



Measuring What Matters for Child Well-being and Policies



Measuring What Matters for Child Well-being and Policies

This work is published under the responsibility of the Secretary-General of the OECD. The opinions expressed and arguments employed herein do not necessarily reflect the official views of OECD member countries.

This document, as well as any data and map included herein, are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

Note by Turkey

The information in this document with reference to “Cyprus” relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the “Cyprus issue”.

Note by all the European Union Member States of the OECD and the European Union

The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

Please cite this publication as:

OECD (2021), *Measuring What Matters for Child Well-being and Policies*, OECD Publishing, Paris,
<https://doi.org/10.1787/e82fded1-en>.

ISBN 978-92-64-92443-7 (print)

ISBN 978-92-64-58353-5 (pdf)

Photo credits: Cover Illustration © Nicolas Guichard.

Corrigenda to publications may be found on line at: www.oecd.org/about/publishing/corrigenda.htm.

© OECD 2021

The use of this work, whether digital or print, is governed by the Terms and Conditions to be found at <http://www.oecd.org/termsandconditions>.

Foreword

Overwhelming evidence attests to the importance of our well-being as children in shaping who we are and what we can become when we grow older. Child well-being leaves its impression on well-being at every point in life. It manifests itself in our health, our job opportunities, our family life and our relationships. Child well-being policies, from family supports and early childhood education and care and to housing, schooling, health services, and culture and leisure facilities can have important effects on children's opportunities to flourish and grow. They can help level the playing field and ensure that all children – regardless of background and life circumstances – can develop to their full potential and enjoy the good things in life

Countries will confront difficult challenges as they begin to recover from the COVID-19 pandemic. Since the beginning of this global crisis, the OECD has stressed the need for countries to quickly take measures to minimise risks to children's well-being and provide assistance and support to the most vulnerable. Looking forward, to set up our future generation of adults to prosper and flourish in the midst of the challenges that may lie ahead, promoting child well-being should sit at the heart of countries' post COVID-19 recovery efforts.

This report builds on a long history of OECD work on child well-being. Important milestones include the publication of the 2009 flagship report *Doing Better for Children*, a dedicated chapter on child well-being in *OECD How's Life? 2015*, the *PISA 2015* and *PISA 2018* reports on *Students' Well-Being*, and the 2019 report *Changing the Odds for Vulnerable Children: Building Opportunities and Resilience*. In 2017, the Organisation established the *OECD Child Well-being Data Portal* – a hub for cross-national data on child well-being and the settings in which children grow up. Most recently, over the past few years, the OECD has established several new and important international surveys – including the *OECD International Early Learning and Child Well-being Study* and the *OECD Study on Social and Emotional Skills* – that seek to collect data on the well-being of children at various points in childhood.

This report goes one step further by pushing forward the child data agenda and laying the groundwork for better child data infrastructures. It develops a new conceptual framework for measuring child well-being, identifies key gaps in child data, and outlines priorities for child data development. The over-arching aim is not just to motivate improvements in child well-being data in and of itself, but also to build better and more useful data to inform the development of better child well-being policies. The report and its lessons form a key pillar of the OECD's ongoing efforts to improve the availability of international child data, including the development of a key indicator dashboard to monitor child well-being, and to assist countries in measuring better what matters most in children's lives.

This report was prepared by the OECD Centre on Well-Being, Inclusion, Sustainability and Equal Opportunity (WISE Centre) with contributions from the OECD Directorate for Employment, Labour and Social Affairs (ELS). It was developed under the leadership of Romina Boarini (Director of OECD WISE Centre) and the supervision of Olivier Thévenon (Head of the Child Well-Being Unit, OECD WISE Centre), Willem Adema (Social Policy Division, ELS) and Monika Queisser (Head of Social Policy Division & Senior Counsellor, ELS) are kindly acknowledged for providing inputs and comments at the early stage of the process.

The report was written by Olivier Thévenon (lead author), Chris Clarke and Gráinne Dirwan (OECD WISE Centre), and Jonas Fluchtmann (OECD ELS). Anne-Lise Faron, OECD WISE Publications and Event Coordinator, prepared the manuscript for publication. Julia Carro, OECD WISE Centre, and Martine Zaida, OECD WISE Communications, Partnership and Forum Manager, provided support and advice on communication aspects.

The report benefited from comments and feedback by Richie Poulton (Chief Science Advisor to the New Zealand Minister for Child Poverty Reduction), Nichola Shackleton and Debra Small (New Zealand Social Wellbeing Agency), Michele Cecchini, Emily Hewlett, Gaetan Lafortune and Michael Müller (Health Division, OECD ELS), Willem Adema (Social Policy Division, OECD ELS), Tracey Burns, Francesca Gottschalk, Rowena Phair and Mario Piacentini (OECD Directorate for Education and Skills), and Romina Boarini, Carrie Exton and Lara Fleischer (OECD WISE Centre). The authors are grateful to the members of the OECD Working Party on Social Policy for the many comments and suggestions made on an earlier version of the report.

The OECD gratefully acknowledges financial support provided by New Zealand for the preparation of this report.

Table of contents

Foreword	3
Executive summary	8
1. Overview and summary	10
1.1. Introduction	11
1.2. Child well-being measurement in OECD countries	12
1.3. An “aspirational” framework for child well-being measurement	16
1.4. An overview of key priorities and gaps in cross-national child data	19
1.5. The agenda ahead for child data	24
References	26
Annex 1.A. Summary of dimensions and indicators included in national and cross-national child well-being measurement initiatives	30
Notes	33
2. Measuring what matters most for children	34
2.1. Introduction and main findings	35
2.2. What does child well-being mean? Conceptual foundations for child well-being measurement	37
2.3. A conceptual framework for measuring child well-being	50
References	60
3. Do children have the things they need?	72
3.1. Introduction and main findings	73
3.2. Key child material outcomes	74
3.3. Key aspects of children’s settings and environments for child material outcomes	80
3.4. Key public policies for child material outcomes	85
3.5. Data on children’s economic and material well-being	88
3.6. The way forward	95
References	98
Annex 3.A. Overview of available and comparable cross-national data on children’s economic and material well-being	110
4. Are children active and physically healthy?	114
4.1. Introduction and main findings	115
4.2. Physical health as a key driver of well-being across childhood	116
4.3. Physical health outcomes	121
4.4. Health behaviours	125
4.5. Environment and public policies	128

4.6. Overview of data availability	132
4.7. The way forward	138
References	143
Annex 4.A. Details on data availability	166
5. Do children feel safe and secure, respected, included and happy?	182
5.1. Introduction and main findings	183
5.2. Key aspects of social and emotional well-being	186
5.3. Key influences on children's social and emotional outcomes	203
5.4. Overview of data availability	208
5.5. The way forward	210
References	218
Annex 5.A. The Big Five domains of social-emotional development	240
Annex 5.B. Overview of data on children's social and emotional well-being	242
6. Are children learning and achieving in education?	250
6.1. Introduction and main findings	251
6.2. An overview of cognitive development and educational attainment	252
6.3. Cognitive development and educational progression and attainment	255
6.4. Key influences on children's cognitive development and education outcomes	260
6.5. Overview of data availability	265
6.6. The way forward	272
References	276
Annex 6.A. Details on data availability	290

FIGURES

Figure 1.1. The OECD Well-being Framework	14
Figure 1.2. The aspirational child well-being measurement framework	17
Figure 2.1. Summarised conceptual framework for child well-being measurement	37
Figure 2.2. The conceptual framework for child well-being measurement	51
Figure 2.3. Correspondence between levels and areas of the conceptual framework for child well-being measurement and dimensions of the OECD Well-being Framework	57
Figure 4.1. Channels through which policies impact child health	120
Annex Figure 4.A.1. Infant mortality rates	168
Annex Figure 4.A.2. Low birth weight	169
Annex Figure 4.A.3. Children deprived of basic nutrition	174
Annex Figure 4.A.4. Vaccination rates	175
Annex Figure 4.A.5. Adolescents doing no exercise	176
Annex Figure 5.A.1. The Big Five Domains of social-emotional development	241

TABLES

Table 1.1. Selected national and cross-national child well-being frameworks, initiatives and indicator sets	15
Table 3.1. Key aspects of children's economic and material well-being	76
Table 4.1. Key aspects of children's physical health throughout childhood	117
Table 4.2. Top 5 most significant child morbidities in the OECD	124
Table 4.3. Overview of available data sources	133
Table 5.1. Key aspects of children's social and emotional well-being throughout childhood	189
Table 5.2. Overview of available data sources	209

Table 6.1. Key aspects of children’s cognitive development and educational well-being throughout childhood	254
Table 6.2. Overview of available data sources	266
Annex Table 1.A.1. Summary of dimensions and indicators included in national and cross-national child well-being measurement initiatives	30
Annex Table 3.A.1. Overview of available and comparable cross-national data on children's economic and material well-being	110
Annex Table 4.A.1. Data on physical health outcomes and key pre-natal determinants	170
Annex Table 4.A.2. Child health behaviours and other health activities	177
Annex Table 4.A.3. Data on environments and public policies	179
Annex Table 5.B.1. International data on adolescents’ social and emotional well-being	245
Annex Table 5.B.2. International data on middle-aged children’s social and emotional well-being	248
Annex Table 6.A.1. Data on cognitive development and educational achievements	290
Annex Table 6.A.2. Data on educational attitudes and aspirations	291
Annex Table 6.A.3. Data on the student’s environment	292

Follow OECD Publications on:



http://twitter.com/OECD_Pubs



<http://www.facebook.com/OECDPublications>



<http://www.linkedin.com/groups/OECD-Publications-4645871>



<http://www.youtube.com/oecdilibrary>



<http://www.oecd.org/oeccdirect/>

Executive summary

To design, implement and monitor effective child well-being policies, policy-makers need data that capture what is going on in children's lives, that measure what is important to them, and that can detect emerging problems and vulnerabilities before they take hold.

In recent decades, great strides have been made in measuring child well-being and understanding the richness of children's lives and experiences. National statistical offices, international organisations and academic researchers alike have engaged in a range of activities aimed at developing better data. At the cross-national level, international instruments like the *Children's Worlds* survey, the *Health Behaviour in School-Aged Children* (HBSC) survey, and the OECD *Programme for International Student Assessment* (PISA) have helped advance what we know and understand about children at different points in childhood in a range of areas. At the national level, in many countries, a growing number of country-specific surveys and datasets have greatly expanded the evidence base on child well-being. Yet despite these efforts, most OECD countries do not have good data to base their child well-being policies on, nor strong data infrastructures for policy monitoring.

Measuring What Matters for Child Well-being and Policies aims to push forward the child data agenda to inform the development of better child well-being policies. It lays the groundwork for improvements in child well-being measurement. It outlines a new “aspirational” conceptual framework for child well-being measurement, setting out which aspects of children's lives should be measured in order to best monitor child well-being. It also outlines priorities for child data development and identifies key data gaps, all with a view of motivating improvements in child data infrastructures.

An “aspirational” conceptual framework for child well-being measurement

The conceptual framework has its roots in the understanding that children should be able to both enjoy a “good” childhood in the here and now, and have the opportunity to develop skills and abilities that allow them to prepare for the future. It is “aspirational” in the sense that it is not guided by immediate data availability considerations, but instead by research findings on the key aspects of well-being that matter for children and for supporting their full development.

The framework seeks to overcome a common shortcoming in child well-being measurement: treating the different dimensions of child well-being – material well-being, physical health, social, emotional and cultural well-being, and cognitive development and educational well-being – as if they are separate or independent from one another. Well-being needs to be understood as a whole because its dimensions develop alongside one another.

The framework innovates on child well-being measurement in several ways. First, its multi-level structure helps clarify the importance of children's environments, relationship, and other potential influences, emphasising that these potential drivers of well-being are distinct from outcomes. Second, it pays greater attention to ways in which the things that children want, need and should be able to do change through childhood. Finally, it looks to reinforce efforts to integrate children's own thoughts, views and perspectives across layers of child well-being measurement.

Some areas of children’s lives are measured better than others...

As a whole, comparable cross-national data on child well-being is scant and limited in scope. However, comparable data on children’s cognitive development and learning outcomes, for example, is relatively widely available – especially with respect to the traditional core areas of reading, maths and science – as is information on adolescent health and physical well-being. Children’s social and emotional well-being is less well covered, in part due to the lack of a consistent conceptual and statistical framework. Comparable information on children’s material living standards is also relatively scarce, especially for many OECD countries outside Europe. There is also a general lack of comparable cross-national data on children’s well-being during early childhood.

...while the most marginalised are often poorly covered by existing child data

Even though cross-national surveys generally strive to cover populations as comprehensively as possible, those in the most vulnerable or marginalised positions – such as children with disabilities, children experiencing maltreatment and children in out-of-home settings – are frequently either not easily identifiable or missing entirely in the data. As a result, comparable cross-national information on the well-being outcomes of these children is often lacking. Greater efforts are required to better document well-being outcomes of marginalised child populations.

...and children’s views and perspectives are not always well reflected

While innovative instruments like the *Children’s Worlds* survey go a long way towards ensuring children’s perspectives are better reflected, there are still many gaps in the availability of cross-national data that capture children’s thoughts and views about their own lives. For example, there is limited cross-national information available on adolescents’ views on several important areas, including their own material and social and emotional well-being. There also is a lack of data on children and adolescents’ “social capital”, including on perceptions and confidence in their social and cultural identities, their participation in group activities, their trust in institutions, and their knowledge of global and societal issues.

...nor is the inter-connected nature of child well-being well captured

Existing cross-national child data are not well suited to the inter-connected nature of child well-being. Cross-national child data, to the extent that they are available, typically come from a range of separate and disconnected surveys and datasets, each with their own particular focus. While understandable from a survey management perspective, the limited scope of child surveys makes it difficult to track the many linkages across areas of child well-being and examine how outcomes in areas (e.g. physical health) affect well-being in others (e.g. cognitive and socio-emotional well-being).

Working together to improve cross-national child data infrastructure

Further improvement of cross-national child data infrastructure will require significant investment. The key to progress here is the synchronisation of efforts by the many actors in field, from governments and international organisations to the wider international statistical and policy communities. Collecting comparable data requires either widespread support for international data collections, or a strong degree of co-operation to promote the harmonisation of national surveys and datasets. Countries and the wider community can also assist one another through knowledge sharing and the exchange of good and innovative child data collection practices.

1. Overview and summary

This chapter provides an overview of the report and a summary of its main findings and conclusions. The chapter begins with an outline of child well-being measurement initiatives in OECD countries, highlighting common features and principal differences. It provides a concise overview of the “aspirational” framework for child well-being measurement developed in detail in later chapters, and a summary of the key priorities and gaps in cross-national child data under each of the well-being domains – economic and material, physical health, social and emotional, and cognitive and educational – considered in the report.

1.1. Introduction

Children have a right to well-being. Just like everyone else, their current quality of life is important in itself. Children have a right to feel loved, valued, supported and cared for; they have a right to the best possible health, to the best possible education, and to an enjoyable childhood, today, in the here and now. But childhood is also a critical time for growth and development, and the things that children do, learn, feel and experience matter, for today but also for their futures. Childhood living conditions and the ways children develop leave deep impressions that can affect their lives for years to come. Overwhelming evidence attests to the importance of children’s well-being in shaping who they are, how they behave, and what they do when they grow up.

OECD governments are increasingly recognising the critical importance of childhood and child well-being. Over the past few decades, a number of governments have established cross-cutting national policy strategies and frameworks aimed at promoting child well-being and offering children the best possible start in life. These include Ireland’s *Better Outcomes, Brighter Futures* framework (DCYA, 2014^[11]), New Zealand’s *Child and Youth Wellbeing Strategy* (DPMC, 2019^[21]) and, most recently, Finland’s *National Child Strategy* (STM, 2021^[31]).

Good child policy needs good child data. Child well-being policy development requires deep and sound information on a range of areas, including children’s material living standards, their physical and mental health, their social lives, and their learning and education. Data on the settings and environments in which children live their lives – their families, their schools, their communities and their neighbourhoods – are important too, as there is increasing evidence on the importance of children’s environments for their outcomes, especially for those growing up in the most vulnerable families and communities (OECD, 2019^[41]). In recent decades, national statistical offices, international organisations and academic researchers alike have engaged in a range of activities aimed at developing better data to better capture children’s lives. At the cross-national level, international instruments like the *Children’s Worlds* survey, the *Health Behaviour in School-Aged Children* (HBSC) survey, and the *OECD Programme for International Student Assessment* (PISA) have helped push forward what we know and understand about children’s lives in a range of areas. At the national level, in many countries, a growing number of country-specific surveys and datasets have helped do something similar.

Still, there is more to do. As discussed throughout this report, there remain a number of important gaps in child data, especially but not only from a cross-national perspective. Some of these gaps are long-standing. The OECD has long highlighted the need for better data on children’s well-being during early childhood (0- to 5-year-olds), for instance, and on the well-being of children in the most vulnerable or marginalised positions (OECD, 2009^[51]; Richardson and Ali, 2014^[61]). Other information gaps are newer, and have been exposed by advances in scientific knowledge on what makes for a good childhood, as well as societal change and developments in the ways that children live their lives. One example is the importance of children’s socio-emotional well-being – both in itself, and for its interactions with other areas of well-being – which is often not well covered in existing data. Data gaps hamper the development of better child policies.

This report aims to push forward the child data agenda. Building on past OECD work on child well-being measurement and data, including *Doing Better for Children* (2009^[51]), *How’s Life for Children* (2015^[71]), and the *OECD Child Well-being Data Portal* (2019^[81]), as well as the Organisation’s experience with well-being measurement more generally (OECD, 2020^[91]), it highlights key gaps in child data, especially from a comparative cross-national perspective, and outlines priorities for the improvement of child data infrastructures. The over-arching objective is not just to motivate improvements in child well-being measurement in and of itself, but also to build better data to inform the development of better child well-being policies.

The report assesses and reviews the current state and availability of cross-national data on child well-being. To provide the basis and structure for the assessment, it starts in Chapter 2 by outlining a new “aspirational” framework for child well-being measurement. Using an in-depth review of research evidence on child well-being and development as its starting point, this framework sets out which aspects of children’s lives *should* be measured in order to best monitor child well-being, and in what way. It is “aspirational” in the sense that it is not guided by immediate data availability considerations, but instead by research findings. The framework also provides a data “roadmap” that can be used both to improve the use of existing child data and, in the longer term, to guide better data collection and motivate improvements in child data infrastructures.

Guided by this conceptual framework, subsequent chapters (Chapters 3-6) examine and assess cross-national data in different domains of child well-being. They identify areas where existing cross-national data are limited or lacking, and highlight priority areas for better data collection. Chapter 3 (“*Do children have the things they need?*”) concentrates on children’s economic and material well-being. Chapter 4 (“*Are children active and physically healthy?*”) looks into data on children’s physical health and well-being. Chapter 5 (“*Do children feel safe and secure, respected, included and happy?*”) focuses on children’s social, emotional and cultural well-being. Chapter 6 (“*Are children learning and achieving in education?*”) covers children’s education, learning and cognitive well-being. In each case, the chapters start with a review of the research evidence on what matters most for the given domain of child well-being, before turning to discuss data availability, data gaps, and data priorities.

Overall, the report finds that comparable cross-national data on child well-being remains scant and limited in scope. While the availability of cross-national child data has improved considerably in recent decades, there are still many areas of children’s lives that are not covered well or, in some cases, at all by existing cross-national data. Furthermore, age group and country coverage remains an issue, while some children, often those in the most vulnerable positions, are frequently missing or not easily identifiable in the data. There is, in general, a need for co-ordinated action from governments, international organisations, and the wider community to improve the availability of cross-national child data. This is a sizable task. It will require both significant investment and medium- to long-term commitment from all actors involved.

1.2. Child well-being measurement in OECD countries

Well-being is a multifaceted phenomenon that requires a diversified set of measures. Measuring the well-being of *children* requires an even larger set of measures that capture not just how children are doing, but also how they’re developing. Children’s well-being is also tightly related to and embedded in their environment. Especially in early childhood, children’s well-being depends heavily on their parents or carers. More so than for adults, it is difficult to get a full picture of children’s well-being without taking their family, school, community, neighbourhood and policy environment into account.

In the wider well-being field, many OECD countries have in recent decades developed well-being frameworks, dashboards, and indicator sets to help formalise and improve the measurement of well-being (Exton and Shinwell, 2018^[10]; OECD, 2011^[11]; OECD, 2020^[9]). Building on decades of international work on measuring societal progress beyond GDP, in 2011, the OECD established a framework for measuring well-being (Box 1.1). The framework stands at the centre of the Organisation’s well-being monitoring activities and informs monitoring efforts in a large majority of OECD members. While national well-being initiatives come with country-specific features, they have a lot in common, providing a holistic picture of well-being along a range of similar dimensions, as well as a focus on both distributional and sustainability aspects.

Well-being measurement initiatives have helped push forward the well-being agenda in several ways (Durand and Exton, 2019^[12]). By fostering a more comprehensive approach to measurement, they have helped draw attention to important aspects of people’s lives – for example, subjective well-being – that

were often neglected in standard analyses. In several OECD countries, they have been integrated systematically into the policy making process. To varying extents, they have been used in agenda setting, in policy formulation, and in policy evaluation (Exton and Shinwell, 2018^[10]). In some countries, well-being metrics are used by government to help set policy priorities and inform budget allocations (Durand and Exton, 2019^[12]).

In an effort to improve the measurement of children’s well-being, a smaller but growing number of OECD countries have in recent years developed child-specific well-being measurement activities (Table 1.1). In some cases, these activities are explicitly tied to and motivated by policy initiatives to enhance child well-being. Both Ireland (BOBF) and New Zealand, for example, have established measurement activities as part of (and in support of) their wider whole-of-government child strategies. In both, the measurement activities are closely aligned with and informed by the objectives of the wider strategy. In others (e.g. Australia, Ireland (NSCWBI), the United Kingdom, the United States), the frameworks have been developed as part of initiatives to improve monitoring more generally and are not directly tied to specific policy activities.

International organisations have also developed child well-being frameworks and initiatives applicable at the cross-national level (Table 1.1). UNICEF was an early mover in this area, establishing through its Innocenti Research Centre *Report Card* series an influential approach to cross-national child well-being comparisons. The OECD has also played a central role. Its initial child well-being measurement framework, introduced in *Doing Better for Children* (2009^[5]), focused heavily on key child outcomes across six dimensions: material well-being; housing and environment; education; health; risk behaviours; and quality of school life. This framework was later revised (in 2015) to increase consistency with the OECD’s wider Well-Being Framework (see Box 1.1).

These national and international initiatives are underpinned by a relatively common understanding of child well-being. All adopt a multi-dimensional approach and use multiple indicators to capture children’s well-being. Several use a combination of objective and subjective measures, with some (e.g. New Zealand, the United Kingdom) putting particularly strong emphasis on making sure that children’s own thoughts and views are well heard. Several national initiatives (e.g. Ireland (NSCWBI), Finland, New Zealand, the United Kingdom) also ran child consultations at the design stage, with a view to ensuring the aspects covered and measures used are meaningful to children themselves.

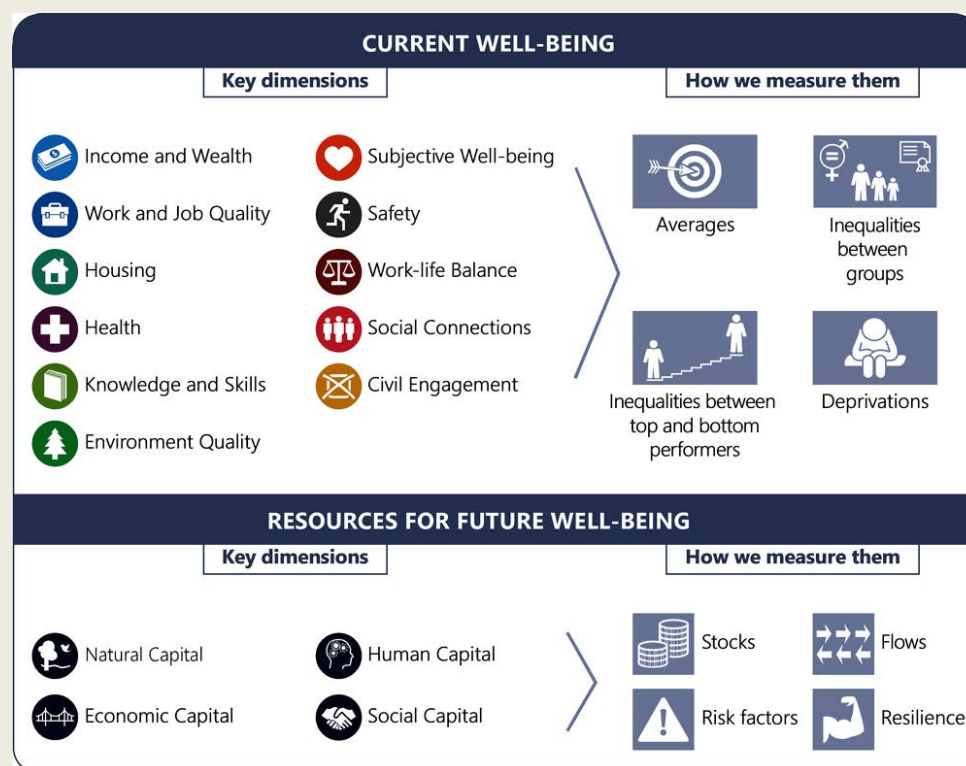
While focusing largely on outcomes, several of the initiatives (e.g. Australia, New Zealand, UNICEF) emphasise that children’s well-being is embedded in their family, social, community and physical environments (UNICEF, 2020^[13]); they recognise that children’s outcomes are influenced by and interwoven with different levels of (inter-connected) social influence, and stress the importance of children’s connections and relationships with their environment(s). The need to pay attention to child-environment relational quality is emphasised, for instance, in the framework that underpins New Zealand’s *Child and Youth Well-Being Strategy* that was set in 2019 to guide child well-being policies and data collection (DPMC, 2019^[2]; DPMC, 2021^[14]). This notion is also central to the “multi-level” framework adopted in UNICEF’s most recent *Report Card*, which specifies various levels of influences stretching from children’s activities and behaviours to the wider policy and country context (UNICEF, 2020^[13]).

Box 1.1. The OECD Well-being Framework

The OECD Well-being Framework (Figure 1.1) guides both the OECD’s statistical reporting on well-being across member and partner countries, and its work on the well-being from a policy perspective. There are two central pillars: *current well-being*, which addresses living conditions here and now, as well as inequalities in their distribution; and *resources for future well-being*, which considers the stocks, flows, risk and resilience factors that shape well-being over time and for future generations (OECD, 2020^[9]).

Current well-being comprises of 11 dimensions. These relate to material conditions that shape people’s economic options (Income and Wealth, Housing, Work and Job Quality) and quality-of-life factors that encompass how well people are (and how well they feel they are), what they know and can do, and how healthy and safe their places of living are (Health, Knowledge and Skills, Environmental Quality, Subjective Well-being, Safety). Quality of life also encompasses how connected and engaged people are, and how and with whom they spend their time (Work-Life Balance, Social Connections, Civic Engagement).

Figure 1.1. The OECD Well-being Framework



Source: (OECD, 2020^[9]), *How's Life? 2020: Measuring Well-being*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9870c393-en>.

As national averages often mask large inequalities in how different groups of the populations are doing, the distribution of current well-being is taken into account by looking at inequalities across population groups (i.e. horizontal inequalities); gaps between those at the top and the bottom of the achievement scale in each dimension (i.e. vertical inequalities); and deprivations(i.e. the share of the population falling below a given threshold of achievement, such as a minimum level of skills or health).

The systemic resources that underpin future well-being over time are expressed in terms of four types of capital, i.e. stocks that endure over time but are also affected by decisions taken (or not taken) today. *Economic Capital* includes both man-made and financial assets; *Natural Capital* encompasses natural assets (e.g. stocks of natural resources, land cover, species biodiversity), as well as ecosystems and their services (e.g. oceans, forests, soil and the atmosphere); *Human Capital* refers to the skills and future health of individuals; and *Social Capital* refers to the social norms, shared values and institutional arrangements that foster co-operation.

With respect to thematic coverage, children's physical health outcomes and education and learning outcomes feature in all the initiatives, while (aspects of) children's material well-being and their social and emotional are included in many (Annex Table 1.A.1). There are, however, some differences across the initiatives. For example, only a few of the national initiatives (e.g. Ireland (NSCWBI), Ireland (BOBF), the United Kingdom) include measures of children's life satisfaction and overall subjective well-being, and only a minority of all initiatives (Australia (KNICHDW), Ireland (BOBF), New Zealand) cover aspects relating to children's identities, social identities and broader social needs.

One area where initiatives differ considerably is in the treatment and coverage of environmental factors and other potential influences on outcomes. While family income (or related measures) and certain aspects of children's behaviours (especially children's health behaviours) along with various other aspects of children's home and family environment (e.g. family work status) are covered in many of the initiatives (Annex Table 1.A.1), coverage of other environmental factors, e.g. children's school and ECEC environment and the wider community and physical environment, is inconsistent across initiatives. UNICEF's latest *Report Card (2020)*^[13] has made a significant contribution in this area by placing greater emphasis on children's relational, community and household resources.

Table 1.1. Selected national and cross-national child well-being frameworks, initiatives and indicator sets

Country	Measurement initiative/activity	Lead body	Linked policy strategy	Year	Dimensions	Indicators
National child well-being measurement activities						
United States	America's Children: Key National Indicators of Well-being	Federal Interagency Forum on Child and Family Statistics	-	1997-	7	41
Ireland (NSCWBI)	State of the Nation's Children/National Set of Child Well-Being Indicators	Irish Department of Children, Equality, Disability, Integration and Youth	-	2005/2006-	6	61
Australia (CHI)	Children's Headline Indicators	Australian Institute of Health and Welfare	-	2008/2009-	3	19
Australia (KNICHDW)	Australia's Children/Key National Indicators for Child Health, Development and Wellbeing	Australian Institute of Health and Welfare	-	2008/2009-	7	40
United Kingdom	Children's Well-being Measures	United Kingdom Office for National Statistics	-	2014-	7	31
Ireland (BOBF)	Better Outcomes Brighter Futures Indicator Set	Irish Department of Children, Equality, Disability, Integration and Youth	Better Outcomes, Brighter Futures: The National Policy Framework for Children and Young People	2017-2020	5	100+
New Zealand	Child and Youth Wellbeing	New Zealand	Child and Youth	2019-	6	36

Country	Measurement initiative/activity	Lead body	Linked policy strategy	Year	Dimensions	Indicators
	Indicators	Department of the Prime Minister and Cabinet	Wellbeing Strategy			
Finland	-	Finland Prime Ministers' Office and Ministry of Social Affairs and Health	National Child Strategy	2021	10	-
Cross-national child well-being measurement activities						
Cross-national	Child Poverty in Perspective: An overview of child well-being in rich countries	UNICEF (CPIP)	-	2007	6	40
Cross-national	Doing Better for Children	OECD (DBFC)	-	2009	6	21
Cross-national	How is Life for Children?	OECD (HILFC)	-	2015	10	28
Cross-national	Worlds of Influence: Understanding What Shapes Child Well-being in Rich Countries	UNICEF (WOI)	-	2020	7	31

Note: Finland's National Child Strategy was published in February 2021, with the associated measurement and implementation plan to be released in summer 2021. For more information, see www.lapsenoikeudet.fi.

Sources: (UNICEF, 2007^[15]), "Child poverty in perspective: An overview of child well-being in rich countries", Innocenti Report Card 7, UNICEF Innocenti Research Centre, Florence, <https://www.unicef-irc.org/publications/445-child-poverty-in-perspective-an-overview-of-child-well-being-in-rich-countries.html>; (OECD, 2009^[5]), *Doing Better for Children*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264059344-en>; (OECD, 2015^[7]), *How's Life? 2015: Measuring Well-being*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/how-life-2015-en>; (DCYA, 2017^[16]), *An Indicator Set for Better Outcomes, Brighter Futures*, Department of Children and Youth Affairs, Dublin, <https://www.gov.ie/pdf/?file=https://assets.gov.ie/27126/9b1f25ec7da348e6921373e7e91e1ae3.pdf#page=1>; (AIHW, 2018^[17]), *Children's Headline Indicators*, Australian Institute of Health and Welfare, Canberra, <https://www.aihw.gov.au/reports/children-youth/childrens-headline-indicators/contents/overview>; (ONS, 2018^[18]), *Children's Well-Being Measures*, Office for National Statistics, <https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/datasets/childrenswellbeingmeasures>; (ChildStats, 2019^[19]), *America's Children: Key National Indicators of Well-Being*, Federal Interagency Forum on Child and Family Statistics, <https://www.childstats.gov/americaschildren19/>; (AIHW, 2020^[20]), *Australia's Children*, Australian Institute of Health and Welfare, Canberra, <https://www.aihw.gov.au/reports/children-youth/australias-children/contents/executive-summary>; (DCEDIY, 2021^[21]), *State of the Nation's Children*, Department of Children, Equality, Disability, Integration and Youth, <https://www.gov.ie/en/campaigns/1f703-state-of-the-nations-children/>; (STM, 2021^[3]), *National Child Strategy*, Finland Ministry of Social Affairs and Health, <https://www.lapsenoikeudet.fi/en/campaign/national-strategy-for-children/>; (DPMC, 2021^[14]), *Child and Youth Wellbeing Strategy: Annual Report for the Year Ending 30 June 2020*, New Zealand Department of the Prime Minister and Cabinet (DPMC), https://childyouthwellbeing.govt.nz/sites/default/files/2021-05/4380671_FINAL%20Annual%20Report%2020210506_1.PDF.

1.3. An “aspirational” framework for child well-being measurement

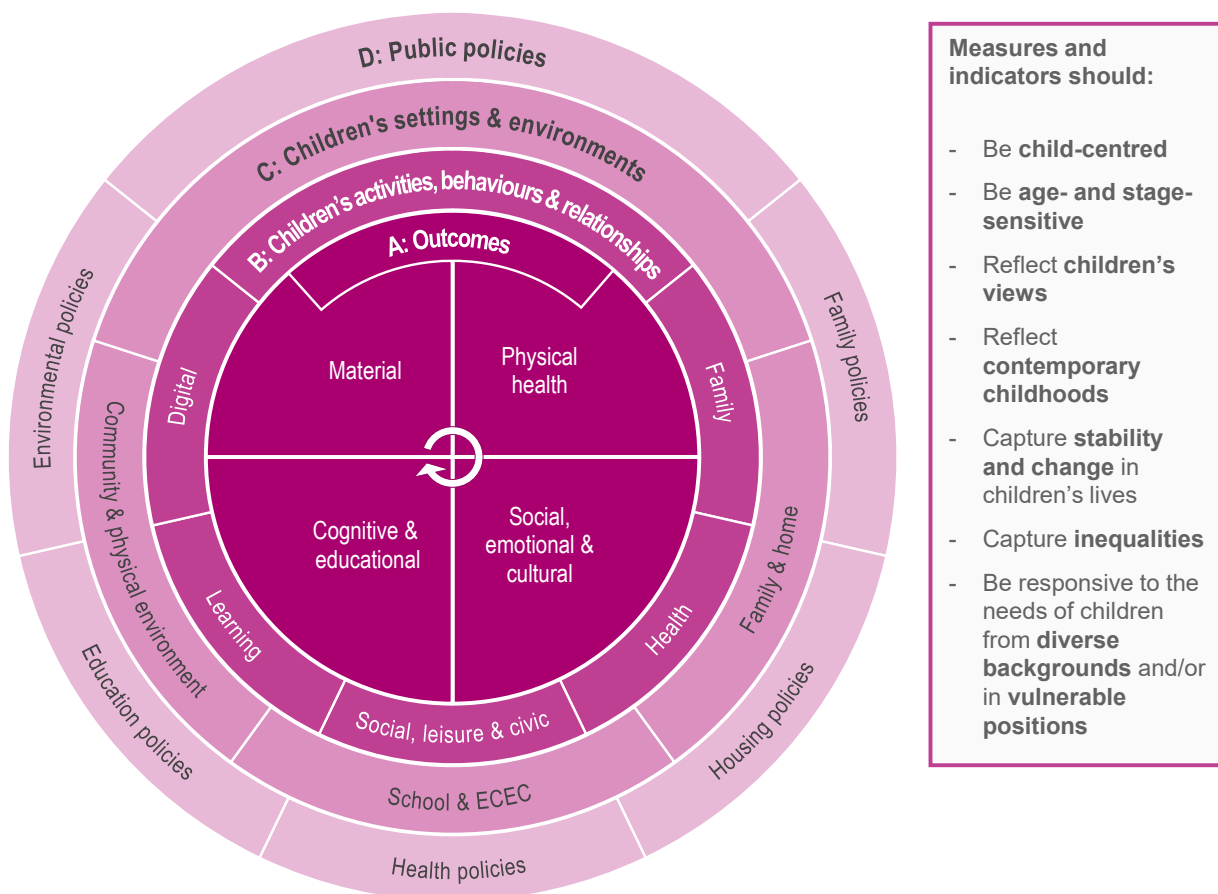
Chapter 2 of this report sets out an “aspirational” conceptual framework for measuring child well-being. Grounded in an in-depth review of the child well-being literature, the framework builds on and extends the OECD’s existing approach to child well-being measurement. It provides a renewed structure and set of guidelines detailing what aspects of children’s lives need to be measured, and how, in order to fully monitor child well-being and its determinants. It is “aspirational” in the sense that it is not constrained by immediate data availability concerns; rather, it sets out how child well-being should ideally be measured according to the research, and can serve as a medium- to long-term “roadmap” for the improvement of child well-being data collections.

The starting point for the framework is a concept of child well-being that is multi-dimensional (encompassing a range of aspects of children’s lives) and forward-looking. Similar to much of the OECD’s past work on child well-being measurement, the framework has its roots in the idea that children should be able to both enjoy a “good” positive childhood in the here-and-now, and have the opportunity to develop

skills and abilities that set them up well for the future. Child development – and the changing nature of what is needed for development as children grow up – feature heavily, alongside other measures of children’s quality of life.

Reflecting increasing recognition in child well-being research of the importance of the environments and settings in which children grow up, the framework adopts a multi-level or “ecological” structure, covering both child well-being outcomes and potential drivers and influences (Bronfenbrenner, 1979^[22]; 1989^[23]; Minkinen, 2013^[24]). This in line with several recent child well-being measurement initiatives, including the approach developed by UNICEF mentioned above (UNICEF, 2020^[13]). Children’s well-being outcomes are at the centre of the framework (Level A), surrounded by a series of drivers and influences (Figure 1.2). Level B covers child-level influences: the things that children do or are engaged in that can contribute to their well-being outcomes, including their activities, attitudes, behaviours, and relationships. Level C covers environment-level influences: aspects of children’s settings and environments that can impact well-being, either directly or indirectly, for example by shaping opportunities and influencing attitudes and behaviours. This includes children’s family and home environments, the environments they face at school or in childcare, and their wider physical and community environments. Level D covers child-relevant public policies, such as public family and housing policies and public health policies.¹

Figure 1.2. The aspirational child well-being measurement framework



In terms of thematic content, the framework focuses on child well-being outcomes in four core areas, which are inter-connected and frequently interact with one another (see Box 1.2):

- *Material* outcomes, which covers children's access to material resources, including essential or important goods, services and activities. This includes their access to basic necessities like food, clothing and housing, but also other material goods and activities (e.g. a computer and the internet) that are important for children growing up in OECD countries today.
- *Physical health* outcomes, which covers children's physical health status and physical development. In broad terms, this area covers outcomes relating to whether children are healthy, free from illness, injury and disease, and developing and functioning well physically, given their circumstances.
- *Social, emotional and cultural* outcomes, which covers outcomes relating to children's behaviours, emotions, and thoughts and feelings towards themselves and others, as well as related outcomes tied to social and cultural identities. This area covers many of the more "subjective" aspects of children's well-being, ranging from basic emotional security and children's sense of safety, to their sense of identity and social identity (including sexual, gender and cultural identities), their sense of belonging, and their over-arching life satisfaction. It also covers children's socio-emotional skills, mental health status, and psychological well-being.
- *Cognitive development and education* outcomes, which covers outcomes relating to children's learning, knowledge, and cognitive skill and ability development. This area includes measures of children's cognitive development as well as their progression through the education system, their educational attainment, and their satisfaction with what they learn.

Other key features of the framework include:

- A requirement that measurement is *sensitive to children's age* (or stage of development), with age- (or stage-) appropriate (variations in) in concepts and measures used where relevant.
- An emphasis on *children's own voices*, and a belief that children's views and perspectives should be reflected throughout the measurement process wherever possible, including in both the indicators design and selection stage (in order to reflect what matters most to children themselves), and in the measures themselves, through the use self-report and subjective child data.
- A requirement that measures capture not just average levels of well-being but also the *distribution of well-being across children*, including through measures that reflect inequalities and disparities across different groups of children (e.g. by sex, by living arrangement, and by migrant background). Wherever possible, measures should also be flexible and responsive to the needs and challenges faced by children from diverse backgrounds and in different or vulnerable positions (e.g. children with disabilities, children in out-of-home care, children experiencing maltreatment).

This framework innovates on child well-being measurement in several ways. First, its multi-level structure acknowledges and helps clarify the importance of children's activities, relationships, environments, and other potential influences of child well-being, emphasising that these potential drivers are distinct from (though often have an important role to play in) children's well-being outcomes. Second, through the emphasis it places on age-sensitive concepts and measures, it pays greater attention to the ways that the things children need, want and should be able to do change through childhood. Finally, through the weight placed on children's voices, it looks to reinforce efforts to ensure that children's own thoughts, views and perspectives across all stages of child well-being measurement. Later chapters in this report develop this approach further by reviewing and identifying the key mechanisms and specific factors that impact children's current and future outcomes.

Box 1.2. The inter-connected nature of child well-being

Most research into children’s lives and child well-being focuses on a specific outcome or aspect of well-being. While this kind of focused approach helps researchers produce detailed information on the topic and outcome at hand, one downside is that it risks implying different parts of children’s lives are largely separate or independent from one another.

Different aspects of children’s lives do not function separately; rather they are interconnected and interact all the time (Bronfenbrenner, 1979^[22]). Different areas of well-being depend on one another, with interactions between areas leading to “developmental cascades”, that is, with functioning in one domain influencing functioning in others (Masten and Cicchetti, 2010^[25]; Masten and Tellegen, 2012^[26]). For instance, there is ample evidence pointing out the positive association between emotional regulation in early childhood, early learning, and the quality of friendship and social skills developed in middle and late childhood (Blair et al., 2015^[27]; Ursache, Blair and Raver, 2012^[28]). Conversely, conduct problems in early childhood are found to undermine academic and work success and increase risks of mental distress and of substance use during the adolescence (Otten et al., 2019^[29]; Masten and Tellegen, 2012^[26]). Other examples include links between aspects of children’s physical health and activity and their learning (Sibley and Etnier, 2003^[30]; Zeng et al., 2017^[31]), between areas of socio-emotional well-being and learning (Weber, Wagner and Ruch, 2016^[32]; Lewis et al., 2009^[33]), and between many aspects of children’s of material and economic well-being – including adequate nutrition and shelter – and a range of physical, educational, and socio-emotional outcomes (see Chapters 4-6). The linkages are many, and are complex.

The inter-connected nature of well-being has implications for how we understand and look to improve children’s lives. It means that, in at least some cases, promoting well-being in one area of children’s lives requires the improvement of outcomes in, and/or connections with, other areas. For instance, children’s well-being both at school and in the family requires the development of positive connections between the two. This involves good communication between parents and children, good communication between parents and teachers, and the delivery of appropriate school-based support for children from disadvantaged family backgrounds (Ottova et al., 2012^[34]; OEJA, 2018^[35]). More generally, it underscores the need for policy and policy-makers to look at children and their well-being holistically; to take a rounded view of child well-being, and to consider the potential interactions, trade-offs and knock-on effects of intervening in different areas of children’s lives.

1.4. An overview of key priorities and gaps in cross-national child data

Guided by this conceptual framework, subsequent chapters in this report – Chapters 3, 4, 5 and 6 – discusses the current state and availability of cross-national child data, and how the available data matches up to the identified aspects of child well-being. These chapters highlight priority areas for better data collection, and identify areas where existing cross-national data are limited or lacking.

The sub-sections below summarise the key priorities and data gaps identified in the chapters. Some of these gaps are broad and stretch across many or most aspects of child well-being. Others are more specific and relate to selected areas of well-being, only.

General issues

Children’s material and socio-emotional well-being, and the well-being of younger children generally, are not well covered by existing cross-national child data

Some dimensions of children’s lives are covered better than others by existing cross-national data. Data on children’s cognitive development and educational outcomes, for example, tend to be relatively widely available (Chapter 6). This is especially the case with respect to the traditional core areas of reading, mathematics and science, which, for children in middle childhood and adolescence, are covered comprehensively through the major international student assessments programmes like *Trends in International Mathematics and Science Study* (TIMSS), *Progress in International Reading Literacy Study* (PIRLS), and the *OECD Programme for International Student Assessment* (PISA). Comparable information on adolescent health and physical well-being is also fairly well covered (Chapter 4). For many (but not all) OECD countries, the HBSC survey provides valuable information on a range of health outcomes and behaviours among 11- to 15-year-olds.

But for several other aspects of children’s lives, coverage is incomplete and measures are limited. Children’s social and emotional well-being provides the most acute example (Chapter 5). While certain aspects of socio-emotional well-being are covered in some cross-national child surveys, including those mentioned above, these surveys tend to look at the issue from different angles. In general, measurement is not based on a common understanding of social-emotional development across childhood, leading to a lack of alignment in the dimensions explored. The OECD’s *Study on Social and Emotional Skills* (SSES), which covers students age 10 and 15 years old, goes some way towards tackling this issue. Results from the first round cover 10 cities from across the globe.

Children’s economic and material well-being provides a second example of an area where cross-national data are limited in scope (Chapter 3). For European OECD countries, the *European Union Statistics on Income and Living Conditions* (EU SILC) survey provides valuable comparable information on aspects of children’s material living standards, but these data are not comprehensive. For many OECD countries outside Europe, available instruments are often not directly comparable with those from other countries or have often been designed mostly for other purposes, such as PISA.

There is also a general lack of comparable cross-national data on children’s well-being during early childhood. Most dedicated international child surveys cover children during middle- or, more often, late-childhood, only. Some general-purpose household surveys like EU SILC can provide data on children of all ages, but the information provided, while valuable, is not always child-centred and is limited in breadth and scope. There are, of course, a number of challenges involved with collecting data on young children, especially child-centred and self-reported data (see below). Nonetheless, there are a growing number of techniques available for this purpose. One promising example is the OECD’s *International Early Learning and Child Well-being Study* (IELS), which uses a combination of direct (child-completed) and indirect (adult-completed) methods to collect information on 5-year-old’s early learning and well-being. However, this study is still in its early stages: the first round, run in 2018, covered only three countries (i.e. England (United Kingdom), Estonia and the United States).

Children in the most marginalised positions are often poorly covered

Some children are also better covered than others by existing data. While cross-national surveys generally strive to cover populations as comprehensively as possible, those in the most vulnerable or marginalised positions – such as children with disabilities, children in care institutions, children in homeless families, and children experiencing maltreatment – are frequently either not easily identifiable or missing entirely in the data. As a result, as is stressed across all chapters of this report, comparable cross-national information on the well-being of vulnerable children² is often lacking.

In some cases, at least part of the issue lies in the questions asked in cross-national surveys. Few surveys contain questions about child disability, for example. Another issues lies in survey coverage. Most cover private households only, and exclude people (including children) living in other types of living arrangement, such as children in homeless families and those in care institutions. More generally speaking sample size requirements are insufficient to adequately capture the situation of a group that often makes up a small proportion of the overall child population. Thus, even if vulnerable children were both included and identifiable, too few children would be covered in the absence of specific over-sampling (OECD, 2019^[41]).

Children's views and perspectives are not always well reflected

One major trend in child well-being research in recent decades has been the increased emphasis placed on children's own voices and concerns (Clark et al., 2020^[36]). Experts increasingly see value in listening to children's thoughts and views on (aspects of) their own lives, for multiple reasons. First, children's feelings and perceptions matter for many aspects of their well-being, and often impact behaviours that can shape lifetime well-being. Decisions to improve children's well-being cannot be made without taking account of their worries and concerns, their preferences and aspirations, and also their perceptions and knowledge of the challenges for their well-being now and in the future. There is also growing evidence that, from an early age, children develop a good sense of the economic and social conditions in which they live, which can impact their interactions and engagement with peers and society (Chapter 3). In addition, for some areas of children's well-being, the best or, at times, only way of collecting relevant information is through children themselves. This is largely the case when looking to collect data on children's personal relationships, for instance, or on many aspects of their socio-emotional well-being more generally (Chapter 5).

For a number of OECD countries, the *Children's Worlds* survey, which covers children from age 8 to 12, provides valuable self-reported data covering a range of areas of well-being. This includes their views towards certain aspects of their own material and socio-emotional well-being, including whether they feel listened to and well supported in different areas of life. Several other cross-national child surveys and instruments – including PISA – now ask children questions about their over-arching life satisfaction, as well as questions about a limited number of specific areas of life, such as their learning and educational aspirations.

However, there are still major gaps in the availability of cross-national data covering children's views towards their own lives. For example, there is no real equivalent to *Children's Worlds* for adolescents. As a result, there is a general lack of cross-national information on older children's views of many important aspects of life. There is also little information available on the educational attitudes and aspirations of children in middle childhood, and on children's (of all ages) knowledge of and attitudes towards health issues. Indeed, there is in general a lack of data on children's understandings of how their actions, behaviours, skills, and abilities may (or may not) impact on their well-being, both now and in the future.

There are, of course, challenges involved with producing data that capture children's views. Collecting self-reported data can be more difficult for children than for adults, especially in the case of younger children, who may have more trouble fully expressing themselves. For new-borns and the very youngest, it is impossible. There are also concerns about the general reliability and validity of such data. There are techniques available for overcoming these challenges – including visual methods and vignette or story-based methods – and initiatives like *Children's Worlds* show that, at least for children over a certain age, it is possible to collect this kind of data in a reliable way (Casas, 2017^[37]; Casas and Rees, 2015^[38]; Bradshaw, 2019^[39]). As the OECD recommends for subjective well-being data more generally (OECD, 2013^[40]), subjective and self-report child data can act as valuable complement to (rather than replacement for) other measures of child well-being.

Existing data are not well suited to the inter-connected nature of child well-being

Child well-being, while multi-dimensional, is also complex and inter-connected. Different aspects of children’s lives are intertwined and interlinked (Box 1.2). Various areas of child development, for instance, often depend on each other, with interactions between areas leading to “developmental cascades” from one aspect to another. For example, ample evidence highlights the association between self-regulation in early childhood with children’s learning, and the quality of friendships and social skills developed in middle and late childhood (McClelland and Cameron, 2011^[41]; Trentacosta and Shaw, 2009^[42]). Aspects of children’s environments too, also often overlap and interact. Children’s lives at home can affect their lives at school and in the community, for example, and vice versa.

As stressed throughout this report, most existing child data are not well suited to capturing the interactions between different aspects of child well-being. Cross-national child data, to the extent that they are available, come from a range of separate and disconnected surveys and datasets, each with their own particular focus. The *Health Behaviour in School-Aged Children* survey, for example, concentrates primarily on issues around child health, while cross-national education surveys like TIMSS and PIRLS focuses mostly on schooling and learning. While understandable from a survey management perspective, the limited scope of many child surveys makes it difficult to track linkages across areas and examine how outcomes in some dimensions of children’s lives (e.g. physical health) affect well-being in others (e.g. cognitive and social and emotional well-being).

Overcoming these disconnects is not straightforward. In general, there is a need for better, more comprehensive datasets that allow for the assessment of combinations of outcomes at the individual level. One option is to expand the scope of child surveys, though this can require extensive resources. An alternative is to improve data linking across datasets, including through matching administrative datasets with each other and/or with existing survey data.

Topic-specific gaps in child data

Beyond the above-mentioned cross-cutting considerations, the report highlights priorities for collecting better data in each specific area of child well-being.

With respect to **children’s material well-being**, the conclusions from Chapter 3 highlight the importance of collecting “child-centred” information on material well-being, including on child income poverty and persistent income poverty, on children’s access to basic necessities, and on housing quality and stability. Further steps could be taken to harmonise the information collected, especially on access to adequate food and nutrition, on resources for education and leisure, and on newer deprivation issues gaining increasing attention, such as girls’ inability to afford sanitary products. The chapter also identifies important data gaps, including that:

- Cross-national data on children with complex and/or precarious living arrangements is severely lacking. There is a general lack of detailed information on children’s living arrangements in mainstream surveys, making it difficult to properly establish the material living conditions of children living between two homes, for example, after parental separation or following family reconstitution.
- The measurement of families’ financial resilience needs to be improved. The COVID-19 crisis (and, before it, the financial crisis of 2008) highlighted the need to better understand the capacity of families to cope with sudden income shocks, particularly to better gauge the immediate policy response needed. While existing cross-national data provides information on family income levels, there is far less information available on family wealth, assets, and the ability of families to withstand income shocks.
- As with other areas of child well-being, there is a strong need to better connect data on the many aspects of children’s economic and material well-being both with each other, and with other areas of well-being. This is crucial for better identifying the drivers of child material deprivation, as well

as to measure the extent to which children's economic and material situations is linked to inequalities in other outcomes areas. More connected data requires better data linking and/or new and better survey sources.

Chapter 4 stresses the need for a full and better understanding of the key dimensions of **children's physical health** and the risks that children face from conception onwards. It also emphasises the need for better data on protective and health-enhancing factors and the resources families can use to improve child health resilience, prevent health problems, and foster children's physical development. It identifies several areas where data can be improved, including the need for better data to:

- Capture social gradients affecting child health and better track the formation of health inequalities from the early years, including in the first 1 000 days of life.
- Cover children exposed to high physical health risks, such as child victims of maltreatment.
- Improve information on child health checks and health care service coverage and spending at different stages of childhood.
- Better track the implementation and outcomes of recommendations on child health.
- Track children's exposure to the environmental risks such as unsafe air, contaminated water and food.
- Provide information on children's and parents' knowledge of health issues, the main challenges for current and future health well-being, how they can improve their physical health, and the support they can receive if needs be.
- Develop cross-cutting data to monitor how children's physical health affects other aspects of their well-being, such as cognitive and socio-emotional well-being.

Chapter 5 emphasises that all stages of childhood shape children's social-emotional development, in their own important way, and that children's **social and emotional outcomes** at all ages strongly depend on their social and physical environment. The chapter also identifies a set of priorities for improving data on children's social and emotional well-being, including the need to:

- Bridge the data gap that currently exists on socio and emotional well-being during early- and middle-childhood.
- Develop data on children's perceptions and confidence in their personal, gender, social and cultural identities, their participation in group activities, their trust in institutions, and their knowledge of global and societal issues.
- Develop data on the dimensions of children's social and physical environment that really matter to children. This means asking children which issues are important to them. It also means focusing on children's perceptions with regards to whether they feel listened to or not, and if they feel supported in their different life domains. While sources such as the Children's World's surveys provide valuable cross-national information on some of these areas for children in middle-childhood, there is no equivalent international data available for adolescents.
- Develop data and evidence on new or emerging risks to children's social and emotional well-being, such as the potential risks carried by the use of prescription pharmaceuticals (e.g. painkillers, tranquillisers, sedatives) for recreational purposes.
- Produce data to better inform on the potential linkages between children's socio-emotional well-being and their outcomes in other well-being areas, including their mental and physical health and education outcomes.

In contrast to many other areas of child well-being, Chapter 6 highlights a relatively wide range of cross-national data on **cognitive development and educational outcomes** for school-aged children and adolescents. The growth of international student assessment programmes such as TIMMS, PIRLS, and PISA has helped produce a large body of information on school performance at different ages, especially

in the traditional core areas of reading, mathematics and science. Over the years, these same programmes have also begun to provide information on children's perceptions of the school environment, their attitudes towards school work, their relationships with teachers and peers, and their perceptions of support from parents. However, this expansion has also led to changes in questionnaires, which can sometimes come at the cost of breaks in series and inconsistencies across years. The chapter also points to data gaps that could be filled to improve the understanding of where to prioritise actions, including the development of data on:

- Children's cognitive outcomes in early childhood (i.e. globally before entering in compulsory school) are lacking, despite efforts to harmonise data collection in a few countries. Tracking early learning outcomes is crucial for identifying the key competences children develop from infancy and which are a prerequisite for effective learning throughout childhood.
- Children's learning and cognitive development in areas outside reading, mathematics and science. This includes children's transversal cognitive skills (e.g. problem solving, creative thinking, critical thinking), their self-regulated learning and "learning to learn" skills (e.g. motivation, planning, self-monitoring, self-reflection), and their digital skills (e.g. data and digital literacy). There is increasing recognition that these kinds of competences are or will be crucial for children growing up in today's world.
- Skill acquisition and learning achievements of highly vulnerable groups of children such as victims of maltreatment, children with disabilities, in alternative care, or homeless children who are covered in general children's surveys. Data on learning achievements and needs of these groups of children are crucial to ensure they are not left behind.
- Children's educational motivations, aspirations and perceptions of their school environment and of parental support, as well as their knowledge (and parents' knowledge) of education systems, which are key determinants of education tracks and career choices. While PISA is increasingly providing cross-national data in these areas for 15-year-olds, less information is available for children in middle childhood and early adolescence.

1.5. The agenda ahead for child data

The overarching message from this report is that, while much progress has been made on cross-national child data, there are still many important gaps and areas where knowledge is sporadic at best. Strong efforts are still needed to further improve child data at both national and cross-national levels. Doing so is crucial if policy-makers are to receive a better picture and understanding of children's lives and the evidence needed to make fully informed decisions on child policies.

The "aspirational" framework for child well-being measurement developed in Chapter 2 of this report is set out in such a way as to help countries recognise the full implications involved in developing sound data on children's well-being. Together with the key elements and mechanisms of well-being highlighted through subsequent chapters, this framework can be used to help guide better data collection, motivate improvements in child data at all levels, and can serve as a "roadmap" for these efforts. It is not yet, however, a full-fledged model of child well-being, and much work remains to be done to identify precisely which dimensions should be prioritised when countries are building national data and indicator sets. Countries without good data infrastructure at population level could also use the shared understanding of child well-being set out in this report to guide data collection when constructing evaluation frameworks for child intervention programmes.

In general, there are relatively few simple solutions to filling the child data gaps highlighted through this report. In some cases, gaps can be eased by extending existing surveys or data collection instruments through, for instance, the addition of new or alternative survey questions. One example is the current lack of information on children's knowledge of health issues, which could be tackled by adding new questions

to existing child health surveys. In other instances, data relevance and usefulness could be improved by increasing the regularity or timeliness of collection, or by ensuring consistency in questionnaire and variable definitions across waves, which is crucial for policy monitoring. A core set of data and indicators should be defined, against which countries can commit to update at regular intervals. However, many data gaps have their roots in the fundamental scope, coverage, and design of existing child data collections. The limitations of many child and/or household surveys are one of the primary reasons for the scarcity of data on the well-being of young children, for example, and on the lack of data on children in the most vulnerable positions. Tackling gaps like these will often require new (and sometimes novel) or radically revised data collections.

The good news is that there are a growing number of innovative data production methods available to countries and others looking to improve child data infrastructures. One example is data linking and techniques for combining data from multiple sources – including administrative- and register-based data, as well as survey data – which have the potential to widen the breadth and depth of child data. Others include techniques for collecting data on the well-being of young children, such as those used in the OECD's *International Early Learning and Child Well-being Study*, and for collecting data that capture and reflect children's views, like those used in the *Children's Worlds* survey.

Fundamentally, however, further improving cross-national child data infrastructures will require significant investment as well co-ordinated action from governments, international organisations, and the wider international statistical and policy communities. The synchronisation of efforts is key. Collecting comparable data requires either widespread support for international data collections, or a strong degree of co-operation to promote and harmonisation of national surveys and datasets. Countries and the wider community can also assist one another through knowledge sharing and the exchange of good and innovative child data collection practices.

This is a sizeable task that cannot be fully realised overnight. It will require a medium- to long-term commitment on the part of countries and the community. As there are likely to be limits on available resources, the development of new and better child data will be gradual. Priorities and preferences will have to be set. In this respect, the areas and gaps highlighted in the previous section can be seen as a working guide, to be developed further in line with countries' and the community's own priorities. For example, among the possible priorities, this report stresses a strong need for better statistics on vulnerable children and better data on child outcomes in early childhood. The evidence discussed throughout this report can help with the identification of key areas in which better data is needed to inform policies for young children and children in vulnerable situations. Better cross-national data on children's family living arrangements and material living conditions is another priority, and one that could potentially be tackled by adapting and extending existing household living conditions surveys to better reflect children's lives and experiences in a comparable way. The OECD stands ready to help countries in this work.

References

- AIHW (2020), *Australia's Children*, Australian Institute of Health and Welfare, Canberra, <https://www.aihw.gov.au/reports/children-youth/australias-children/contents/executive-summary> (accessed on 20 April 2021). [20]
- AIHW (2018), *Children's Headline Indicators*, Australian Institute of Health and Welfare, Canberra, <https://www.aihw.gov.au/reports/children-youth/childrens-headline-indicators/contents/overview> (accessed on 17 May 2021). [17]
- Blair, B. et al. (2015), "Identifying developmental cascades among differentiated dimensions of social competence and emotion regulation", *Developmental Psychology*, Vol. 51/8, pp. 1062-1073, <http://dx.doi.org/10.1037/a0039472>. [27]
- Bradshaw, J. (2019), "Child subjective well-being studies. Some points for discussion", *Revue des politiques sociales et familiales*, Vol. 131/1, pp. 219-229, <http://dx.doi.org/10.3406/caf.2019.3361>. [39]
- Bronfenbrenner, U. (1989), "Ecological systems theory", in Vasta, R. (ed.), *Annals of Child Development*, Greenwich, CT:JAI. [23]
- Bronfenbrenner, U. (1979), *The Ecology of Human Development: Experiments by Nature and Design*, Harvard University Press, Cambridge, MA, <http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:The+ecology+of+human+development:+experiments+by+nature+and+design#3> (accessed on 4 December 2019). [22]
- Casas, F. (2017), "Analysing the comparability of 3 multi-item subjective well-being psychometric scales among 15 countries using samples of 10 and 12-year-olds", *Child Indicators Research*, Vol. 10/2, pp. 297-330, <http://dx.doi.org/10.1007/s12187-015-9360-0>. [37]
- Casas, F. and G. Rees (2015), "Measures of children's subjective well-being: Analysis of the potential for cross-national comparisons", *Child Indicators Research*, Vol. 8/1, pp. 49-69, <http://dx.doi.org/10.1007/s12187-014-9293-z>. [38]
- ChildStats (2019), *America's Children: Key National Indicators of Well-Being, 2019*, Federal Interagency Forum on Child and Family Statistics, <https://www.childstats.gov/americaschildren19/> (accessed on 17 May 2021). [19]
- Clark, H. et al. (2020), "The Lancet commissions - A future for the world's children? A WHO-UNICEF-Lancet commission executive summary", *The Lancet*, Vol. 395, pp. 605-658, [http://dx.doi.org/10.1016/S0140-6736\(19\)32540-1](http://dx.doi.org/10.1016/S0140-6736(19)32540-1). [36]
- DCEDIY (2021), *State of the Nation's Children*, Department of Children, Equality, Disability, Integration and Youth, <https://www.gov.ie/en/campaigns/1f703-state-of-the-nations-children/> (accessed on 17 May 2021). [21]
- DCYA (2017), *An Indicator Set for Better Outcomes, Brighter Futures*, Department of Children and Youth Affairs, Dublin, <https://www.gov.ie/pdf/?file=https://assets.gov.ie/27126/9b1f25ec7da348e6921373e7e91e1ae3.pdf#page=1> (accessed on 15 April 2021). [16]

- DCYA (2014), *Better Outcomes, Brighter Futures: The National Policy Framework for Children & Young People*, Department of Children and Youth Affairs, Dublin, <https://assets.gov.ie/23796/961bbf5d975f4c88adc01a6fc5b4a7c4.pdf> (accessed on 15 April 2021). [1]
- DPMC (2021), *Child and Youth Wellbeing Strategy: Annual Report for the Year Ending 30 June 2020*, New Zealand Department of the Prime Minister and Cabinet (DPMC), https://childyouthwellbeing.govt.nz/sites/default/files/2021-05/4380671_FINAL%20Annual%20Report%2020210506_1.PDF (accessed on 18 May 2021). [14]
- DPMC (2019), *Child and Youth Wellbeing Strategy 2019*, New Zealand Department of the Prime Minister and Cabinet (DPMC), <https://childyouthwellbeing.govt.nz/sites/default/files/2019-08/child-youth-wellbeing-strategy-2019.pdf> (accessed on 20 April 2021). [2]
- Durand, M. and C. Exton (2019), “Adopting a well-being approach in central government: Policy mechanisms and practical tools”, in *Global Happiness and Wellbeing Policy Report 2019*, Global Council for Happiness and Wellbeing, Sustainable Development Solutions Network, New York, https://s3.amazonaws.com/ghwbpr-2019/UAE/GH19_Ch8.pdf. [12]
- Exton, C. and M. Shinwell (2018), “Policy use of well-being metrics: Describing countries’ experiences”, *OECD Statistics Working Papers*, No. 2018/07, OECD Publishing, Paris, <https://dx.doi.org/10.1787/d98eb8ed-en>. [10]
- Lewis, A. et al. (2009), “The incremental validity of positive emotions in predicting school functioning”, *Journal of Psychoeducational Assessment*, Vol. 27/5, pp. 397-408, <http://dx.doi.org/10.1177/0734282908330571>. [33]
- Masten, A. and D. Cicchetti (2010), “Developmental cascades”, *Development and Psychopathology, Developmental Cascades: Part 1*, Vol. 22/3, pp. 491-495, <http://dx.doi.org/10.1017/S0954579410000222>. [25]
- Masten, A. and A. Tellegen (2012), *Resilience in Developmental Psychopathology: Contributions of the Project Competence Longitudinal Study*, Cambridge University Press, <http://dx.doi.org/10.1017/S095457941200003X>. [26]
- McClelland, M. and C. Cameron (2011), “Self-regulation and academic achievement in elementary school children.”, *New directions for child and adolescent development*, Vol. 2011/133, pp. 29-44, <http://dx.doi.org/10.1002/cd.302>. [41]
- Minkinen, J. (2013), “The structural model of child well-being”, *Child Indicators Research*, Vol. 6, pp. 547-558, <http://dx.doi.org/10.1007/s12187-013-9178-6>. [24]
- OECD (2020), *How’s Life? 2020: Measuring Well-being*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9870c393-en>. [9]
- OECD (2019), *Changing the Odds for Vulnerable Children: Building Opportunities and Resilience*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/a2e8796c-en>. [4]
- OECD (2019), *OECD Child Well-Being Data Portal*, <http://www.oecd.org/els/family/child-well-being/data/> (accessed on 17 January 2020). [8]
- OECD (2015), *How’s Life? 2015: Measuring Well-being*, OECD Publishing, Paris, https://dx.doi.org/10.1787/how_life-2015-en. [7]

- OECD (2013), *OECD Guidelines on Measuring Subjective Well-being*, OECD Publishing, Paris, [40]
<https://dx.doi.org/10.1787/9789264191655-en>.
- OECD (2011), *How's Life?: Measuring Well-being*, OECD Publishing, Paris, [11]
<https://dx.doi.org/10.1787/9789264121164-en>.
- OECD (2009), *Doing Better for Children*, OECD Publishing, Paris, [5]
<https://dx.doi.org/10.1787/9789264059344-en>.
- OEJA (2018), *Ce que les enfants entendent par bien-être et les leçons à tirer pour le choix et la définition d'indicateurs de bien-être*, Observatoire de l'Enfance, de la Jeunesse et de l'Aide à la Jeunesse (OEJA), [35]
https://www.researchgate.net/publication/256441875_CE_QUE_LES_ENFANTS_ENTENDENT_PAR_BIEN-ETRE_COMMUNICATION_EUROPEAN_SEMINAR_ON_CHILD_WELLBEING_INDICATORS.
- ONS (2018), *Children's Well-Being Measures*, Office for National Statistics, [18]
<https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/datasets/childrenswellbeingmeasures> (accessed on 15 May 2021).
- Otten, R. et al. (2019), "A developmental cascade model for early adolescent-onset substance use: the role of early childhood stress", *Addiction*, Vol. 114/2, pp. 326-334, [29]
<http://dx.doi.org/10.1111/add.14452>.
- Ottova, V. et al. (2012), "The role of individual- and macro-level social determinants on young adolescents' psychosomatic complaints", *The Journal of Early Adolescence*, Vol. 32/1, pp. 126-158, [34]
<http://dx.doi.org/10.1177/0272431611419510>.
- Richardson, D. and N. Ali (2014), "An evaluation of international surveys of children", *OECD Social, Employment and Migration Working Papers*, No. 146, OECD Publishing, Paris, [6]
<https://dx.doi.org/10.1787/5jxzmjrqvntf-en>.
- Sibley, B. and J. Etnier (2003), *The Relationship between Physical Activity and Cognition in Children: A Meta-Analysis*, Human Kinetics Publishers Inc., [30]
<http://dx.doi.org/10.1123/pes.15.3.243>.
- STM (2021), *National Child Strategy*, Finland Ministry of Social Affairs and Health, [3]
<https://www.lapsenoikeudet.fi/en/campaign/national-strategy-for-children/> (accessed on 17 May 2021).
- Trentacosta, C. and D. Shaw (2009), "Emotional self-regulation, peer rejection, and antisocial behavior: Developmental associations from early childhood to early adolescence", *Journal of Applied Developmental Psychology*, Vol. 30/3, pp. 356-365, [42]
<http://dx.doi.org/10.1016/j.appdev.2008.12.016>.
- UNICEF (2020), *Worlds of Influence Understanding What Shapes Child Well-being in Rich Countries*, Unicef Innocenti Research Center, [13]
<https://www.unicef.org/media/77571/file/Worlds-of-Influence-understanding-what-shapes-child-well-being-in-rich-countries-2020.pdf> (accessed on 23 February 2021).

- UNICEF (2007), "Child poverty in perspective: An overview of child well-being in rich countries", *Innocenti Report Card 7*, UNICEF Innocenti Research Centre, Florence, <https://www.unicef-irc.org/publications/445-child-poverty-in-perspective-an-overview-of-child-well-being-in-rich-countries.html> (accessed on 1 June 2021). [15]
- Ursache, A., C. Blair and C. Raver (2012), *The Promotion of Self-Regulation as a Means of Enhancing School Readiness and Early Achievement in Children at Risk for School Failure*, John Wiley & Sons, Ltd, <http://dx.doi.org/10.1111/j.1750-8606.2011.00209.x>. [28]
- Weber, M., L. Wagner and W. Ruch (2016), "Positive feelings at school: On the relationships between students' character strengths, school-related affect, and school functioning", *Journal of Happiness Studies*, Vol. 17/1, pp. 341-355, <http://dx.doi.org/10.1007/s10902-014-9597-1>. [32]
- Zeng, N. et al. (2017), "Effects of physical activity on motor skills and cognitive development in early childhood: A systematic review", *BioMed Research International*, <http://dx.doi.org/10.1155/2017/2760716>. [31]

Annex 1.A. Summary of dimensions and indicators included in national and cross-national child well-being measurement initiatives

Annex Table 1.A.1. Summary of dimensions and indicators included in national and cross-national child well-being measurement initiatives

Level	Area and dimension		No. initiatives featuring at least one relevant indicator		
			National	Cross-national	List
Children's well-being outcomes	Material	Food, clothing, and basic necessities	5	0	Australia (KNICHDW), Ireland (BOBF), New Zealand, United Kingdom, United States
		Housing	6	2	Australia (CHI), Australia (KNICHDW), Ireland (BOBF), New Zealand, United Kingdom, United States, OECD (DBFC), OECD (HILFC)
		Leisure materials	2	1	Ireland (BOBF), New Zealand, UNICEF (CPIP)
		Learning materials	2	4	Australia (KNICHDW), Ireland (BOBF), OECD (DBFC), OECD (HILFC), UNICEF (CPIP), UNICEF (WOI)
	Physical health	Birth outcomes	7	4	Australia (CHI), Australia (KNICHDW), Ireland (NSCWBI), Ireland (BOBF), New Zealand, United Kingdom, United States, OECD (DBFC), OECD (HILFC), UNICEF (CPIP), UNICEF (WOI)
		Physical development	6	3	Australia (CHI), Australia (KNICHDW), Ireland (NSCWBI), Ireland (BOBF), United Kingdom, United States, OECD (HILFC), UNICEF (CPIP), UNICEF (WOI)
		Physical health status	7	4	Australia (CHI), Australia (KNICHDW), Ireland (NSCWBI), Ireland (BOBF), New Zealand, United Kingdom, United States, OECD (DBFC), OECD (HILFC), UNICEF (CPIP), UNICEF (WOI)
	Social, emotional and cultural	Safety, emotional security, and basic emotional needs	6	2	Australia (CHI), Australia (KNICHDW), Ireland (BOBF), New Zealand, United Kingdom, United States, OECD (HILFC), UNICEF (CPIP)
		Identity, social and cultural identities, and basic social needs	3	0	Australia (KNICHDW), Ireland (BOBF), New Zealand
		Socio-emotional skills	5	0	Australia (CHI), Australia (KNICHDW), Ireland (BOBF), New Zealand, United States
		Mental health status and disorders	6	3	Australia (KNICHDW), Ireland (NSCWBI), Ireland (BOBF), New Zealand, United Kingdom, United States, OECD (DBFC), OECD (HILFC), UNICEF (WOI)
		Life satisfaction	3	2	Ireland (NSCWBI), Ireland (BOBF), United Kingdom, OECD (HILFC), UNICEF (CPIP)
	Cognitive development and educational	Cognitive skills and abilities and related learning skills	6	4	Australia (CHI), Australia (KNICHDW), Ireland (NSCWBI), Ireland (BOBF), New Zealand, United States, OECD (DBFC), OECD (HILFC), UNICEF (CPIP), UNICEF (WOI)
		Educational progression and attainment	5	3	Ireland (NSCWBI), Ireland (BOBF), New Zealand, United Kingdom, United States, OECD (DBFC), UNICEF (CPIP), UNICEF (WOI)

Level	Area and dimension	No. initiatives featuring at least one relevant indicator				
		National	Cross-national	List		
	Satisfaction and confidence in learning	0	0			
Children's activities, behaviours and relationships	Family activities and relationships	Activities with parents and family	6	3	Australia (KNICHDW), Ireland (NSCWBI), Ireland (BOBF), New Zealand, United Kingdom, United States, OECD (HILFC), UNICEF (CPIP), UNICEF (WOI)	
		Child parent and family relationships	4	3	Australia (KNICHDW), Ireland (NSCWBI), Ireland (BOBF), United Kingdom, OECD (HILFC), UNICEF (CPIP), UNICEF (WOI)	
	Health behaviours	Protective health behaviours	4	2	Australia (KNICHDW), Ireland (NSCWBI), Ireland (BOBF), United Kingdom, OECD (DBFC), UNICEF (CPIP)	
		Risky health behaviours	5	2	Australia (KNICHDW), Ireland (NSCWBI), Ireland (BOBF), New Zealand, United States, OECD (DBFC), UNICEF (CPIP)	
	Social, leisure and civic activities and relationships	Social and leisure activities	3	1	Ireland (BOBF), New Zealand, United Kingdom, UNICEF (WOI)	
		Civic and voluntary activities	3	1	Australia (KNICHDW), Ireland (BOBF), New Zealand, OECD (HILFC)	
		Friendships, peer relationships, and social support	5	1	Australia (KNICHDW), Ireland (NSCWBI), Ireland (BOBF), New Zealand, United Kingdom, UNICEF (CPIP)	
	Learning activities, attitudes, behaviours and relationships	School and ECEC activities, attitudes and behaviours	5	4	Australia (CHI), Australia (KNICHDW), Ireland (BOBF), United Kingdom, United States, OECD (DBFC), OECD (HILFC), UNICEF (CPIP), UNICEF (WOI)	
		Child teacher and classmate relationships	2	3	Ireland (BOBF), United Kingdom, OECD (DBFC), OECD (HILFC), UNICEF (WOI)	
		Learning motivation and aspirations	1	1	United Kingdom, UNICEF (CPIP)	
		Home and out-of-school learning activities	1	0	Ireland (NSCWBI)	
	Digital activities and behaviours	Digital activities and behaviours	2	1	Ireland (BOBF), United Kingdom, UNICEF (WOI)	
	Children's settings and environments	Family and home environment	Family financial resources and work arrangements	7	4	Australia (CHI), Australia (KNICHDW), Ireland (NSCWBI), Ireland (BOBF), New Zealand, United Kingdom, United States, OECD (DBFC), OECD (HILFC), UNICEF (CPIP), UNICEF (WOI)
			Family living and custody arrangements	3	1	Australia (KNICHDW), Ireland (NSCWBI), United States, UNICEF (CPIP)
Family relationships			1	0	Australia (KNICHDW)	
Family support networks			2	1	Australia (CHI), Australia (KNICHDW), UNICEF (WOI)	
Family physical and mental health			2	0	Australia (KNICHDW), Ireland (BOBF)	
Family violence and abuse			3	0	Australia (CHI), Australia (KNICHDW), Ireland (BOBF)	
School and ECEC service climate		2	0	Ireland (NSCWBI), Ireland (BOBF)		

Level	Area and dimension		No. initiatives featuring at least one relevant indicator		
			National	Cross-national	List
	School and ECEC service environment	School- and teacher-parent relationships	0	1	UNICEF (WOI)
		School and ECEC service material supports and activities	0	0	
	Community and physical environment	Crime and violence	5	0	Australia (KNICHDW), Ireland (NSCWBI), Ireland (BOBF), United Kingdom, United States
		Noise, pollution and air quality	1	2	United States, OECD (DBFC), OECD (HILFC)
		Local green spaces	0	0	
		Local health services/facilities	0	0	
		Local cultural and learning services/facilities	0	0	
		Local play and leisure services/facilities	2	1	Ireland (NSCWBI), Ireland (BOBF), UNICEF (WOI)
		Community material support services and activities	0	0	
		Community social support services and activities	0	0	
Public policies		Family policies	0	1	UNICEF (WOI)
		Housing policies	0	0	
		Health policies	1	0	Ireland (NSCWBI)
		Education policies	1	1	Ireland (NSCWBI), UNICEF (WOI)
		Environmental policies	0	0	

Note: Child well-being areas, dimensions and indicators are categorised using the conceptual framework for child well-being measurement developed in Chapter 2. Australia (CHI) refers to the Australian Institute of Health and Welfare's Children's Headline Indicators; Australia (KNICHDW) refers to the Australian Institute of Health and Welfare's Key National Indicators for Child Health, Development and Wellbeing; Ireland (NSCWBI) refers to the Ireland Department of Children, Equality, Disability, Integration and Youth's National Set of Child Well-Being Indicators; Ireland (BOBF) refers to the Ireland Department of Children, Equality, Disability, Integration and Youth's Better Outcomes Brighter Futures Indicator Set; OECD (DBFC) refers to OECD *Doing Better for Children*; OECD (HILFC) refers to OECD *How's Life for Children?*; UNICEF (CPIP) refers to UNICEF *Child Poverty in Perspective: An overview of child well-being in rich countries*; and UNICEF (WOI) refers to UNICEF *Worlds of Influence: Understanding What Shapes Child Well-being in Rich Countries*.

Sources: (UNICEF, 2007^[15]), "Child poverty in perspective: An overview of child well-being in rich countries", Innocenti Report Card 7, UNICEF Innocenti Research Centre, Florence, <https://www.unicef-irc.org/publications/445-child-poverty-in-perspective-an-overview-of-child-well-being-in-rich-countries.html>; (OECD, 2009^[15]), *Doing Better for Children*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264059344-en>; (OECD, 2015^[7]), *How's Life? 2015: Measuring Well-being*, OECD Publishing, Paris, https://dx.doi.org/10.1787/how_life-2015-en; (DCYA, 2017^[16]), *An Indicator Set for Better Outcomes, Brighter Futures*, Department of Children and Youth Affairs, Dublin, <https://www.gov.ie/pdf/?file=https://assets.gov.ie/27126/9b1f25ec7da348e6921373e7e91e1ae3.pdf#page=1>; (AIHW, 2018^[17]), *Children's Headline Indicators, Australian Institute of Health and Welfare*, Canberra, <https://www.aihw.gov.au/reports/children-youth/childrens-headline-indicators/contents/overview>; (ONS, 2018^[18]), *Children's Well-Being Measures*, Office for National Statistics, <https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/datasets/childrenswellbeingmeasures>; (ChildStats, 2019^[19]), *America's Children: Key National Indicators of Well-Being*, Federal Interagency Forum on Child and Family Statistics, <https://www.childstats.gov/americaschildren19/>; (AIHW, 2020^[20]), *Australia's Children*, Australian Institute of Health and Welfare, Canberra, <https://www.aihw.gov.au/reports/children-youth/australias-children/contents/executive-summary>; (DCEDIY, 2021^[21]), *State of the Nation's Children*, Department of Children, Equality, Disability, Integration and Youth, <https://www.gov.ie/en/campaigns/1f703-state-of-the-nations-children/>; (DPMC, 2021^[14]), *Child and Youth Wellbeing Strategy: Annual Report for the Year Ending 30 June 2020*, New Zealand Department of the Prime Minister and Cabinet (DPMC), https://childyouthwellbeing.govt.nz/sites/default/files/2021-05/4380671_FINAL%20Annual%20Report%2020210506_1.PDF.

Notes

¹ The framework focuses on child-relevant public policies in five core areas: family policies; housing policies; health policies; education policies; and environmental policies. These are policies areas that have strong, and clear, and specific links with children's outcomes. Many policies outside these areas also have the potential to impact children's well-being, but the linkages are typically less direct. Examples of the latter include general income support policies and general labour market and macro-economic policies.

² Vulnerable children are broadly the groups of children most at risk of experiencing low well-being and worthy of the greatest investment (OECD, 2019_[4]). Child vulnerability is the outcome of the interaction of a range of individual and environmental factors that compound dynamically over time. Individual factors contributing to child vulnerability stem from cognitive, emotional and physical capabilities or personal circumstances, for instance age, disability, a child's own disposition or mental health difficulties. Environmental factors contributing to child vulnerability operate at both family and community levels. Family factors include income poverty and material deprivation, parents' health and health behaviours, parents' education level, family stress and exposure to intimate partner violence. Types and degrees of child vulnerability vary as these factors change and evolve with children's age.

2. Measuring what matters most for children

This chapter outlines a new “aspirational” framework for child well-being measurement, setting out which aspects of children’s lives should be measured in order to best monitor child well-being, and in what way. It explains the key principles guiding this framework, which include multi-dimensional and forward-looking measurement, the fundamental role of children’s environments and relationships of their well-being, and the importance of integrating the views and perspectives of children themselves. It elaborates on the key features of the framework’s structure and thematic content, and sets out a series of ideal properties for measures and indicators, such as capturing inequalities and being age- and stage-sensitive.

2.1. Introduction and main findings

Measuring child well-being is not always straightforward. Well-being in general is a multi-faceted concept that requires careful measurement of people achievements and satisfaction regarding multiple aspects of their lives (Boarini, Johansson and Mira d'Ercole, 2006^[1]; OECD, 2011^[2]; OECD, 2020^[3]). Measuring the well-being of *children* carries additional difficulties and considerations.

Part of the challenge lies in the lack of a single unifying definition or common approach to children's well-being and how it should be measured. Child well-being is studied in a range of scientific disciplines, including psychology, medical sciences, economics and sociology. Each produces valuable insights, but each also brings their own methods, approach and understanding of the issue. Moreover, some child well-being concepts differ depending on social and cultural context (Amerijckx and Humblet, 2014^[4]; Ben-Arieh et al., 2014^[5]; Perron et al., 2019^[6]). As a result, the concept of child well-being remains blurred and the boundaries have not been fixed.

A second challenge lies in the critical importance of childhood for human development and well-being throughout life. Child well-being measurement must take into account both children's lives in the present (the "here and now"), and their lives in the future (laying the foundations for future well-being). This future-orientation is relevant for people of all ages, but is of critical importance when looking at children, given the strong consequences of development during childhood on outcomes later in life.

A third challenge comes from the ways in which the children's well-being is tightly connected to their environments. Childhood and adolescence are periods of life when one's sense of self gradually develops through actions, feelings, experiences and interactions with others. Especially in early childhood, children's well-being depends heavily on their parents or carers; later in childhood, it increasingly depends on the way they connect with peers and wider society. For children, more than for adults, to get a full picture of well-being, measurement must account for a number of social and environmental influences – including children's family and home life, their school life, and their neighbourhood and physical environment – as well as children's outcomes in various areas of life.

This chapter outlines a conceptual framework for child well-being measurement. It starts in section 0 with a discussion of conceptual considerations important when looking to measure child well-being, and by outlining a series of conceptual "principles" that are used as building blocks for the framework. Moving from these principles, section 2.3 outlines the framework itself. The aim and intention of the framework is to guide data collection, allow for the mapping of cross-national differences, and facilitate policy-relevant comparisons. The framework is also used to guide the data review in later chapters of this report.

The key conceptual principles underlying the framework are as follows:

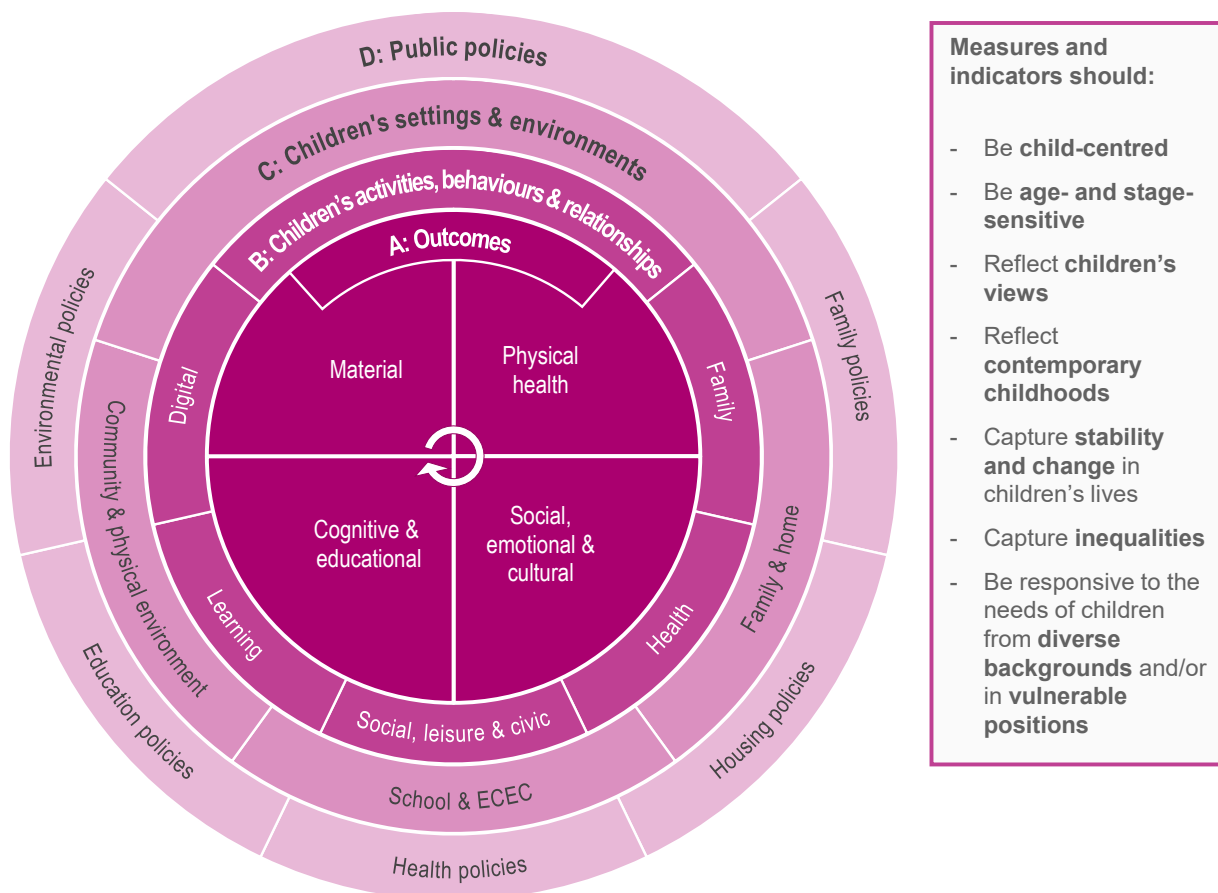
- *Child well-being measurement should be multi-dimensional*: The notion of child well-being is multifaceted, in all senses of the word. It encompasses a range of aspects of children's lives, including the things they have and own, their health, their education and learning, and their personal and social lives. It brings together objective and subjective components, such as children's moods and emotions, their satisfaction with life, and their sense of purpose. Multi-dimensional measurement, while complicated, is the best way to capture such a complex concept; it can provide a rich and detailed picture of well-being, enhancing, among other things, usefulness in informing policy.
- *Child well-being measurement should reflect children's lives today and tomorrow*: Child well-being is about both the present and the future. While, historically, child well-being research has tended to focus on either one or the other, modern work looks to find a middle ground. Children's well-being in the here-and-now matters, and is important in and of itself. However, so too does their future well-being and their ability to sustain well-being over time. Child well-being measurement

should look to cover what is important for children’s lives right now, and what is important for them once they grow up and reach adulthood.

- *Child well-being measurement should be age-sensitive:* Child well-being is a developmentally-situated concept. What children need, want, and should be able to achieve changes as they move through childhood. Children’s cognitive, social and emotional skills develop in different ways at different ages. They are also responsive to certain environmental factors at some ages more than others. Child well-being measurement should be sensitive to children’s age (or stage of development) and use age- (or stage-) appropriate variations in measures where needed.
- *Child well-being measurement should integrate children’s views and perspectives:* Asking children for their views, perceptions and perspectives on different aspects of the lives can help ensure that key dimensions of children’s well-being are properly understood and taken into consideration. Children’s perceptions of their environment are also important as they shape how they self-regulate emotions, learn, and engage with others. Children’s perspectives on risks and issues that may affect their well-being now or in the future are also important for designing engaging and effective policies. Measurement should therefore look where and when possible to make use of children’s own views and perspectives and children’s self-report data. This includes measures of children’s over-arching subjective well-being, but also other types of self-reported data covering children’s views on other more specific aspects of their lives.
- *Child well-being measurement should capture children’s environments:* Child well-being is tied to and shaped by the environments and settings in which children grow up. Families, schools, neighbourhoods and communities can all impact on children’s lives, in various and at times in contradictory ways. They can act as a resource for well-being, providing children with the materials, support and opportunities needed to thrive. They can also carry risks and dangers. These environments do not operate as separate worlds; rather they are interconnected. To a large extent, children’s well-being depends on the quality of interconnections developed across children’s spheres of life. Measurement should look to capture the many important aspects of children’s environments, alongside and in addition to child well-being outcomes.
- *Child well-being measurement should include child-related public policies:* Children’s lives can also be shaped strongly by public policies. Policies can influence the resources available for children at home. They can help support parents in providing care and education for their children, by for example, offering financial support or a right to time away from work. Policies can also shape children’s lives at school and in the community. Measurement should look to integrate indicators of child-related public policies, again alongside and in addition to child well-being outcomes.

Taken together, these elements build up to a framework for child well-being measurement that can be used to guide better and more comprehensive child data collections. A summarised version of the framework is given in Figure 2.1, with the full framework presented later in section 2.3. The framework is multi-dimensional and multi-level. It consists of four “levels”, covering, in turn, children’s well-being outcomes (Level A), child activities, behaviours and relationships (Level B), children’s settings and environments (Level C), and public policies for child well-being (Level D). Each level contains a series of thematic “areas”, which are further sub-divided into well-being dimensions (see section 2.3).

Figure 2.1. Summarised conceptual framework for child well-being measurement



2.2. What does child well-being mean? Conceptual foundations for child well-being measurement

Child well-being can be defined, thought about, and measured in different ways. Many experts would agree that child well-being is, at heart, about children living a good life, “doing well”, and reaching their full potential to the best of their abilities. Beyond this, however, there is room for debate on exactly how the issue should be approached. For some researchers, (child) well-being is rooted principally in people’s mental states and what they think and feel about their lives. Other factors matter, but mostly only for the ways in which they feed into mental states. For others, child well-being is more about whether or not children’s basic needs or rights are being met, or whether they are developing the skills and abilities they will need in later life (Pollard and Lee, 2003^[7]; Ben-Arieh and Frønes, 2007^[8]; Ben-Arieh et al., 2014^[5]; Cho and Yu, 2020^[9]).

For the purpose of this report, child well-being is framed primarily in terms of the things that children need and should be able to do in order to live a good life (Ben-Arieh et al., 2014^[5]). Building on insights from needs-based-, capability-, and developmental approaches to well-being, and drawing on Raghavan and Alexandrova (2015^[10]), the basic underlying principle is that, for children, good well-being means both being able to live a “good” childhood in the here-and-now *and* being able to develop the skills, abilities and competencies needed for a good future, given their circumstances (Raghavan and Alexandrova, 2015^[10]). Put slightly differently, children should both be enjoying a good childhood today, and be “*flourishing*” in

age- (or stage-) and context-appropriate ways that set them up well for tomorrow (Kraut, 2009^[11]; Ben-Arieh et al., 2014^[5]).

Importantly, both normative standards like the United Nations Convention on the Rights of the Child (UNCRC, 1990^[12]) and scientific research suggest that children have a range of needs and capabilities that should be met in order for them to “flourish” and live a good childhood. Good child well-being rests on meeting these needs and fulfilling these capabilities. These needs and capabilities stretch far beyond those necessarily for basic survival. In broad terms, they range from material goods and activities to things like physical health, mental health, social and emotional security, gender, sexual and cultural identities, and learning and skill development. They involve both objective and subjective factors, with the latter including, among other things, children’s satisfaction with life, the presence of positive moods and emotions and the absence of negative ones, and a broader sense of purpose and fulfilment in life. In some cases, children’s needs and capabilities can differ with their personal circumstances (e.g. children with disabilities, maltreated children). Some needs may also vary with their environments.

The remainder of this section expands on these and other conceptual considerations important when looking to measure child well-being. The discussion outlines a series of conceptual building blocks – labelled as “principles” – that are later used to guide the construction of the proposed conceptual framework (section 2.3). Each sub-section covers a separate principle, and briefly discusses their practical implications for child well-being measurement.

Principle 1: Measurement should be multi-dimensional

The concept of well-being captures the notion that people’s lives are complex, and that living a good life depends on a range of different things, each bringing their own value and meaning (Boarini, Johansson and Mira d’Ercole, 2006^[11]). It is built on the idea that people’s quality of life is determined not only by their income or the things they own, but also, among other things, by their physical and mental health, their skills and abilities, their social lives, and their connections with others.

Well-being’s multi-dimensional nature creates challenges for measurement. How to capture something so complex? One approach is to strip everything back and measure well-being simply in terms of the person’s over-arching self-reported subjective well-being; to directly ask people about how they see their well-being, overall (see Box 2.4). This approach not only allows people to express their own well-being, but also avoids complicated decisions about which life dimensions should be measured, which type of indicators to use, and so on. However, there are limitations, especially when applied to children. One is that younger children cannot easily respond to such questions. A second is that over-arching measures can obscure the ways in which well-being can vary and interact across different aspects of people’s lives. While global measures can be highly informative, there is also value in measuring and monitoring how children are doing in specific areas of domains of life (Ben-Arieh et al., 2014^[5]; Andresen, Bradshaw and Kosher, 2019^[13]; Rees, 2017^[14]; Dinisman and Ben-Arieh, 2016^[15]), such as, for instance, their satisfaction with regards to their family, school and social life (Huebner, 1991^[16]; Seligson, Huebner and Valois, 2003^[17]; Dinisman and Ben-Arieh, 2016^[15]; Rees, 2017^[14]).

A second common approach is to look to capture well-being through multi-dimensional measures. In practice, this means multiple indicators reflecting different aspects of people’s lives. This sometimes includes over-arching self-reported measures of subjective well-being similar to those above, but in combination with other (objective and subjective) domain-specific measures of well-being. Where data allows, the multi-dimensional approach can help provide a rich and detailed picture of well-being and the ways that people live their lives.

Reflecting the idea that child well-being is a multi-dimensional concept, this report identifies the most salient child well-being outcomes (Box 2.1 and section 2.3).

Box 2.1. A categorisation of child well-being outcomes

A key challenge when looking to construct multi-dimensional measures of well-being is deciding on which aspects of people's lives to cover. Although it is now relatively common to examine child well-being using multi-dimensional measures (UNICEF, 2007^[18]; Bradshaw and Richardson, 2009^[19]; OECD, 2009^[20]; OECD, 2015^[21]), there is no real consensus in the literature on which areas, aspects or dimensions of children's lives should be included. Different studies and different activities examine different areas, albeit often with some degree of overlap (Fernandes, Mendes and Teixeira, 2012^[22]; Ben-Arieh et al., 2014^[5]). Often, choices are constrained by practical considerations like data availability.

This report focuses on children's well-being outcomes in four broad thematic areas: material outcomes, physical health outcomes, social, emotional and cultural outcomes, and cognitive development and educational outcomes. This outcome categorisation shares similarities, with some differences in scope, aggregation and terminology, to those used in certain previous OECD child well-being activities (Borgonovi and Pál, 2016^[23]), UNICEF Innocenti Research Centre's most recent child well-being *Report Card* (UNICEF, 2020^[24]), and some national child well-being monitoring activities, such as in Ireland (DCYA, 2017^[25]). It covers and largely corresponds with the outcome areas most frequently used in multi-dimensional child well-being research (Fernandes, Mendes and Teixeira, 2012^[22]).

- *Material* outcomes covers children's access to material resources, including essential or important goods, services and activities. This includes basic necessities like food, clothing and housing, but also other material goods and activities that children need in order to learn and grow and fully engage with society. For children living in OECD countries today, depending on age, this means access to things like a computer and the internet, certain types of clothing and footwear, holidays, day trips, and a little money to spend on themselves ("pocket money"), as well as books, toys and other resources important for learning and development (see Chapter 3).
- *Physical health* outcomes covers children's physical health status and physical development. In broad terms, it covers outcomes relating to whether children are healthy, free from illness, injury and disease, and developing and functioning well physically, given their background and circumstances (e.g. presence of disabilities). Important outcomes in this area include children's birth outcomes (e.g. infant mortality and low birth weight frequency), the presence of illness and disease, the presence of injuries and impairments (e.g. refractive disorders, vision loss, hearing loss), and various aspects of physical development, including height, weight, and motor skills (see Chapter 4).
- *Social, emotional and cultural* outcomes covers several aspects of well-being relating to children's behaviours, emotions, and thoughts and feelings towards themselves and others, as well as related aspects tied to children's social and cultural identities. It covers at the most basic level children's emotional security, attachment, and sense of safety from physical harm and violence – fundamental needs, sometimes described as "meta-needs" (Lacharité, Éthier and Nolin, 2006^[26]), that underpin children's functioning and interactions with the world. Beyond this, it covers the fulfilment of children's emotional or affective needs (e.g. the need to be loved, supported and cared for), their basic social needs (e.g. being listened to, respected and socially recognised), and their sense of identity (including gender, sexual, ethnic and/or cultural identities) and sense of belonging, as well as outcomes relating to socio-emotional skills (e.g. emotional regulation, conscientiousness, openness, sociability, assertiveness), mental health, life satisfaction – both in general and in key domains, such as with home and family life and with school life – and overall psychological functioning and well-being (see Chapter 5).

- *Cognitive development and education outcomes* covers outcomes relating to children's learning, knowledge, cognitive skill and ability development. Important outcomes in this area include various aspects of early cognitive development for younger children (such as emerging literacy and numeracy), a range of cognitive and relevant non-cognitive competences for older children (including core foundational competences like literacy and numeracy and transversal skills like self-regulated learning, problem solving, and critical and creative thinking). Children's progression through the education system and their educational attainment is also covered here, as is their "satisfaction" with their learning and subjective confidence in their own abilities (see Chapter 6).

These outcome areas are inter-connected. As discussed in Box 1.2, aspects of child well-being are often inter-linked and frequently depend on one another. In many cases, specific aspects are not only outcomes in themselves, but are also drivers and determinants of outcomes in other areas. For instance, aspects of children's material well-being like good-quality nutrition and housing have clear links to child physical health (see Chapter 4), and are also important for learning and educational outcomes (through their effects on children's abilities to study and learn) and to some extent social and emotional outcomes, too (through, for instance, their effects on children's abilities to play and socialise with others) (see Chapters 5 and 6).

Principle 2: Measurement should reflect children's lives today and tomorrow

The second foundational principle of the framework is that it should take a "forward-looking" approach to child well-being. It should acknowledge that children have rights, including to a good childhood, but also that they are future adults and that their development is important. In short, the framework should recognise that child well-being is about children's lives both today and tomorrow.

Historically, the literature on child well-being has emphasised two major perspectives on what makes for a good life for children: the "developmental" perspective, and the "child's rights" perspective (OECD, 2015^[21]). The developmental perspective stresses the importance of children's futures (Ben-Arieh et al., 2014^[5]). While not the only concern, this approach emphasises that today's children are tomorrow's adults, and highlights the importance of children collecting the skills and resources needed for a good adulthood. The developmental approach often leans heavily on insights from the child development literature (Box 2.2) to identify key aspects of good child well-being. The child's rights approach to child well-being, in contrast, places stronger emphasis on children's well-being in the "here-and-now" (Casas, 1997^[27]; Ben-Arieh et al., 2014^[5]). The rights-based approach stresses the importance of viewing children as human beings who have a right to a "good" childhood, independent of their futures. This approach frequently relies on children's direct input on what makes for a good childhood and for the selection and construction of measures of child well-being (see Principle 4).

Modern work on child well-being often looks to find a middle ground between the two (Raghavan and Alexandrova, 2015^[10]; Ben-Arieh et al., 2014^[5]). Children's well-being in the here-and-now matters, and is important in and of itself. However, so too does their future well-being, and their ability to sustain well-being over time and when they reach adulthood. In many cases, aspects of children's current and future well-beings are likely to be aligned. Indeed, in some cases, the two cannot be separated. For example, evidence suggests that emotional well-being and self-control in childhood as well as early-life adversity are key determinants of adult physical health and other well-being outcomes (Poulton, Moffitt and Silva, 2015^[28]; Clark et al., 2019^[29]; Flèche, Lekfuangfu and Clark, 2019^[30]; Lansford, 2018^[31]). In other areas, however there are potential trade-offs. Child well-being then becomes a matter of balancing concerns about the present ("*well-being*") with those relating to the future ("*well-becoming*") (Ben-Arieh and Frønes, 2007^[8]; Clark et al., 2020^[32]). Such a perspective might be labelled a "forward-looking" approach to child well-being (Raghavan and Alexandrova, 2015^[10]; Conti and Heckman, 2014^[33]).

Use of a forward-looking approach has a couple of implications for child well-being measurement. One is that, in addition to capturing whether children are living good lives today, child well-being measurement should also look to *monitor children's development*. Childhood is a period of rapid and important growth and development, both mentally and physically, and children's progress along the "development trajectory" can have major, long-lasting and possibly cumulative effects on outcomes in later life (Rutter, 1989^[34]; Settersten, McClelland and Miao, 2014^[35]; Torche, 2019^[36]; Clark et al., 2019^[29]). Development is not the *only* determinant of children's lives and their future well-being, but it is one important driver. Children's development can be monitored through measures of age- (or stage-) appropriate achievements and the reaching of milestones (see later chapters for more detail).

A second is that, measurement should also cover *aspects of children's lives that may impact on their future well-being*. This includes in particular the attitudes, actions, aspirations and behaviours that develop through childhood and may impact on well-being outcomes in later life. One example is regular physical activity, which is found to be predictive of adolescent mental health and social inclusion (Eime et al., 2013^[37]). Another is substance use, which contributes to a higher risk of dropping out of school early and lower school achievements, while also increasing the likelihood of mental disorders (Hall et al., 2016^[38]).

Box 2.2. Insights into child development from across the sciences

Various research strands describe child development as a **time-dependent process** with cumulative effects over time:

- Cognitive and psychological sciences emphasise that sensitivity of brain development in the early period of life to environmental stressors, – starting from the point of conception – with significant consequences for individual outcomes over the entire life course. Certain periods of life, despite being limited in time, have been shown to have a critical influence on skill development, providing "windows of opportunity" for essential developmental processes (Salkind and Brown, 2013^[39]; Ismail, Fatemi and Johnston, 2017^[40]). This is especially true for environmental stressors occurring during the early years (Knudsen, 2004^[41]; Keenan, Evans and Crowley, 2016^[42]; Caspi et al., 2017^[43]). Similarly, the onset of puberty in adolescence is associated with neurobehavioral changes. This introduces new challenges, for example, increase in risk-taking behaviours, but also new opportunities for social, emotional, and motivational learning (Dahl, 2016^[44]; Dahl, 2004^[45]; UNICEF, 2017^[46]; Patton et al., 2016^[47]). Children and adolescents rely on their environment for protection and for the resources and guidance needed for a healthy development (Patton et al., 2016^[47]; Ben-Arieh et al., 2014^[48]).
- Epidemiology understands the ways in which various social and biological factors occurring during child development exert an influence over the life course. These factors may have an independent influence but they can also interact with each other. This approach links early-life exposure with the determinants of health states and events throughout the life course (Ben-Shlomo, 2002^[49]; Hertzman and Boyce, 2010^[50]; Lynch and Smith, 2005^[51]).
- The economic approach places an emphasis on self-productivity and the dynamic complementarity processes to explain lifetime dependencies in the acquisition of human and social capital (Cunha and Heckman, 2007^[52]; Conti and Heckman, 2014^[33]). Self-productivity refers to the idea that capabilities produced at one stage of development increase the chances of attaining other skills at later stages. Capabilities are self- and also often mutually reinforcing. For example, good health fosters learning, which in turn may promote emotional security (Payton et al., 2000^[53]; Fiscella and Kitzman, 2009^[54]). Dynamic complementarity means that capabilities acquired at one stage of the life course raise the productivity of investment at subsequent stages: for example, mastering basic mathematic concepts makes learning more complex concepts easier and fosters problem solving later in life (Chu, vanMarle and Geary,

2015^[55]; Chu et al., 2018^[56]). The economic approach also puts forward the benefit of allocating resources to investments in early childhood to benefit from the cumulative effect expected throughout childhood and in adult life (Currie, 2009^[57]; Almond, Currie and Duque, 2018^[58]). It also helps explain the processes behind the transmission of socio-economic inequalities from one generation to the next (Aizer and Currie, 2014^[59]; OECD, 2018^[60]; OECD, 2019^[61])

- The "ecological" approach to human development recognises the interdependencies between the child, their immediate- environment (i.e. family, school, peer groups, neighbourhood, etc.), the more distant context (e.g. parents' working conditions,) and the broader cultural context (Bronfenbrenner, 1979^[62]; Bronfenbrenner and Ceci, 1994^[63]; Bronfenbrenner et al., 1986^[64]; Lacharité, Éthier and Nolin, 2006^[26]; Garbarino, 2014^[65]). This approach emphasises that the well-being of children cannot be understood as belonging to separate independent worlds (e.g. family on the one hand and school on the other) but that good connections between these different environments are required. For example, it is often important for children to be able to invite school friends home, or to be able to go to birthday parties. On another level, regular contact between parents and teachers is necessary for children to be better supported by at school and in the family.

Principle 3: Measurement should be age-sensitive

The third foundational principle of the conceptual framework is that child well-being, and the measurement of child well-being, should be sensitive to children's age (or stage of development) and reflect the changing nature of what children need, want, and should be able to achieve as they move through childhood.

"Children" are not a single lump. What it means for children to have a good life at, say, age 1 or age 2 is very different to what it means to have a good life at age 16 or 17. There are, of course, some aspects of child well-being that are relatively constant across childhood, at least in general terms. All children, like all adults, need access to (age-appropriate) food, clothing and housing, for example. But many aspects of child well-being are relevant mostly or only to children in certain age groups or at certain stages of development.

Children's needs provide one such example. Broadly speaking, children's needs evolve along the following sequence as they move through childhood:

- **Pregnancy and infancy** (Pregnancy to about age 2): During the first few years of life, children require a physically and nutritionally healthy start to life, low stress during pregnancy, secure attachment with a parent or a caregiver, and appropriate stimulation and movement to support brain-, nervous system-, and muscular development. Sleep and the sleeping routine is central, as at this age, a considerable amount of brain "wiring", immune functioning, and physical growth occur during sleep.
- **Early childhood** (roughly, 3- to 5-year-olds): For children in early childhood a stable routine is important, including a regular sleep pattern. Good quality nutrition, and opportunities for physical and educational play support healthy development. Secure relationships and safe and good quality housing are also important during early childhood. Access to good quality early childhood education and care can also be beneficial, especially for children from disadvantaged backgrounds (see Chapter 6).
- **Middle childhood** (roughly, 6- to 12-year-olds): For children in middle childhood, the brain is still developmentally flexible enough for children to "catch up" on learning if they have missed out on opportunities earlier in life. In addition to reading, writing and numeracy, other fundamental skills such as language, reasoning, behavioural and social skills all develop during this stage of childhood. Children's appetite for learning requires that they are intellectually stimulated. Children's

peer relationships are developing and different emotional and physical developments take place, all of which build on children's need to be listened to, respected and socially recognised.

- **Late childhood** (or adolescence; roughly, 13- to 17-year-olds): A range of new needs emerge as children reach late childhood and adolescence. The challenges of becoming more independent from parents, of achieving qualifications and of new relationships all begin to emerge. This is also a time when hormonal changes are affecting how young people think, behave and react. Sharing collective values and feeling respected by others grows in importance, as does risk-taking.

Child development provides a second example. Research on child development suggests that, while many aspects of development have their roots in early childhood, some are more responsive or experience deeper changes during particular stages of childhood (Box 2.3). One example is the development of self- and social identity, much of which occurs during adolescence (see Chapter 5). There is also evidence to suggest that, at certain ages, particular well-being outcomes or behaviours are more sensitive to variations in the environment and settings in which children live (Gardner et al., 2018^[66]; OECD, 2019^[61]).

In practical terms, treating child well-being as age (or stage-) sensitive means that, where needed, measurement should make use of age- (or stage-) appropriate variations in measures and/or age- (or stage-) specific measures in order to capture what is most important to children's lives at each stage of childhood. Put differently, measurement should be responsive to children's age and development, and should not discount or exclude aspects or measures of well-being that are important on the grounds that they are not relevant to *all* age groups. A further implication is that, where possible, measures that apply across childhood should be disaggregated by child age.

Box 2.3. Child development across the stages of childhood

Early childhood

A large body of research across the different disciplines affirms the early years (from pregnancy up to roughly age 5) as a critical period for securing a good start in life (Shonkoff and Philipps, 2000^[67]). Birth outcomes provide the first indication of any possible developmental or health problems that may affect children over the short and long term. For example, premature birth and low birth weight are associated with poorer health and lower educational attainment (Currie, 2009^[57]; Almond, Currie and Duque, 2018^[58]). Maternal prenatal distress is also shown to have an adverse impact on child health and behavioural outcomes such as children's temperament. This is significant as temperament moderates the effect of a poor caregiving environment and exposure to adverse circumstances, with a difficult temperament increasing the likelihood of children exhibiting more behavioural problems (Pluess and Belsky, 2011^[68]).

Early childhood is also crucial for the development of basic cognitive and socio-emotional skills, which serve as a fundamental basis for future achievements at school, in the labour market, and for self-actualisation more generally (NSCDC, 2016^[69]; Dehaene, 2018^[70]; Shuey and Kankaras, 2018^[71]). Skills learned early in life are also important for resilience, and inform how children will cope with the many successes and setbacks that adult life contain (Settersten, McClelland and Miao, 2014^[35]; Torche, 2019^[36]). Two factors contribute to making the early years critical for child development. First, the rate of learning is faster than at any other time in life as the brain's plasticity is at its strongest during the first few years of life (Knudsen, 2004^[41]; NSCDC, 2016^[69]). Second, at this age, children's meeting of developmental milestones is strongly influenced by the quality of care and interactions provided by parents (or caregivers) and, where relevant, early childhood education and care services (Morris et al., 2007^[72]; Zimmer-Gembeck et al., 2017^[73]; Shuey and Kankaras, 2018^[71]). Gaps between children emerge can early in life, in part because of differences in family economic resources, parental education

and care practices, and access to and the use of early childhood education and care and family support services.

Middle childhood

Middle childhood (roughly, ages 6 to 12) is rich in opportunity for child development, yet is often neglected in the research relative to early childhood and adolescence (McHale, Dariotis and Kauh, 2003^[74]; Mah and Ford-Jones, 2012^[75]). Middle childhood is a time an important time for skill consolidation and it is also when children become more engaged in school life. For instance, when it comes to language learning, children start to use more complex grammatical constructions, and they gain an increasing sensitivity to verbal ambiguity, as well as a comprehension of non-literal forms of speech such as sarcasm and metaphor (Keenan, Evans and Crowley, 2016^[42]). Improvements in cognitive performance relative to the ranking obtained during early childhood or, alternatively, their deterioration have effects that persist over time and which can impact completed educational attainment as well as other adult outcomes such as health, employment or income level (Feinstein and Bynner, 2004^[76]).

Middle childhood is also a period when children's social worlds expand, making self-regulation and control, as well as the ability to read and understand expectations of new social settings essential (Mah and Ford-Jones, 2012^[75]; Keenan, Evans and Crowley, 2016^[42]). It is a time when social competencies are practiced and refined. For example, there is some evidence to suggest that, at around this age, children start attributing moral values to their own and others' behaviours and form value priorities that develop over time (Daniel et al., 2020^[77]; Daniel et al., 2014^[78]).

Despite the evidence on the importance of the transitional years middle childhood represents, international and comparable data covering this period of children's lives are still lacking (Richardson and Ali, 2014^[79]; OECD, 2015^[21]). Developing relevant data for this age group is therefore an important challenge to overcome.

Late childhood (adolescence)

Adolescence (roughly, ages 13 to 17) has received considerable attention in the research literature, with much highlighting it as a critical period during which a number of key developmental milestones are met (Arnett, 2007^[80]; Patton et al., 2016^[47]). In addition to physical and sexual maturation, developmental milestones include the development of capacity for abstract reasoning (Smith and Handler, 2007^[81]; UNICEF, 2017^[46]), the acquisition of social and economic independence, the development of self- and social identity, and the acquisition of skills needed to fulfil adult roles and establish adult relationships. Also, some personal traits developed during adolescence are reflected later on in adulthood. For instance, some evidence suggests that adolescents with positive affects (i.e. showing happiness or cheerfulness) during their adolescence experience fewer relationship difficulties in early adulthood (i.e. less self-reported and partner-reported conflict, and greater attachment with friends, greater job satisfaction and better mental health outcomes (i.e. lower levels of depression, anxiety, and lower degree of loneliness) (Kansky, Allen and Diener, 2016^[82]).

While adolescence is a time of exceptional growth and potential, it is also a time of significant risk taking where the social context can have a determining influence (Albert and Steinberg, 2011^[83]). In particular, many adolescents face pressures and incentives to engage in risky behaviours, from smoking and consuming alcohol or other drugs, to engaging in unsafe sex. These activities place them at high risk of intentional or unintentional trauma, unwanted pregnancy, and sexually transmitted infections. In particular, health-related behaviours that develop during this period, such as for example drug use and unsafe sex, can have lasting positive or negative effects on future health and well-being.

Adolescence is an important point in time for intervening to support young people socio-emotional well-being and mental health. Half of all lifetime mental health disorders seem to start by the age 14 years

and there is a significant association between child mental health and later adult mental health and other outcomes (Kessler et al., 2007^[84]). Some intervention programmes targeted at disadvantaged adolescents are more effective than those designed for younger children, signifying the relevance of adolescence as a critical period for intervention (Gardner et al., 2018^[66]; UNICEF, 2017^[46]). One reason might be that the adolescent brain undergoes structural remodelling and neuronal reconfiguring as it transitions to the mature adult structure, in which case adolescents may become more sensitive to certain aspects of their environment (UNICEF, 2017^[46]).

Principle 4: Measurement should integrate children’s views and perspectives

The fourth foundational principle of the conceptual framework is that children’s own views and perspectives matter, and these views and perspectives should be taken into account, where relevant and possible, when measuring child well-being.

There are two related but separate concerns when it comes to integrating children’s voices, views and perspectives into measurement. The first is whether children should be consulted in the identification of key aspects, dimensions and measures of well-being. The core argument here is that, while children’s well-being is an obvious concern to adults (especially their parents), adults’ perceptions of what is important for children often differs from that of children’s (Bradshaw and Rees, 2017^[85]; Doek, 2014^[86]).

Involving children as active participants in the construction of child well-being measurement raises some issues. One is that children are not a uniform group: what is important to children themselves is likely to differ strongly with age, for instance, but also potentially by other demographic and socio-economic markers. A second challenge is that it is difficult to involve young children in this kind of consultative process. For new-borns and the very youngest, it is impossible.

The second issue is the relevance of using self-reported assessments for measuring child well-being outcomes. Children’s social well-being provides one example where self-report data is highly valuable. Children, like adults, are social-beings. They have a great need for social relationships and interactions, and to feel like they are a part of society. The feeling of being fairly treated by family members, teachers or friends is important for children’s perception of their well-being (Kowal et al., 2002^[87]; Pretsch et al., 2016^[88]; Mameli et al., 2018^[89]; Gini et al., 2018^[90]; Main, 2019^[91]). Conversely, experiences of discrimination or bullying, which undermine children’s sense of belonging and interactions with others, can be damaging for self-image, and leave children feeling socially excluded and isolated (Arseneault, Bowes and Shakoor, 2010^[92]; Arseneault, 2017^[93]; Oexle et al., 2020^[94]; Priest et al., 2013^[95]). These, and other important aspects of children’s lives, can only be monitored properly by listening to children and through self-reported data from children themselves.

On top of self-assessments, many researchers also see value in listening to children’s thoughts and views on various specific aspects of their lives. The *Children’s Worlds* surveys, for instance, ask children not just for their thoughts about themselves, but also their home, their possessions, and their neighbourhood, among other things (Children’s Worlds, 2020^[96]). Child self-report data like this can help shed light on to the degree to which their needs and preferences are being properly met in many different well-being areas, including their home life, their school life, and their life in the community.

A third issue has to do with the use of “subjective well-being” measures (Box 2.4) which provide broad assessments of how life is going overall; feelings and emotions; or purpose. In recent years, a number of OECD countries have introduced measures of subjective well-being into their well-being monitoring activities (Exton and Shinwell, 2018^[97]), including in some instances child well-being monitoring activities. (See for example, the child well-being measures used by the United Kingdom (ONS, 2018^[98])).

Subjective and self-report child data do come with limits and caveats. Some of these are general and apply to subjective data collected from adults, too. They include, for example, potential frame-of-reference effects

– where differences in life experiences and the way respondents see themselves relative to others influence the way they formulate answers – and adaptation effects – where the initial boost to subjective self-assessments delivered by positive life events, and the damage delivered by negative life events, diminishes over time (OECD, 2013^[99]). For children, there may be additional concerns around their ability to fully express themselves. Techniques such as visual methods and vignette or story-based methods can help overcome the latter issue (Rees, Andresen and Bradshaw, 2016^[100]; Lam and Comay, 2020^[101]), and initiatives like the *Children’s Worlds* surveys have shown that, at least for children above a certain age, it is possible to collect self-report and subjective child data in a reliable way (Casas, 2017^[102]; Casas and Rees, 2015^[103]; Bradshaw, 2019^[104]). Nonetheless, as the OECD recommends for subjective well-being data more generally (OECD, 2013^[99]), subjective and self-report child data should be interpreted with some degree of caution, and may be best used to complement rather than replace other measures of child well-being (Raghavan and Alexandrova, 2015^[10]).

Integrating children’s views and perspectives has two main practical implications for child well-being measurement. First, to the extent possible, children’s thoughts and views should be used to help inform the identification of aspects and dimensions of child well-being for measurement. This can help ensure measurement remains meaningful to children themselves. Second, where relevant, measurement should use indicators based on self-reported data from children, alongside other forms of data. This includes measures of “subjective well-being” but also other types of self-report data covering children’s views on other (more specific) aspects of their lives, to be used where relevant in combination with other types of data (e.g. objective measures, parent-reported data) to provide a rounded view of the issue.

Box 2.4. What is subjective well-being?

For many researchers, a central pillar of well-being is how people themselves think and feel about their lives. Both for adults and for children (above a certain age), researchers see great value in listening to people’s own views about whether they are satisfied with their lives, feel their lives have meaning and purpose, and whether they experience a positive balance of emotions and states. Together, these elements are often collectively called “subjective well-being”, which includes three core components (Clark et al., 2019^[29]; OECD, 2013^[99]; Boarini, Johansson and Mira d’Ercole, 2006^[11]):

- **Life evaluation**, which captures people’s satisfaction with their lives and/or with certain aspects of their lives;
- **Affect**, (also known as experienced well-being), which captures which capture the emotions, feelings and states experienced by the respondent at a particular point in time. This includes positive affects (i.e. feelings of happiness, joy, vitality) and negative affects (i.e., feelings of insecurity, sadness, anger, or of depression);
- **Eudaimonia** (psychological “flourishing”), which is often understood as capturing whether people feel that the things they do in life are worthwhile, but can also include self-perceptions of autonomy, capabilities, competence, sense of purpose, locus of control, and other aspects of psychological well-being or flourishing.

Principle 5: Measurement should capture children’s environments

The fifth foundational principle of the conceptual framework is that children’s environments are central to child well-being, and should be fully integrated into well-being measurement. Measurement should reflect the resources that children can draw on, and the risks they are exposed to, at home, at school, and in the community, and how these risks and resources differ across children.

Environments are important for everyone’s well-being, but the well-being of children, as dependent members of society, is particularly strongly embedded in the settings and environment in which they live (Box 2.5). Families, schools, neighbourhoods and communities can all impact on children’s lives. Especially in the early stages of childhood, children’s well-being depends heavily on their parents or carers. By early adolescence, it increasingly depends on the way they connect with peers and wider society.

Children’s environments can impact child well-being in potentially contradictory ways. Good environments can act as a resource for well-being, providing children with the materials, support and opportunities needed to thrive. A positive school environment, for example, can help to promote not just children’s learning, but also their socio-emotional well-being (Box 2.5). Conversely, bad environments can carry risks for children’s well-being. These environmental risks and resources – and differences in the distribution of environmental risks and resources across children – are one important mechanism for the transmission of inequalities across generations (OECD, 2018^[60]).

Informed in large part by Bronfenbrenner’s (1979^[62]; 1989^[105]) “ecological” approach to human development (see Box 2.2), in recent years, a number of child well-being measurement activities have looked to better integrate children’s environments into well-being measurement. For example, in their most recent *Report Card* on child well-being (UNICEF, 2020^[24]), UNICEF Innocenti Research Centre adopted a “multi-level” measurement framework that reflects the layers of influences that surround children and impact on outcomes. An “ecological” conception of child well-being also underpins the national child well-being activities or measurement frameworks used by Australia (AIHW, 2020^[106]), New Zealand (DPMC, 2019^[107]), and to some extent Ireland (DCYA, 2014^[108]).

In practical terms, adopting an “ecological” approach and integrating children’s environments into the measurement of well-being means the environmental factors should be measured alongside and in addition to child well-being outcomes. To the extent possible, measurement should provide information on children’s families and home life, on the school and classroom environment, and on the broader neighbourhood and communities in which children live. It should capture inequalities in environments across children, and how, from the start, different children have access to, and are exposed to, different environment risks and resources. Importantly, measurement should make clear that these environmental measures do not capture children’s well-being outcomes in themselves; instead, they are environmental drivers that have the capacity to influence children’s well-being outcomes.

Box 2.5. The importance of environments for children’s well-being

Environments can play a pivotal role in children’s lives. Children’s environments can influence what is possible for children to achieve. A nurturing and inspiring environment, for example, can help build child resilience and provide children with the resources needed when faced with adversity (OECD, 2019^[61]). Children’s environments can even influence what is *desirable* for children to achieve by, for example, shaping norms, attitudes and aspirations (Weisner, 1998^[109]; Minkinen, 2013^[110]; Ben-Arieh et al., 2014^[5]; Aschauer, 2019^[111]).

Several aspects of children’s environments are important for well-being. The family environment, for example, can influence children’s well-being through various channels, including family material living conditions and the relationships with parents and caregivers. As discussed in later chapters, poor quality housing and family poverty affect child well-being because material resources are lacking and/or because poverty generates financial stress that may damage the quality of intra-family relationships (Cooper and Stewart, 2013^[112]; Cooper and Stewart, 2017^[113]; Schenck-Fontaine and Panico, 2019^[114]). By contrast, good quality interactions between toddlers and parents, involving language-rich interactions through reading books and having conversations is key to foster good language development in the early years of life (Sylva et al., 2010^[115]; Rowe, 2018^[116]; Sperry, Sperry and Miller,

2018^[117]). These are also important factors contributing to the transmission of inequality from one generation to the next (Haring, Sorin and Caltabiano, 2019^[118]; Lahire, 2019^[119]). More broadly, parenting styles can influence parent-child communication vary with regards to the ways children communicate with parents, can exercise a say in the decisions affecting them and be listened and supported within family (Rodrigo, Byrne and Rodriguez, 2014^[120]).

Particular family circumstances can jeopardise children's basic sense of security and compromise their development (OECD, 2019^[61]). Parental separation can, for instance, be associated with both material insecurity and emotional disruption affecting children's academic achievements (Amato and Boyd, 2013^[121]; Härkönen, Bernardi and Boertien, 2017^[122]). Other family circumstances can create even more serious disruption in child emotional bonds, such as a lack of placement permanency for children in out-of-home care, which prevents children from making plans for the future and from developing the emotional and affective relationships they need to grow as individuals (Lerch and Nordenmark Severinsson, 2019^[123]). Exposure to violence during childhood is also a traumatic experience which increases the later risk for substance abuse, suicide, prostitution or violence aimed at other persons (UNICEF, 2017^[124]; Salmona, 2018^[125]).

The school environment plays a key role in shaping children's intellectual, personal and social development. For younger children, high quality education and care services are key to enhancing child motor development and early learning, especially for disadvantaged children (van Huizen and Plantenga, 2018^[126]; Shuey and Kankaras, 2018^[71]; OECD, 2020^[127]). Among older children, feeling respected at school and supported by teachers is key to their well-being at school as well as to their life satisfaction in general (OECD, 2017^[128]; Rees, 2017^[14]). A positive school climate has been found to be a strong predictor of emotional and learning outcomes. A positive school climate is associated with better school performance among children of low socio-economic status (Aldridge et al., 2016^[129]), while a negative climate is associated with increased behavioural problems (Wang et al., 2010^[130]; OECD, 2019^[131]).

However, school can be a place where children have negative experiences and may not always feel safe or happy. In particular, children can experience bullying at school and this has the potential for a lasting impact on psychological and social well-being, as well as academic performance (Tokunaga, 2010^[132]; Juvonen, Yueyan Wang and Espinoza, 2011^[133]; Eriksen, Nielsen and Simonsen, 2014^[134]). Bullying may continue or arise for some children outside of school through the Internet and cyberbullying, with similar implications for children's physical and mental health as traditional face to face bullying (Koo et al., 2011^[135]; Livingstone, Stoilova and Kelly, 2016^[136]; OECD, 2018^[137]).

Several aspects of children's local and built environment (i.e. at the community or neighbourhood level) play a key role in child well-being as they affect the quality of life of families and operate as a source of opportunities for children (Freisthler and Crampton, 2008^[138]). For instance, children's opportunities to learn and socialise (as well as to form aspirations in this regard) often depend crucially on the availability (and affordability) of education, care, recreation and play services. Concerns around the construction of the built environment can be particular important for children with disabilities: well-designed built environments can facilitate children with disabilities' participation in society and the community, while poorly-designed environments do the opposite (Anaby et al., 2013^[139]; Anaby et al., 2014^[140]). Housing policies, urban planning, and the quality of transportation are key for making the lives of families better and develop child-friendly cities (UNICEF, 2018^[141]; Nam and Nam, 2018^[142]; Woolcock, Gleeson and Randolph, 2010^[143]).

The environmental quality of children's neighbourhood matter for numerous dimensions of well-being. For instance, children's exposure to air pollution, including during the pre-natal period, can impair immune systems or lead to the development of chronic respiratory problems, including asthma, and to

certain vitamin deficiencies (Buka, Koranteng and Osornio-Vargas, 2006^[144]; Currie, 2013^[145]; Landrigan et al., 2019^[146]).

The quality of the neighbourhood where children grow up is also a key determinant of their trajectories since there is evidence that children who live in an area with high residential segregation, high income inequality, lower quality schools or high crime rate, have lower chances than others to experience an upward income mobility (Chetty and Hendren, 2018^[147]; OECD, 2018^[60]).

An important point to emphasise is that the different elements of children's environments are not entirely separate from one another. Rather, the home, the school, and the community have multiple connections, which form what Bronfenbrenner (1989^[105]) calls the "meso-system". The quality of this meso-system can have a major consequences for child well-being. For instance, learning to read depends not just on activities that take place in school, but also on the extent to which academic learning takes place in the home (Shuey and Kankaras, 2018^[71]). Likewise, the quality of friendship ties developed by children with their peers at school depends on the possibilities children may have to invite friends at home or to meet them outside in a safe and pleasant neighbourhood.

Principle 6: Measurement should include child-related public policies

The sixth and final foundation principle of the conceptual framework is that public policy can and does matter for child well-being and that, similar to children's environments, child-related public policies should be integrated into the measurement of children's well-being.

A large research literature, including from the OECD (OECD, 2009^[20]; OECD, 2011^[148]; Thévenon, 2018^[149]), has built up around the links between public policies, legal frameworks, and children's well-being outcomes. The ways in which these factors can shape children's lives are far reaching. Childcare policies and other measures to support the reconciliation of work and family life are one example. These policies can help support parental employment, for instance, and provide parents with time at home to care and educate children. Child support systems that set the rules for financial transfers and for child custody when parents separate are another, even if the rules are enforced, are not always adapted to the complexity of families' situations (Miho and Thévenon, 2020^[150]). Family and parenting support services also help vulnerable families to develop positive family functioning and parenting practices (Acquah and Thévenon, 2019^[151]). The way health systems provides care to children from birth, monitor children's health, promote standards of nutrition, immunisation, or health behaviours are also important institutional elements impacting child health and possibly other dimensions of child well-being (OECD, 2009^[20]; Lo, Das and Horton, 2017^[152]; WHO, UNICEF and World Bank, 2018^[153]).

The laws and legislation of a country perform a fundamental duty towards child well-being as far they provide for children's rights and lay out obligations on behalf of parents and the state. However, they also carry with them an intrinsic value; for instance, children's awareness of their rights and their perception that adults respect their rights seems to bring higher levels of subjective well-being (Casas, González-Carrasco and Luna, 2018^[154]).

Many cross-national multi-dimensional child well-being studies do not cover public policies as part of well-being measurement (UNICEF, 2007^[18]; Bradshaw and Richardson, 2009^[19]; OECD, 2009^[20]; OECD, 2015^[21]). However, especially when looking to examine and compare children's being across countries, it is difficult, if not impossible, to get a full picture without integrating policy supports in some form.

2.3. A conceptual framework for measuring child well-being

This section outlines the conceptual framework for child well-being measurement. Using the foundational principles laid out in the previous section as its building blocks, the framework builds on and extends the OECD's existing approach to child well-being measurement. It provides a renewed structure and set of guidelines detailing which aspects of children's lives should be measured, and how, in order to better monitor child well-being and its determinants.

The full measurement framework is shown in Figure 2.2. In line with the principles outlined in the previous section, the key features of the framework's structure and thematic content are as follows:

- **Multi-dimensional:** The framework adopts a multi-dimensional approach to child well-being measurement. It looks to monitor how children are doing in many different areas of life, with multiple indicators used to capture a range of aspects of child well-being.
- **Forward-looking:** The framework is built around the idea that children should be able to both enjoy a "good" positive childhood in the here and now, and have the opportunity to develop skills and abilities that set them up well for the future.
- **Age- and stage-sensitive:** The framework looks to reflect the changing nature of children's needs across childhood. It recognises not just the child well-being measures and indicators should be age- (or stage-) sensitive, but also that, in some cases, the concepts or aspects to be measured themselves change as children grow up.
- **Multi-level:** In line with several recent child well-being measurement initiatives (e.g. UNICEF (2020^[24])), the framework adopts an "ecological" or "multi-level" structure that acknowledges and integrates important (potential) influences on children's outcomes (Bronfenbrenner, 1979^[62]; 1989^[105]; Minkinen, 2013^[110]). The framework contains four "levels" in total, organised according to the proximity to the child: child well-being outcomes; children's activities, behaviours and relationships; children's settings and environments; and child-relevant public policies.

In addition to these structural and thematic features, the framework also specifies a series of properties for the measures and indicators that would, ideally, be used to populate the framework. These properties imply that, where relevant and as far as possible, measures and indicators should:

- **Be child-centred:** As is now common in child well-being research, child well-being measures and indicators should be *child-centred* wherever possible, with children (not families or households) used as the unit of analysis.

Figure 2.2. The conceptual framework for child well-being measurement

Level A. Children's well-being outcomes		Dimension	Measures and indicators should:
Outcome area	Dimension		
A1	Material outcomes	Food, clothing, and basic necessities Housing and housing quality Leisure and learning materials	- Be child-centred , with children (not families or households) used as the unit of analysis wherever possible.
A2	Physical health outcomes	Birth outcomes Physical development Physical health status	- Be age- and stage-sensitive , with age- (or stage-) appropriate (variations of) measures used where relevant.
A3	Social, emotional and cultural outcomes	Safety, emotional security, and basic emotional needs Identity, social and cultural identities, and basic social needs Socio-emotional skills Mental health status and disorders Life satisfaction and satisfaction with home life, with school life, and with community life	- Reflect children's views where possible, both in the design and selection stage and in the measures themselves, through the use of self-report and subjective child data.
A4	Cognitive development and education outcomes	Cognitive skills and abilities and related learning skills Educational progression and attainment Satisfaction and confidence in learning	- Reflect what is important for contemporary childhoods in OECD countries, accounting for changes in the way that children live their lives and new and emerging risks and opportunities.
Level B. Children's activities, behaviours and relationships		Dimension	Measures and indicators should:
Area	Dimension		
B1	Family activities and relationships	Activities with parents and family Child parent and family relationships	- Capture stability, change, and transitions in important areas of children's lives
B2	Health behaviours	Protective health behaviours Risky health behaviours	- Capture inequalities and the distribution of well-being across children, in addition to average levels of well-being, including through measures of gaps and disparities between different groups of children.
B3	Social, leisure and civic activities and relationships	Social and leisure activities Civic and voluntary activities Friendships, peer relationships, and social support	- Be responsive to the needs of children from diverse backgrounds and/or in vulnerable positions , with additional circumstance- and background-appropriate (variations of) measures used where relevant.
B4	Learning activities, attitudes, behaviours and relationships	School and ECEC activities, attitudes and behaviours Child teacher and classmate relationships Learning motivation and aspirations Home and out-of-school learning activities	
B5	Digital activities and behaviours	Digital activities and behaviours	
Level C. Children's settings and environments		Dimension	Measures and indicators should:
Area	Dimension		
C1	Family and home environment	Family financial resources and work arrangements Family living and custody arrangements Family relationships Family support networks Family physical and mental health Family violence and abuse	
C2	School and ECEC environment	School and ECEC climate School- and teacher-parent relationships School and ECEC-provided material supports and activities	
C3	Community and physical environment	Crime and violence Noise, pollution and air quality Local green spaces Local cultural and learning services/facilities Local play and leisure services/facilities Community material support services and activities Community social support services and activities	
Level D. Public policies		Dimension	Measures and indicators should:
Area	Dimension		
D1	Family policies	Family financial support policies Family employment-related support policies Family and parenting support service policies Child support regulations	
D2	Housing policies	Public family housing support policies Housing and built environment regulations and policies	
D3	Health policies	Physical and mental health policies	
D4	Education policies	ECEC regulations and policies Education regulations and policies	
D5	Environmental policies	Environmental quality regulations and policies	

- **Reflect children’s views:** Children’s voices should be heard throughout the measurement process, including both in the indicators design and selection stage (in order to reflect what matters most to children themselves), and in the measures themselves, through the use self-report and subjective child data.
- **Reflect contemporary childhoods:** Related to the above, indicators should be relevant to and meaningful for children growing up in OECD countries today. They should reflect what is important for contemporary childhoods in OECD countries, accounting for changes in the way that children live their lives, and reflecting the opportunities and risks faced by children today.
- **Be age- and stage-sensitive:** In addition to framework content being age- (or stage-) appropriate, in many cases, child well-being indicators should also be sensitive to children’s age and/or stage of development, with age- (or stage-) appropriate (variations in) measures used where relevant.).
- **Capture inequalities:** Indicators should capture not just average levels of well-being in a given area of children’s lives, but also the *distribution* of well-being across children, including through measures of inequalities and disparities across different groups of children (e.g. by sex, by living arrangement, and by migrant background).
- **Capture stability, change, and transitions:** In addition to “static” measures of children’s well-being, indicators should where relevant look to capture stability, change and transitions in important areas of children’s lives, as well as the persistence and duration of children’s exposure to important risk (and protective) factors.
- **Be responsive to the needs of children in vulnerable positions:** Indicators should where possible be flexible and responsive to the challenges faced by children in vulnerable positions.

The following two sub-sections provide more detail on the structure and thematic content of the framework, and on its guidelines for indicator selection and measurement, respectively.

The framework’s four levels

Level A: Children’s well-being outcomes

The framework’s first and central level, Level A, covers children’s well-being outcomes. This is the core of the framework. The aspects covered at this level capture how children are doing in life. They aim to reflect whether children are enjoying a good childhood today, and whether they learning, growing and developing in ways that set them up well for tomorrow, given their circumstances.

As outlined earlier in Box 2.1, the framework focuses on children’s well-being outcomes in four (inter-related) thematic areas (Figure 2.2): material outcomes, physical health outcomes, social, emotional and cultural outcomes, and cognitive development and educational outcomes. Each of these areas contains a range of more specific outcome dimensions. Following the framework’s foundational principles, these dimensions are age-sensitive rather than strictly universal (Principle 3), and include outcomes that are relevant both to children’s well-being in the here-and-now, and their well-being in future (Principle 2). Measurement can be either objective (e.g. educational attainment), subjective (e.g. children’s satisfaction with their learning), or both, depending on the exact outcome in question (Principle 4).

The conceptual and empirical bases for each of the framework’s four outcomes areas are outlined in Box 2.1 and discussed in detail in the corresponding later chapters of this report. As a brief summary, the four outcomes areas are:

- A1. *Material* outcomes, which covers children’s access to material resources, including essential or important goods, services and activities. This includes their access to basic necessities like food, clothing and housing, but also other material goods and activities (e.g. a computer and the internet) that, depending on age, are important for children growing up in OECD countries today (see Chapter 3).

- A2. *Physical health* outcomes, which covers children’s health status and physical development. In broad terms, this area covers outcomes relating to whether children are healthy, free from illness, injury and disease, and developing and functioning well, given their background and circumstances (e.g. presence of disabilities) (see Chapter 4).
- A3. *Social, emotional and cultural* outcomes, which covers outcomes relating to children’s behaviours, emotions, and thoughts and feelings towards themselves and others, as well as related outcomes tied to social and cultural identities. This area covers many of the more “subjective” aspects of children’s well-being, ranging from basic emotional security and their sense of safety, to their sense of identity (e.g. sexual, gender and cultural identities) and belonging and over-arching life satisfaction. It also covers children’s socio-emotional skills, mental health, and overall psychological functioning and well-being (see Chapter 5).
- A4. *Cognitive development and education* outcomes, which covers outcomes relating to children’s learning, knowledge, and cognitive skill and ability development. This area includes measures of children’s cognitive development – including early cognitive development outcomes for younger children, such as emerging literacy and numeracy – as well as their progression through the education system, their educational attainment, and their satisfaction with their learning (see Chapter 6).

Level B: Children's activities, behaviours and relationships

Moving from outcomes to influences, the framework’s second level, Level B, covers child-level factors that have important links to children’s well-being outcomes (Figure 2.2). These are the things that children do or are involved in that can contribute to, or detract from, their well-being. They include children’s activities, such as play, exercise, and studying, their behaviours, like healthy eating, and their relationships with parents, friends and peers, and other important adults, such as teachers. Children’s attitudes and aspirations, including their attitudes to school, are also included at this level.

Importantly, while these child-level factors directly *involve* children, they are not always under children’s full control. Indeed, in many cases, children’s activities, behaviours, attitudes and relationships are shaped by the decisions and actions of family and friends, as well as the wider environment around them (Minkkinen, 2013^[110]; UNICEF, 2020^[24]). In some cases, especially (but not only) for younger children, certain activities and behaviours are determined wholly by the choices of, and the opportunities provided by, parents and wider society. Many of the environmental factors covered later in the framework (Level C) are also important in shaping the things that children can do or engage in.

The framework focuses on children’s activities, attitudes, behaviours and relationships in five thematic areas (Figure 2.2): family activities and relationships; health behaviours; social, leisure and civic activities and relationships; learning activities, attitudes, behaviours and relationships; and digital activities and behaviours. These five areas are not tied explicitly to one particular well-being outcome area. Certain activities or behaviours may, of course, be *more* relevant or *more* important for some outcomes than for others. However, as discussed in Box 1.2, the inter-connected nature of well-being means that few activities, behaviours or relationships are relevant only to one specific outcome or outcome area.

Level B’s five thematic areas are:

- B1. *Family activities and relationships*, which includes children’s time and activities with parents (or caregivers) and the family, as well the strength and quality of child-parent (or child-caregiver) and child-family relationships. Children’s time and activities with caregivers and the quality of child-caregiver relationships is central to healthy development in several areas. This includes children’s social-emotional development, especially (but not only) during early childhood (Chapter 5), as well as their learning and early cognitive development (Chapter 6).

- B2. *Health behaviours*, which covers a number of risky and protective child health behaviours that may impact on well-being now or in future. Key risk behaviours include smoking, substance use, alcohol use, and practicing unsafe sex. Protective behaviours include regular physical exercise, healthy age-appropriate eating behaviours, regular age-appropriate sleep patterns, as well as safety-oriented behaviours such use of seatbelts. Many of these behaviours have clear and well-known links to children’s current and future physical health (see Chapter 4). However, they may also be relevant to other aspects of well-being. For instance, practicing regular physical activity during childhood is known to be predictive of adolescent mental health and social inclusion (Eime et al., 2013_[37]).
- B3. *Social, leisure and civic activities and relationships*, which includes a range of child-level factors linked to children’s social connections and relationships and well-being more generally. This includes the strength and quality of children’s friendships and peer relationships, as well as the broader social support networks, such as the availability of a trusted adult that they can turn to when in need. Children’s civic participation and engagement are also included in this area. Social, leisure and civic activities are important for a range of child well-being outcomes, especially (but not only) aspects of social, emotional, cultural and psychological well-being (see Chapter 5).
- B4. *Learning activities, attitudes, behaviours and relationships*, which covers children’s learning-related activities, attitudes and behaviours both at school (or childcare) and at home, as well as their relationships with teachers and classmates. Examples of important school-related factors include attendance, absence and truancy, learning engagement and motivation to achieve. Those at home include engagement in and attitudes towards homework and reading for leisure. These behaviours are most closely linked to children’s cognitive and educational outcomes, with important further effects on future career and employment outcomes and quality of life in adulthood (Chapter 6).
- B5. *Digital activities and behaviours*, which covers children’s use of digital tools (e.g. smartphones, tablets, computers, video games) and their online activities and behaviours (e.g. use of social media). Digital technologies are creating a number of new opportunities and risks for children (Burns and Gottschalk, 2020_[155]; Burns and Gottschalk, 2019_[156]), and their impact on child well-being is likely complex. The science on the effects of digital technologies on children’s outcomes is ongoing, but there may be links between (certain types of) digital activities and behaviours and a range of social and emotional outcomes, as well as possible links with certain physical health and learning outcomes (Chapter 5).

Level C: Children's settings and environments

Moving up a level, Level C covers environment-level influences on child well-being outcomes (Figure 2.2). These are aspects of children’s settings and environments that can impact children’s well-being, at times directly and at others indirectly, including by opening or closing opportunities, by shaping attitudes and aspirations, and by influencing activities and behaviours (Minkkinen (2013_[110]); see Box 2.5). They include many aspects of children’s family and home environments, as well as the environments they face at school or in childcare, and a range of factors relating to their communities, neighbourhoods and wider physical and built environments.

The framework focuses on environment-level influences in three thematic areas (Figure 2.2): family and home environment; school and ECEC environment; and community and physical environment. As with the child-level factors in Level B, these three areas are not tied explicitly to one particular outcome area. A key pillar of “ecological” models of child development is that, while important individually, aspects of children’s environments are also inter-connected and frequently interact with one another (Box 2.5).

Level C's three thematic areas are:

- C1. *Family and home environment*, which covers a range of factors relating to the families and households in which children grow up. This includes: family income, income poverty, and key determinants of family income adequacy, such as family work arrangements and family living arrangements; family physical and mental health, including maternal health (and health behaviours) during pregnancy and parental/caregiver physical and mental health more generally; family violence and abuse; family relationships, including especially the quality of parents' relationships with one another; and the family's wider support networks. Family and household-level factors like these are important for a large number of children's well-being outcomes, often simultaneously. Family income adequacy, for example, is central to children's material well-being (Chapter 3), but also important for their health and learning (see Chapters 4 and 6).
- C2. *School and ECEC environment*, which covers factors relating to the environments children are met with at school or in childcare. This includes school and ECEC service "climate", covering aspects such as safety, classroom co-operation and competition, disciplinary climate and class size, as well as school and ECEC service-provided material services and activities, such as school meal programmes and subsidised leisure and cultural activities. School and ECEC climate has strong and clear links with children's learning and education well-being (Chapter 6), but is also important for social and emotional well-being (Chapter 5). School and ECEC service-provided material supports can be important for several aspects of children's material well-being, such as, through school meal programmes, access to adequate nutrition (Chapter 3), with further potential effects for other areas of child well-being (e.g. physical health).
- C3. *Community and physical environment*, which covers a number of factors relating to the communities, neighbourhoods, built environments, and physical settings in which children grow up. This includes the quality of the physical environmental and the extent to which children's physical environments are "health-promoting", meaning things like children's access to green spaces and freedom from pollution, as well as exposure to crime and other environmental risks. Also included here is children's access to local cultural and learning services/facilities (e.g. public libraries) and play and leisure services/facilities (e.g. sports and recreation facilities), plus community-provided material and social supports (e.g. food banks, voluntary family and parenting support services) The factors included in this area are relevant to many areas of children's well-being. Physical environment quality has strong and direct links to children's physical health (Chapter 4), for instance, while access to community and neighbourhood quality has links to various areas of well-being. One example is socio-emotional well-being: children's involvement in social activities contributes strongly to the formation of a social identity and, to this end, it is essential that they have access to safe collective play and recreation spaces in their community or neighbourhood (Chapter 5).

Level D: Public policies for child well being

The framework's fourth and final level (Level D) covers public policies for child well-being. As emphasised under Principle 6 ("*Measurement should include child-related public policies*"), public policy can and does influence children's lives and well-being outcomes, sometimes in crucial ways. Often operating through children's activities and environments, policies can influence children's outcomes by strengthening the resources available to children and families, by shaping opportunities, and by regulating activities and behaviours, among other functions.

The framework focuses on child-relevant public policies in five areas (Figure 2.2): family policies; housing policies; health policies; education policies; and environmental policies. These are policies areas that have strong and clear links with children's outcomes. As with the aspects covered under other levels, and in line with the framework's principles, the specific policies covered are age-sensitive (Principle 3) and include

those that are important for both children's current and future well-being (Principle 2). Again, they are not tied directly to one specific outcome area. Indeed, policies, like outcomes, are inter-related. They can reinforce or contradict one another, with sometimes complex effects on well-being outcomes.

The five public policy areas covered in Level D are:

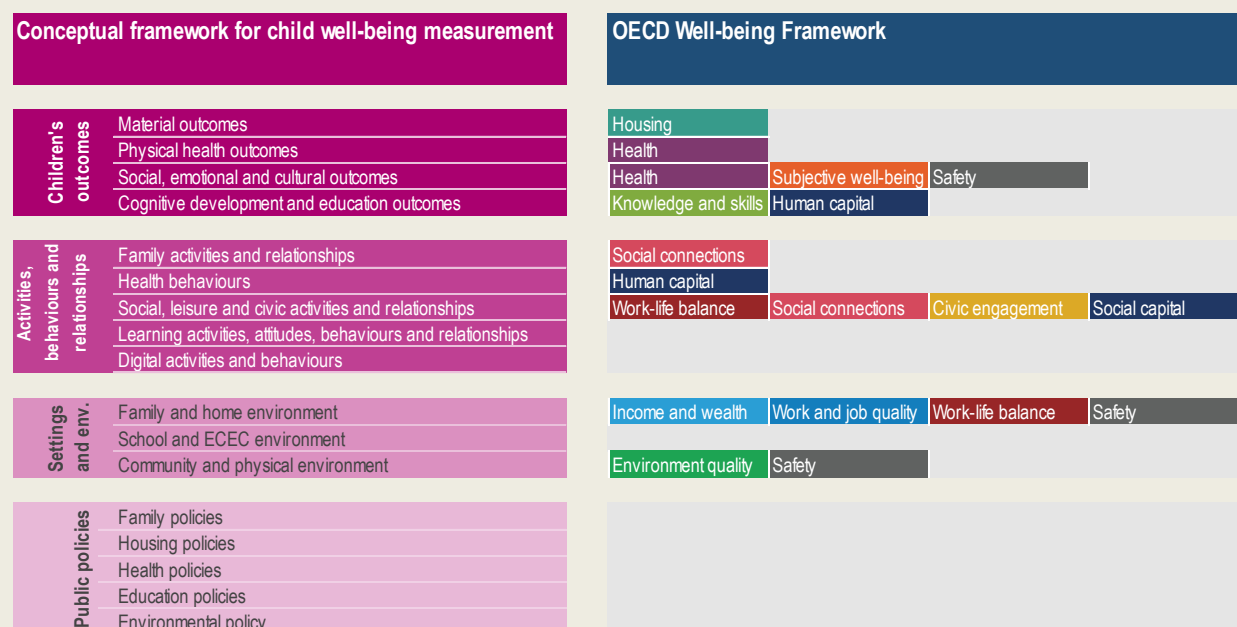
- D1. *Family policies*, which includes a range of public financial and service supports targeted at families and children. This includes family- or child-related financial support policies (e.g. family or child allowances and tax credits), family employment supports such as parental leave policies, family and parenting services like family counselling, and child support regulations and other policies to aim to provide financial support to children in alternative living arrangements. Childcare and out-of-school-hours service supports, covered below under D4, could also be included here. Family policies have strong and direct links to children's material outcomes (Chapter 3), but are also important for a range of other well-being outcomes. Parental leave policies, for instance, are also important child and maternal health (Chapter 4), and possibly for children's social and emotional outcomes (Chapter 5).
- D2. *Housing policies*, which includes both public family housing supports and housing and built environment regulations and policies. Housing supports have clear links to children's material well-being: high housing costs not only limit the extent to which families are able to meet their children's material housing needs, but also, through their impact on after-housing income, damage families' abilities to provide other material goods and services for children (Chapter 3). But housing policies are also important for children's physical health: poor quality housing in particular can negatively affect children's physical health outcomes (Chapter 4).
- D3. *Health policies*, which covers a range of public physical and mental health policies relevant to children. Central here are policies that help shape children's access to preventative and curative physical and mental health services. Examples include the availability (and affordability) of pre- and post-natal health services, of paediatric doctors, and of regular physical and dental health checks, as well as child and family mental health services and supports. This policy area is most closely associated with children's physical health (Chapter 4) and social and emotional well-being (Chapter 5).
- D4. *Education policies*, which covers public policies relating to quality and availability of Early Childhood Education and Care (ECEC), out-of-school-hours services, and schooling. Key policies in this area include public funding for ECEC and education, teachers/staff training and curriculum standards, educational tracking, and governance structures. This policy area is most closely linked to children's cognitive and educational outcomes (Chapter 6), although education policies also have important links with other outcome areas, especially children's social and emotional outcomes (Chapter 5).
- D5. *Environmental policies*, which covers environmental regulations and policies, including those that look to promote environment quality (e.g. clean air regulations). Environmental policies are most closely related to children's physical health outcomes (Chapter 4). However, through their impact on children's physical environment, such as their access to green spaces, environmental policies may also play an important role in children's social and emotional outcomes.

Box 2.6. Links between the conceptual framework for child well-being measurement and the OECD Well-being Framework

The *OECD Well-being Framework* (Box 1.1) stands at the centre of the OECD's work on well-being. Established in 2011 as part of the OECD Better Life Initiative, the *Well-Being Framework* is central to many of the Organisation's well-being monitoring activities – including the *OECD How's Life?* series (OECD, 2020^[3]) – and forms the backbone of much of the Organisation's well-being analysis.

The general approach taken by conceptual framework for child well-being measurement is well aligned with that used in the *OECD Well-being Framework*. Indeed, many aspects of the child framework have been informed by the *Well-being Framework*, alongside the OECD's previous work on measuring child well-being, national child well-being activities, and the child well-being research literature. Both frameworks adopt a multi-dimensional approach to well-being, for example, stressing the importance of covering multiple aspects of people's lives. Both also emphasise the importance of capturing not just average levels of well-being, but also inequalities and the distribution of well-being across groups. Content-wise, almost all of the thematic areas covered in the *OECD Well-being Framework* are also included in the child framework, with some differences in placement and organisation (Figure 2.3).

Figure 2.3. Correspondence between levels and areas of the conceptual framework for child well-being measurement and dimensions of the OECD Well-being Framework



There are, however, also differences between the two frameworks, both in structure and content. These differences are driven largely by the unique nature of childhood as a period of life and its implications for measurement.

One key difference between the two frameworks lies in the emphasis placed on drivers, influences, and environmental factors. While the *OECD Well-being Framework* focuses largely on outcomes, the child framework also includes, through its multi-level structure, a range of social and environmental influences, including children's family, school, and physical environments. As discussed earlier in this chapter, these kinds of influences both play a central role in shaping children's well-being outcomes, and are frequently outside of children's control. This is especially the case for younger children, who's well-being depends

heavily on their parents or carers. As a result, for children perhaps more than for adults, it is difficult to get a full and clear picture of well-being without covering drivers, influences, and environmental factors.

A second key difference lies in the absence of explicit well-being “capitals” from the child framework. Well-being capitals – measures of resources that underpin future well-being – are a central feature of the *OECD Well-being Framework*. The child framework does not make use of similar capitals, in large part because factors important for (children’s) future well-being are “mainstreamed” throughout. This follows from the child framework’s emphasis on a “forward-looking” approach to child well-being measurement and the centrality of children’s development and future prospects to their overall well-being and quality of life (see Principle 2).

What kind of indicators should be used?

The structure outlined above provides the skeleton of a framework for child well-being measurement. However, structure forms only one part of a measurement framework, and a further big challenge lies in developing indicators that can operationalise and populate the dimensions. In many respects, this is as important as the identification of the dimensions themselves. Indicators do not just provide measures to assess various states of well-being; they are also analytical tools that bridge the gap between a conceptual model and the empirical reality. For this very reason, indicators are part of the process of constructing meaning and giving premise to policies (Ben-Arieh and Frønes, 2011^[157])

This sub-section provides an overview of the types and properties of the indicators that would, ideally, be used to populate the framework. Of course, whatever the purpose, researchers always face a number of important considerations when selecting indicators. These include, among others, the relevance, accuracy, comparability, timeliness, and interpretability of the indicator. These issues are all relevant here. However, there are also additional considerations involved when looking to select indicators of well-being generally, and child well-being specifically.

Indicators should be child-centred

A core and central property is that indicators should be child-centred wherever possible, with the child, rather than the family or household, used as the unit of analysis. The use of child-centred indicators has become increasingly common in studies of child well-being over the past few decades. To a large extent, it is now the norm. However, data constraints and an absence of relevant data collected at the child level still sometimes prevent the use of child-centred. This is a particular issue when it comes to measuring children’s material well-being, but also effects other areas of child well-being.

Indicators should reflect contemporary childhoods

A second property is that indicators should reflect contemporary childhoods and be meaningful and relevant to children growing up in OECD countries today. Each generation of children experiences a different home and community environment, which can affect their development trajectory. Today’s children are growing up in very different environments to those born only a decade or two earlier (Burns and Gottschalk, 2019^[156]), including in the role of technology. It is important that indicators properly account for changes in the ways children live their lives, and can identify new or emerging risks and opportunities. One way of doing this is to ask children themselves for what is important in their lives (see below).

Indicators should reflect children’s views and perspectives

A third property of that indicators should, where possible and relevant, take account of children’s views and perspectives. This includes in the first instance using information on children’s own priorities and perspectives to help decide exactly *what* should be measured when it comes to their well-being. But it also

means using children's own voices to actually measure child well-being through, for instance, indicators built on children's self-reported assessments. As discussed earlier under Principle 4, there are challenges involved when looking to engage children as active participants in child well-being measurement. The best approach is often to combine child-reported data with information from other sources, such as parents or teachers.

Indicators should be age-sensitive, where needed

A fourth property is that indicators should, where needed, use age- (or stage-) appropriate variations in measures in order to capture what is important at each stage of childhood. One example could be measures of children's educational attainment, which should adjust as children grow up and moving from the education system. It also means using age- (or stage-) specific indicators where necessary, even if they are not relevant to all children. An example here could be infant mortality and other measures of birth outcomes.

Indicators should where relevant reflect inequalities, deprivation, and differences across groups of children

A fifth property is that indicators should, where relevant, reflect not just child population averages, but also distributions across the child population. They should be able to capture vertical inequalities between top and bottom performers, horizontal inequalities between groups of children (for example, by sex, by living arrangement, and by migrant background), and, where relevant, deprivations. The *OECD Well-being Framework* uses a similar approach when capturing well-being outcomes (OECD, 2020^[3]).

Indicators should capture stability, change and transitions in children's lives

Many aspects of child well-being have a strong time dimension. While most often studied through static cross-sectional measures, the ways in which children and their environments change (or not) over time can have important effects on outcomes. In some cases, it is stability (or, conversely, change) that matters. One example is residential stability, which can help promote security and continuity in children's lives (see Chapter 3). In others, it is persistence, duration, and prolonged exposure to risky or protective factors that are important. One of the clearest examples here is income poverty, with persistent and/or repeated poverty exposure particularly damaging for children's outcomes (see Chapter 3).

A sixth property is that indicators should, where relevant, look to capture and reflect the dynamic nature of many aspects of child well-being. Where appropriate, they should look to capture stability and change, transitions, persistence and duration, often in addition to static measures, which continue to provide important information on frequency and prevalence at a given point in time.

Indicators should reflect the unique needs of children from diverse backgrounds and/or in different or vulnerable positions

A seventh and final important property is that indicators should, where possible, be flexible and responsive to the needs of children from diverse backgrounds and/or in different and vulnerable positions. This includes children from socio-economically disadvantaged homes, children from social, cultural or linguistic minorities, children with disabilities, and children experiencing maltreatment, among others (OECD, 2019^[61]; Frazer, Guio and Marlier, 2020^[158]).

In practical terms, as far as data allow, indicators should look to use specific disaggregations to capture the well-being of children from diverse backgrounds and/or in different or vulnerable positions. Where relevant, there may also be a need to use additional circumstance- and background-appropriate variants or measures, on top of standard measures, in order to provide a better picture of the lives of children facing

additional challenges. One example might be children with disabilities' access to local learning and leisure facilities (e.g. libraries, recreation centres) and other facilities/services important for well-being.

References

- Acquah, D. and O. Thévenon (2019), "Delivering evidence based services for all needy families: a review of main policy issues", *38th Session of the Working Party on Social Policy*, OECD. [151]
- AIHW (2020), *Australia's Children*, Australian Institute of Health and Welfare, Canberra, <https://www.aihw.gov.au/reports/children-youth/australias-children/contents/executive-summary> (accessed on 20 April 2021). [106]
- Aizer, A. and J. Currie (2014), "The intergenerational transmission of inequality: Maternal disadvantage and health at birth", *Science*, Vol. 344/6186, pp. 856-861, <http://dx.doi.org/10.1126/science.1251872>. [59]
- Albert, D. and L. Steinberg (2011), "Judgment and decision making in adolescence", *Journal of Research on Adolescence*, Vol. 21/1, pp. 211-224, <http://dx.doi.org/10.1111/j.1532-7795.2010.00724.x>. [83]
- Aldridge, J. et al. (2016), "Students' perceptions of school climate as determinants of wellbeing, resilience and identity", *Improving Schools*, Vol. 19/1, pp. 5-26, <http://dx.doi.org/10.1177/1365480215612616>. [129]
- Almond, D., J. Currie and V. Duque (2018), "Childhood circumstances and adult outcomes: Act II", *Journal of Economic Literature*, Vol. 56/4, pp. 1360-1446, <http://dx.doi.org/10.1257/jel.20171164>. [58]
- Amato, P. and L. Boyd (2013), "Children and divorce in world perspective", in *Contemporary Issues in Family Studies*, John Wiley & Sons, Oxford, <http://dx.doi.org/10.1002/9781118320990.ch16>. [121]
- Amerijckx, G. and P. Humblet (2014), "Child well-being: What does it mean?", *Children and Society*, Vol. 28/5, pp. 404-415, <http://dx.doi.org/10.1111/chso.12003>. [4]
- Anaby, D. et al. (2013), "The effect of the environment on participation of children and youth with disabilities: A scoping review", *Disability and Rehabilitation*, Vol. 35/19, pp. 1589-1598, <http://dx.doi.org/10.3109/09638288.2012.748840>. [139]
- Anaby, D. et al. (2014), "The mediating role of the environment in explaining participation of children and youth with and without disabilities across home, school, and community", *Archives of Physical Medicine and Rehabilitation*, Vol. 95/5, pp. 908-917, <http://dx.doi.org/10.1016/j.apmr.2014.01.005>. [140]
- Andresen, S., J. Bradshaw and H. Kosher (2019), *Young Children's Perceptions of their Lives and Well-Being*, Springer Netherlands, <http://dx.doi.org/10.1007/s12187-018-9551-6>. [13]
- Arnett, J. (2007), "Emerging adulthood: What is it, and what is it good for?", *Child Development Perspectives*, Vol. 1/2, pp. 68-73, <http://dx.doi.org/10.1111/j.1750-8606.2007.00016.x>. [80]
- Arseneault, L. (2017), *The Long-Term Impact of Bullying Victimization on Mental Health*, Blackwell Publishing Ltd, <http://dx.doi.org/10.1002/wps.20399>. [93]

- Arseneault, L., L. Bowes and S. Shakoor (2010), "Bullying victimization in youths and mental health problems: Much ado about nothing?", *Psychological Medicine*, Vol. 40/5, pp. 717-729, <http://dx.doi.org/10.1017/S0033291709991383>. [92]
- Aschauer, W. (2019), "New directions in cross-cultural well-being research", *Revue des politiques sociales et familiales* 131-132, pp. 155-173, http://hdr.undp.org/sites/default/files/2018_human_development_statistical_update.pdf, (accessed on 6 March 2020). [111]
- Ben-Arieh, A. et al. (2014), *Handbook of Child Well-Being: Theories, Methods and Policies in Global Perspective*, Springer. [48]
- Ben-Arieh, A. et al. (2014), "Multifaceted concept of child well-being", in *Handbook of Child Well-Being*, Springer Netherlands, Dordrecht, http://dx.doi.org/10.1007/978-90-481-9063-8_134. [5]
- Ben-Arieh, A. and I. Frønes (2011), "Taxonomy for child well-being indicators: A framework for the analysis of the well-being of children", *Childhood*, Vol. 18/4, pp. 460-476, <http://dx.doi.org/10.1177/0907568211398159>. [157]
- Ben-Arieh, A. and I. Frønes (2007), "Indicators of children's well being: What should be measured and why?", *Social Indicators Research*, Vol. 84/3, pp. 249-250, <http://dx.doi.org/10.1007/s11205-007-9183-6>. [8]
- Ben-Shlomo, Y. (2002), "A life course approach to chronic disease epidemiology: Conceptual models, empirical challenges and interdisciplinary perspectives", *International Journal of Epidemiology*, Vol. 31/2, pp. 285-293, <http://dx.doi.org/10.1093/ije/31.2.285>. [49]
- Boarini, R., Å. Johansson and M. Mira d'Ercole (2006), "Alternative measures of well-being", *OECD Social, Employment and Migration Working Papers*, No. 33, OECD Publishing, Paris, <https://dx.doi.org/10.1787/713222332167>. [1]
- Borgonovi, F. and J. Pál (2016), "A framework for the analysis of student well-being in the PISA 2015 study: Being 15 in 2015", *OECD Education Working Papers*, No. 140, OECD, Paris, https://www.oecd-ilibrary.org/education/a-framework-for-the-analysis-of-student-well-being-in-the-pisa-2015-study_5jlpzswghvzb-en;jsessionid=rcAUpgGBwsofD2vjZ6LnLGwy.ip-10-240-5-90 (accessed on 15 April 2021). [23]
- Bradshaw, J. (2019), "Child subjective well-being studies. Some points for discussion", *Revue des politiques sociales et familiales*, Vol. 131/1, pp. 219-229, <http://dx.doi.org/10.3406/caf.2019.3361>. [104]
- Bradshaw, J. and G. Rees (2017), "Exploring national variations in child subjective well-being", *Children and Youth Services Review*, Vol. 80, pp. 3-14, <http://dx.doi.org/10.1016/j.childyouth.2017.06.059>. [85]
- Bradshaw, J. and D. Richardson (2009), "An index of child well-being in Europe", *Child Indicators Research*, Vol. 2/3, pp. 319-351, <http://dx.doi.org/10.1007/s12187-009-9037-7>. [19]
- Bronfenbrenner, U. (1989), "Ecological systems theory", in Vasta, R. (ed.), *Annals of Child Development*, Greenwich, CT:JAI. [105]

- Bronfenbrenner, U. (1979), *The Ecology of Human Development: Experiments by Nature and Design*, Harvard University Press, Cambridge, MA, <http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:The+ecology+of+human+development:+experiments+by+nature+and+design#3> (accessed on 4 December 2019). [62]
- Bronfenbrenner, U. et al. (1986), "Ecology of the family as a context for human development: Research perspectives", *Developmental Psychology*, Vol. 22/6, pp. 723-742, <https://doi.org/10.1037/0012-1649.22.6.723>. [64]
- Bronfenbrenner, U. and S. Ceci (1994), "Nature-nurture reconceptualized in developmental perspective: A bioecological model", *Psychological Review*, Vol. 101/4, pp. 568-586, <https://doi.org/10.1037/0033-295X.101.4.568>. [63]
- Buka, I., S. Koranteng and A. Osornio-Vargas (2006), "The effects of air pollution on the health of children", *Paediatrics & Child Health*, Vol. 11/8, pp. 513-516, <http://dx.doi.org/10.1093/pch/11.8.513>. [144]
- Burns, T. and F. Gottschalk (eds.) (2020), *Education in the Digital Age: Healthy and Happy Children*, Educational Research and Innovation, OECD Publishing, https://www.oecd-ilibrary.org/education/education-in-the-digital-age_1209166a-en (accessed on 7 May 2021). [155]
- Burns, T. and F. Gottschalk (eds.) (2019), *Educating 21st Century Children: Emotional Well-being in the Digital Age*, Educational Research and Innovation, OECD Publishing, <https://www.oecd-ilibrary.org/content/publication/b7f33425-en> (accessed on 7 May 2021). [156]
- Casas, F. (2017), "Analysing the comparability of 3 multi-item subjective well-being psychometric scales among 15 countries using samples of 10 and 12-year-olds", *Child Indicators Research*, Vol. 10/2, pp. 297-330, <http://dx.doi.org/10.1007/s12187-015-9360-0>. [102]
- Casas, F. (1997), "Children's rights and children's quality of life: Conceptual and practical issues", *Social Indicators Research*, Vol. 42/3, pp. 283-298, <http://dx.doi.org/10.1023/A:1006836909395>. [27]
- Casas, F., M. González-Carrasco and X. Luna (2018), "Children's rights and their subjective well-being from a multinational perspective", *European Journal of Education*, Vol. 53/3, <http://dx.doi.org/10.1111/ejed.12294>. [154]
- Casas, F. and G. Rees (2015), "Measures of children's subjective well-being: Analysis of the potential for cross-national comparisons", *Child Indicators Research*, Vol. 8/1, pp. 49-69, <http://dx.doi.org/10.1007/s12187-014-9293-z>. [103]
- Caspi, A. et al. (2017), "Childhood forecasting of a small segment of the population with large economic burden", *Nature Human Behaviour*, Vol. 1/1, <http://dx.doi.org/10.1038/s41562-016-0005>. [43]
- Chetty, R. and N. Hendren (2018), "The impacts of neighborhoods on intergenerational mobility I: Childhood exposure effects", *The Quarterly Journal of Economics*, Vol. 133/3, pp. 1107-1162, <http://dx.doi.org/10.1093/qje/qjy007>. [147]
- Children's Worlds (2020), *International Survey of Children's Well-Being (ISCWeB)*, <https://isciweb.org/> (accessed on 4 February 2021). [96]

- Cho, E. and F. Yu (2020), “A review of measurement tools for child wellbeing”, *Children and Youth Services Review*, Vol. 119, p. 105576, <http://dx.doi.org/10.1016/j.childyouth.2020.105576>. [9]
- Chu, F., K. vanMarle and D. Geary (2015), “Early numerical foundations of young children’s mathematical development”, *Journal of Experimental Child Psychology*, Vol. 132, pp. 205-212, <http://dx.doi.org/10.1016/j.jecp.2015.01.006>. [55]
- Chu, F. et al. (2018), “Children’s early understanding of number predicts their later problem-solving sophistication in addition”, *Journal of Experimental Child Psychology*, Vol. 169, pp. 73-92, <http://dx.doi.org/10.1016/j.jecp.2017.12.010>. [56]
- Clark, A. et al. (2019), *The Origins of Happiness: The Science of Well-Being Over the Life Course*, Princeton University Press, <https://doi.org/10.2307/j.ctvd58t1t>. [29]
- Clark, H. et al. (2020), *A Future for the World’s Children? A WHO–UNICEF–Lancet Commission*, Lancet Publishing Group, [http://dx.doi.org/10.1016/S0140-6736\(19\)32540-1](http://dx.doi.org/10.1016/S0140-6736(19)32540-1). [32]
- Conti, G. and J. Heckman (2014), “Economics of child well-being”, in *Handbook of Child Well-Being: Theories, Methods and Policies in Global Perspective*, Springer Netherlands, http://dx.doi.org/10.1007/978-90-481-9063-8_21. [33]
- Cooper, K. and K. Stewart (2017), *Does Money Affect Children’s Outcomes? An update*, <http://sticerd.lse.ac.uk/dps/case/cp/casepaper203.pdf> (accessed on 9 April 2018). [113]
- Cooper, K. and K. Stewart (2013), *Does Money Affect Children’s Outcomes? A Systematic Review*, Joseph Rowntree Foundation, <https://www.jrf.org.uk/sites/default/files/jrf/migrated/files/money-children-outcomes-full.pdf> (accessed on 9 April 2018). [112]
- Cunha, F. and J. Heckman (2007), “The technology of skill formation”, *American Economic Review*, Vol. 97, pp. 31-47, <http://dx.doi.org/10.1257/aer.97.2.31>. [52]
- Currie, J. (2013), “Pollution and Infant Health”, *Child Development Perspectives*, Vol. 7/4, pp. 237-242, <http://dx.doi.org/10.1111/cdep.12047>. [145]
- Currie, J. (2009), “Healthy, wealthy, and wise: Socioeconomic status, poor health in childhood, and human capital development”, *Journal of Economic Literature*, Vol. 47/1, pp. 87-122, <http://dx.doi.org/10.1257/jel.47.1.87>. [57]
- Dahl, R. (2016), *Adolescent brain development: Window of opportunity for social, emotional, & motivational learning*, https://all4ed.org/wp-content/uploads/2017/01/EDUCATION_4_Dahl_nov_11_2016.pdf (accessed on 12 January 2021). [44]
- Dahl, R. (2004), *Adolescent brain development: A period of vulnerabilities and opportunities - Keynote Address*, New York Academy of Sciences, <http://dx.doi.org/10.1196/annals.1308.001>. [45]
- Daniel, E. et al. (2020), “Value profiles during middle childhood: Developmental processes and social behavior”, *Child Development*, Vol. 91/5, <http://dx.doi.org/10.1111/cdev.13362>. [77]

- Daniel, E. et al. (2014), "Developmental relations between sympathy, moral emotion attributions, moral reasoning, and social justice values from childhood to early adolescence", *Journal of Adolescence*, Vol. 37/7, pp. 1201-1214, <http://dx.doi.org/10.1016/j.adolescence.2014.08.009>. [78]
- DCYA (2017), *An Indicator Set for Better Outcomes, Brighter Futures*, Department of Children and Youth Affairs, Dublin, <https://www.gov.ie/pdf/?file=https://assets.gov.ie/27126/9b1f25ec7da348e6921373e7e91e1ae3.pdf#page=1> (accessed on 15 April 2021). [25]
- DCYA (2014), *Better Outcomes, Brighter Futures: The National Policy Framework for Children & Young People*, Department of Children and Youth Affairs, Dublin, <https://assets.gov.ie/23796/961bbf5d975f4c88adc01a6fc5b4a7c4.pdf> (accessed on 15 April 2021). [108]
- Dehaene, S. (2018), *Apprendre !: Les talents du cerveau, le défi des machines*, Odile Jacob, Paris, <https://www.odilejacob.fr/catalogue/psychologie/developpement-de-l-enfant/apprendre-9782738145420.php>. [70]
- Dinisman, T. and A. Ben-Arieh (2016), "The characteristics of children's subjective well-being", *Social Indicators Research*, Vol. 126/2, pp. 555-569, <http://dx.doi.org/10.1007/s11205-015-0921-x>. [15]
- Doek, J. (2014), "Child well-being: Children's rights perspective", in *Handbook of Child Well-Being: Theories, Methods and Policies in Global Perspective*, Springer Netherlands, http://dx.doi.org/10.1007/978-90-481-9063-8_9. [86]
- DPMC (2019), *Child and Youth Wellbeing Strategy 2019*, New Zealand Department of the Prime Minister and Cabinet (DPMC), <https://childyouthwellbeing.govt.nz/sites/default/files/2019-08/child-youth-wellbeing-strategy-2019.pdf> (accessed on 20 April 2021). [107]
- Eime, R. et al. (2013), "A systematic review of the psychological and social benefits of participation in sport for children and adolescents: Informing development of a conceptual model of health through sport", *International Journal of Behavioral Nutrition and Physical Activity*, Vol. 10/98, <http://dx.doi.org/10.1186/1479-5868-10-98>. [37]
- Eriksen, T., H. Nielsen and M. Simonsen (2014), "Bullying in elementary school", *Journal of Human Resources*, Vol. 49/4, pp. 839-871, <http://dx.doi.org/10.3368/jhr.49.4.839>. [134]
- Exton, C. and M. Shinwell (2018), "Policy use of well-being metrics: Describing countries' experiences", *OECD Statistics Working Papers*, No. 2018/07, OECD Publishing, Paris, <https://dx.doi.org/10.1787/d98eb8ed-en>. [97]
- Feinstein, L. and J. Bynner (2004), "The importance of cognitive development in middle childhood for adulthood socioeconomic status, mental health, and problem behavior", *Child Development*, Vol. 75/5, pp. 1329-1339, <http://dx.doi.org/10.2307/3696486>. [76]
- Fernandes, L., A. Mendes and A. Teixeira (2012), *A Review Essay on the Measurement of Child Well-Being*, Springer, <http://dx.doi.org/10.1007/s11205-011-9814-9>. [22]
- Fiscella, K. and H. Kitzman (2009), "Disparities in academic achievement and health: The intersection of child education and health policy", *Pediatrics*, Vol. 123/3, pp. 1073-1080, <http://dx.doi.org/10.1542/peds.2008-0533>. [54]

- Flèche, S., W. Lekfuangfu and A. Clark (2019), “The long-lasting effects of family and childhood on adult wellbeing: Evidence from British cohort data”, *Journal of Economic Behavior and Organization*, <http://dx.doi.org/10.1016/j.jebo.2018.09.018>. [30]
- Frazer, H., A. Guio and E. Marlier (2020), *Feasibility Study for a Child Guarantee - Intermediate report*, European Commission, Brussels, <https://ec.europa.eu/social/main.jsp?catId=1428&langId=en>. [158]
- Freisthler, B. and D. Crampton (2008), “Environment and child well-being”, *Children and Youth Services Review*, Vol. 31, pp. 297-299, <http://dx.doi.org/10.1016/j.childyouth.2008.07.025>. [138]
- Garbarino, J. (2014), “Ecological perspective on child well-being”, in *Handbook of Child Well-Being: Theories, Methods and Policies in Global Perspective*, Springer Netherlands, http://dx.doi.org/10.1007/978-90-481-9063-8_140. [65]
- Gardner, F. et al. (2018), “The earlier the better? Individual participant data and traditional meta-analysis of age effects of parenting interventions”, *Child Development*, Vol. 90/1, pp. 7-19, <http://dx.doi.org/10.1111/cdev.13138>. [66]
- Gini, G. et al. (2018), “Associations between peer victimization, perceived teacher unfairness, and adolescents’ adjustment and well-being”, *Journal of School Psychology*, Vol. 67, pp. 56-68, <http://dx.doi.org/10.1016/j.jsp.2017.09.005>. [90]
- Hall, W. et al. (2016), *Why Young People’s Substance Use Matters for Global Health*, Elsevier Ltd, [http://dx.doi.org/10.1016/S2215-0366\(16\)00013-4](http://dx.doi.org/10.1016/S2215-0366(16)00013-4). [38]
- Haring, U., R. Sorin and N. Caltabiano (2019), *Reflecting on Childhood and Child Agency in History*, Palgrave Macmillan Ltd., <http://dx.doi.org/10.1057/s41599-019-0259-0>. [118]
- Härkönen, J., F. Bernardi and D. Boertien (2017), *Family Dynamics and Child Outcomes: An Overview of Research and Open Questions*, Springer Netherlands, <http://dx.doi.org/10.1007/s10680-017-9424-6>. [122]
- Hertzman, C. and T. Boyce (2010), “How experience gets under the skin to create gradients in developmental health”, *Annual Review of Public Health*, Vol. 31/1, pp. 329-347, <http://dx.doi.org/10.1146/annurev.publhealth.012809.103538>. [50]
- Huebner, E. (1991), “Initial development of the student’s life satisfaction scale”, *School Psychology International*, Vol. 12/3, pp. 231-240, <http://dx.doi.org/10.1177/0143034391123010>. [16]
- Ismail, F., A. Fatemi and M. Johnston (2017), *Cerebral Plasticity: Windows of Opportunity in the Developing Brain*, W.B. Saunders Ltd, <http://dx.doi.org/10.1016/j.ejpn.2016.07.007>. [40]
- Juvonen, J., Yueyan Wang and G. Espinoza (2011), “Bullying experiences and compromised academic performance across middle school grades”, *The Journal of Early Adolescence*, Vol. 31/1, pp. 152-173, <http://dx.doi.org/10.1177/0272431610379415>. [133]
- Kansky, J., J. Allen and E. Diener (2016), “Early adolescent affect predicts later life outcomes”, *Applied Psychology: Health and Well-Being*, Vol. 8/2, pp. 192-212, <http://dx.doi.org/10.1111/aphw.12068>. [82]

- Keenan, T., S. Evans and K. Crowley (2016), *An Introduction to Child Development*, SAGE Foundations of Psychology series, Sage Publishing, <https://uk.sagepub.com/en-gb/eur/an-introduction-to-child-development/book241258> (accessed on 17 December 2019). [42]
- Kessler, R. et al. (2007), "Age of onset of mental disorders: A review of recent literature", *Current Opinion in Psychiatry*, Vol. 20/4, pp. 359-364, <http://dx.doi.org/10.1097/YCO.0b013e32816ebc8c>. [84]
- Knudsen, E. (2004), "Sensitive periods in the development of the brain and behavior", *Journal of Cognitive Neuroscience*, Vol. 16/8, pp. 1412-1425, <http://dx.doi.org/10.1162/0898929042304796>. [41]
- Koo, C. et al. (2011), "Internet-addicted kids and South Korean government efforts: Boot-camp case", *Cyberpsychology, Behavior, and Social Networking*, Vol. 14/6, pp. 391-394, <http://dx.doi.org/10.1089/cyber.2009.0331>. [135]
- Kowal, A. et al. (2002), "Children's perceptions of the fairness of parental preferential treatment and their socioemotional well-being", *Journal of Family Psychology*, Vol. 16/3, pp. 297-306, <http://dx.doi.org/10.1037/0893-3200.16.3.297>. [87]
- Kraut, R. (2009), *What is Good and Why: The Ethics of Well-Being*, Harvard University Press. [11]
- Lacharité, C., L. Éthier and P. Nolin (2006), "Vers une théorie écosystémique de la négligence envers les enfants", *Bulletin de psychologie*, Vol. Numéro 484/4, p. 381, <http://dx.doi.org/10.3917/bupsy.484.0381>. [26]
- Lahire, B. (ed.) (2019), *Enfances de classe*, Seuil | Editions Seuil, <https://www.seuil.com/ouvrage/enfances-de-classe-collectif/9782021419603> (accessed on 9 January 2020). [119]
- Lam, L. and J. Comay (2020), "Using a story completion task to elicit young children's subjective well-being at school", *Child Indicators Research*, Vol. 13/6, pp. 2225-2239, <http://dx.doi.org/10.1007/s12187-020-09745-5>. [101]
- Landrigan, P. et al. (2019), "Pollution and children's health", *Science of the Total Environment*, Vol. 650, pp. 2389-2394, <http://dx.doi.org/10.1016/j.scitotenv.2018.09.375>. [146]
- Lansford, J. (2018), "A lifespan perspective on subjective well-being", in Diener, E., S. Oishi and T. Lay (eds.), *Handbook of Well-Being*, DEF Publishers, Salt Lake City. [31]
- Lerch, V. and A. Nordenmark Severinsson (2019), *Target Group Discussion Paper on Children in Alternative Care - Feasibility Study for a Child Guarantee*, European Commission, Brussels, <https://ec.europa.eu/social/main.jsp?catId=1428&langId=en>. [123]
- Livingstone, S., M. Stoilova and A. Kelly (2016), "Cyberbullying: Incidence, trends and consequences", in *Ending the Torment: Tackling Bullying from the Schoolyard to Cyberspace*, United Nations Office of the Special Representative of the Secretary-General on Violence against Children, New York, USA, <http://eprints.lse.ac.uk/68079/> (accessed on 20 December 2019). [136]
- Lo, S., P. Das and R. Horton (2017), "A good start in life will ensure a sustainable future for all", *The Lancet*, Vol. 389/10064, pp. 8-9, [http://dx.doi.org/10.1016/S0140-6736\(16\)31774-3](http://dx.doi.org/10.1016/S0140-6736(16)31774-3). [152]

- Lynch, J. and G. Smith (2005), "A life course approach to chronic disease epidemiology", *Annual Review of Public Health*, Vol. 26/1, pp. 1-35, <http://dx.doi.org/10.1146/annurev.publhealth.26.021304.144505>. [51]
- Mah, V. and E. Ford-Jones (2012), "Spotlight on middle childhood: Rejuvenating the 'forgotten years'", *Paediatrics & Child Health*, Vol. 17/2, p. 81, <http://dx.doi.org/10.1093/PCH/17.2.81>. [75]
- Main, G. (2019), "Child poverty and subjective well-being: The impact of children's perceptions of fairness and involvement in intra-household sharing", *Children and Youth Services Review*, Vol. 97, pp. 49-58, <http://dx.doi.org/10.1016/j.childyouth.2017.06.031>. [91]
- Mameli, C. et al. (2018), "School context and subjective distress: The influence of teacher justice and school-specific well-being on adolescents' psychological health", *School Psychology International*, Vol. 39/5, pp. 526-542, <http://dx.doi.org/10.1177/0143034318794226>. [89]
- McHale, S., J. Dariotis and T. Kauh (2003), "Social development and social relationships in middle childhood", in *Handbook of Psychology*, John Wiley & Sons, Inc., <http://dx.doi.org/10.1002/0471264385.wei0610>. [74]
- Miho, A. and O. Thévenon (2020), "Treating all children equally? Why policies should adapt to evolving family living arrangements", *OECD Social, Employment and Migration Working Papers*, No. 240, OECD, Paris, <http://dx.doi.org/10.1787/83307d97-en>. [150]
- Minkinen, J. (2013), "The structural model of child well-being", *Child Indicators Research*, Vol. 6, pp. 547-558, <http://dx.doi.org/10.1007/s12187-013-9178-6>. [110]
- Morris, A. et al. (2007), "The role of the family context in the development of emotion regulation", *Social Development*, Vol. 16/2, pp. 361-388, <http://dx.doi.org/10.1111/j.1467-9507.2007.00389.x>. [72]
- Nam, H. and S. Nam (2018), "Child-friendly city policies in the Republic of Korea", *Children and Youth Services Review*, Vol. 94, pp. 545-556, <http://dx.doi.org/10.1016/j.childyouth.2018.08.033>. [142]
- NSCDC (2016), "From best practices to breakthrough impacts: A science-based approach to building a more promising future for young children and families", Center on the Developing Child, Harvard University, <https://developingchild.harvard.edu/resources/from-best-practices-to-breakthrough-impacts/> (accessed on 31 May 2021). [69]
- OECD (2020), *Early Learning and Child Well-being: A Study of Five-year-Olds in England, Estonia, and the United States*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/3990407f-en>. [127]
- OECD (2020), *How's Life? 2020: Measuring Well-being*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9870c393-en>. [3]
- OECD (2019), *Changing the Odds for Vulnerable Children: Building Opportunities and Resilience*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/a2e8796c-en>. [61]
- OECD (2019), *PISA 2018 Results (Volume II): Where All Students Can Succeed*, PISA, OECD Publishing, Paris, <https://dx.doi.org/10.1787/b5fd1b8f-en>. [131]
- OECD (2018), *A Broken Social Elevator? How to Promote Social Mobility*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264301085-en>. [60]

- OECD (2018), *Children and Young People's Mental Health in the Digital Age*, OECD, Paris, [137]
<http://www.oecd.org/els/health-systems/Children-and-Young-People-Mental-Health-in-the-Digital-Age.pdf>.
- OECD (2017), *PISA 2015 Results (Volume III): Students' Well-Being*, PISA, OECD Publishing, Paris, [128]
<http://dx.doi.org/10.1787/9789264273856-en>.
- OECD (2015), *How's Life? 2015: Measuring Well-being*, OECD Publishing, Paris, [21]
https://dx.doi.org/10.1787/how_life-2015-en.
- OECD (2013), *OECD Guidelines on Measuring Subjective Well-being*, OECD Publishing, Paris, [99]
<https://dx.doi.org/10.1787/9789264191655-en>.
- OECD (2011), *Doing Better for Families*, OECD Publishing, Paris, [148]
<https://dx.doi.org/10.1787/9789264098732-en>.
- OECD (2011), *How's Life?: Measuring Well-being*, OECD Publishing, Paris, [2]
<https://dx.doi.org/10.1787/9789264121164-en>.
- OECD (2009), *Doing Better for Children*, OECD, Paris, [20]
<http://www.oecd.org/els/family/43552898.pdf> (accessed on 8 January 2018).
- Oexle, N. et al. (2020), "Childhood bullying victimization, self-labelling, and help-seeking for mental health problems", *Social Psychiatry and Psychiatric Epidemiology*, Vol. 55/1, pp. 81-88, <http://dx.doi.org/10.1007/s00127-019-01743-5>. [94]
- ONS (2018), *Children's well-being measures*, Office for National Statistics, [98]
<https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/datasets/childrenswellbeingmeasures> (accessed on 15 May 2021).
- Patton, G. et al. (2016), "Our future: a Lancet commission on adolescent health and wellbeing - The Lancet commissions executive summary", *The Lancet*, Vol. 387, pp. 2423-2478, [http://dx.doi.org/10.1016/S0140-6736\(16\)00579-1](http://dx.doi.org/10.1016/S0140-6736(16)00579-1). [47]
- Payton, J. et al. (2000), "Social and emotional learning: A framework for promoting mental health and reducing risk behavior in children and youth", *Journal of School Health*, Vol. 70/5, pp. 179-185, <http://dx.doi.org/10.1111/j.1746-1561.2000.tb06468.x>. [53]
- Perron, Z. et al. (2019), "Les approches du bien-être - Un champ de recherche multidimensionnel", *Revue des politiques sociales et familiales*, Vol. 131-132, pp. 119-125, <https://halshs.archives-ouvertes.fr/halshs-03082982/document> (accessed on 25 February 2020). [6]
- Pluess, M. and J. Belsky (2011), "Prenatal programming of postnatal plasticity?", *Development and Psychopathology*, Vol. 23/1, pp. 29-38, <https://doi.org/10.1017/S0954579410000623>. [68]
- Pollard, E. and P. Lee (2003), "Child well-being: A systematic review of the literature", *Social Indicators Research*, Vol. 61/1, pp. 59-78, <http://dx.doi.org/10.1023/A:1021284215801>. [7]
- Poulton, R., T. Moffitt and P. Silva (2015), *The Dunedin Multidisciplinary Health and Development Study: Overview of the First 40 Years, With an Eye to the Future*, Dr. Dietrich Steinkopff Verlag GmbH and Co. KG, <http://dx.doi.org/10.1007/s00127-015-1048-8>. [28]

- Pretsch, J. et al. (2016), "Injustice in school and students' emotions, well-being, and behavior: A longitudinal study", *Social Justice Research*, Vol. 29/1, pp. 119-138, <http://dx.doi.org/10.1007/s11211-015-0234-x>. [88]
- Priest, N. et al. (2013), "A systematic review of studies examining the relationship between reported racism and health and wellbeing for children and young people", *Social Science and Medicine*, Vol. 95, pp. 115-127, <http://dx.doi.org/10.1016/j.socscimed.2012.11.031>. [95]
- Raghavan, R. and A. Alexandrova (2015), "Toward a theory of child well-being", *Social Indicators Research*, Vol. 121/3, pp. 887-902, <http://dx.doi.org/10.1007/s11205-014-0665-z>. [10]
- Rees, G. (2017), *Children's Views on Their Lives and Well-Being: Findings from the Children's Worlds Project*, Springer, <https://www.springer.com/gp/book/9783319651958> (accessed on 13 June 2019). [14]
- Rees, G., S. Andresen and J. Bradshaw (2016), *Children's Views on Their Lives and Well-Being in 16 Countries: A Report on the Children's Worlds Survey of Children Aged Eight Years Old, 2013-15*, Children's Worlds Project (ISCWeB), York, UK, <https://iscweb.org/wp-content/uploads/2019/12/8yearsoldreport.pdf> (accessed on 13 May 2021). [100]
- Richardson, D. and N. Ali (2014), *An Evaluation of International Surveys of Children*, <http://dx.doi.org/10.1787/5jxzmjrqvntf-en>. [79]
- Rodrigo, M., S. Byrne and B. Rodríguez (2014), "Parenting styles and child well-being", in *Handbook of Child Well-Being: Theories, Methods and Policies in Global Perspective*, Springer Netherlands, http://dx.doi.org/10.1007/978-90-481-9063-8_86. [120]
- Rowe, M. (2018), "Understanding socioeconomic differences in parents' speech to children", *Child Development Perspectives*, Vol. 12/2, pp. 122-127, <http://dx.doi.org/10.1111/cdep.12271>. [116]
- Rutter, M. (1989), "Pathways from childhood to adult life", *Journal of Child Psychology and Psychiatry*, Vol. 30/1, pp. 23-51, <http://dx.doi.org/10.1111/j.1469-7610.1989.tb00768.x>. [34]
- Salkind, N. and R. Brown (2013), "Critical period", in *Encyclopedia of Human Development*, SAGE Publications, Inc., <http://dx.doi.org/10.4135/9781412952484.n169>. [39]
- Salmona, M. (2018), "Les traumatismes des enfants victimes de violences : Un problème de santé publique majeur", *Rhizome - Orspere-Samdarra – Observatoire Santé mentale Vulnérabilités et Sociétés*, Vol. 3/69-70, pp. 4-6, <https://www.cairn.info/revue-rhizome-2018-3-page-4.htm>. [125]
- Schenck-Fontaine, A. and L. Panico (2019), "Many kinds of poverty: Three dimensions of economic hardship, their combinations, and children's behavior problems", *Demography*, <http://dx.doi.org/10.1007/s13524-019-00833-y>. [114]
- Seligson, J., E. Huebner and R. Valois (2003), "Preliminary validation of the brief multidimensional students' life satisfaction scale (BMSLSS)", *Social Indicators Research*, Vol. 61/2, pp. 121-145, <http://dx.doi.org/10.1023/A:1021326822957>. [17]
- Settersten, R., M. McClelland and A. Miao (2014), "Child well-being and the life course", in *Handbook of Child Well-Being: Theories, Methods and Policies in Global Perspective*, Springer Netherlands, http://dx.doi.org/10.1007/978-90-481-9063-8_145. [35]

- Shonkoff, J. and D. Philipps (2000), *From Neurons to Neighborhoods: The Science of Early Childhood Development*, National Academies Press, <http://dx.doi.org/10.17226/9824>. [67]
- Shuey, E. and M. Kankaras (2018), “The power and promise of early learning”, *OECD Working paper*, OECD Publishing, Paris, <https://doi.org/10.1787/f9b2e53f-en>. [71]
- Smith, S. and L. Handler (2007), *The Clinical Assessment of Children and Adolescents: A Practitioner’s Handbook*, Lawrence Erlbaum Associates. [81]
- Sperry, D., L. Sperry and P. Miller (2018), “Reexamining the verbal environments of children from different socioeconomic backgrounds”, *Child Development*, <http://dx.doi.org/10.1111/cdev.13072>. [117]
- Sylva, K. et al. (2010), *Early childhood matters : evidence from the effective pre-school and primary education project*, Routledge, <https://www.routledge.com/Early-Childhood-Matters-Evidence-from-the-Effective-Pre-school-and-Primary/Sylva-Melhuish-Sammons-Siraj-Blatchford-Taggart/p/book/9780415482431> (accessed on 14 June 2019). [115]
- Thévenon, O. (2018), “Child poverty: Trends, determinants and policies to tackle it”, *OECD Social, Employment and migrations Working papers*, OECD Publishing, <https://doi.org/10.1787/c69de229-en>. [149]
- Tokunaga, R. (2010), “Following you home from school: A critical review and synthesis of research on cyberbullying victimization”, *Computers in Human Behavior*, Vol. 26/3, pp. 277-287, <http://dx.doi.org/10.1016/j.chb.2009.11.014>. [132]
- Torche, F. (2019), “Early-life circumstances and their effects over the life course”, *Population Research and Policy Review*, Vol. 38, pp. 771-782, <http://dx.doi.org/10.1007/s11113-019-09555-w>. [36]
- UNCRC (1990), *United Nations Convention on the Rights of the Child*, United Nations, New York, <https://www.unicef.org/uk/what-we-do/un-convention-child-rights/> (accessed on 4 February 2021). [12]
- UNICEF (2020), *Worlds of Influence Understanding What Shapes Child Well-being in Rich Countries*, Unicef Innocenti Research Center, <https://www.unicef.org/media/77571/file/Worlds-of-Influence-understanding-what-shapes-child-well-being-in-rich-countries-2020.pdf> (accessed on 23 February 2021). [24]
- UNICEF (2018), *Strategies: Laws and Policies | Child Friendly Cities Initiative*, <https://childfriendlycities.org/strategies-child-friendly-policies-legal-framework-and-programmes/> (accessed on 9 March 2020). [141]
- UNICEF (2017), *A Familiar Face: Violence in the Lives of Children and Adolescents*, https://www.unicef.org/publications/files/Violence_in_the_lives_of_children_and_adolescents.pdf. [124]
- UNICEF (2017), *The Adolescent Brain: A Second Window of Opportunity*, <http://www.unicef-irc.org> (accessed on 17 January 2020). [46]
- UNICEF (2007), “Child poverty in perspective: An overview of child well-being in rich countries”, *Innocenti Report Card 7*, UNICEF Innocenti Research Centre, Florence, <https://www.unicef-irc.org/publications/445-child-poverty-in-perspective-an-overview-of-child-well-being-in-rich-countries.html>. [18]

- van Huizen, T. and J. Plantenga (2018), “Do children benefit from universal early childhood education and care? A meta-analysis of evidence from natural experiments”, *Economics of Education Review*, Vol. 66, pp. 206-222, <http://dx.doi.org/10.1016/j.econedurev.2018.08.001>. [126]
- Wang, M. et al. (2010), “A tobit regression analysis of the covariation between middle school students’ perceived school climate and behavioral problems”, *Journal of Research on Adolescence*, Vol. 20/2, pp. 274-286, <http://dx.doi.org/10.1111/j.1532-7795.2010.00648.x>. [130]
- Weisner, T. (1998), *Human Development, Child Well-Being, and the Cultural Project of Development*, John Wiley & Sons, Ltd, <http://dx.doi.org/10.1002/cd.23219988006>. [109]
- WHO, UNICEF and World Bank (2018), *Nurturing Care for Early Childhood Development*, https://www.who.int/maternal_child_adolescent/documents/nurturing-care-early-childhood-development/en/ (accessed on 9 March 2020). [153]
- Woolcock, G., B. Gleeson and B. Randolph (2010), “Urban research and child-friendly cities: A new Australian outline”, *Children’s Geographies*, Vol. 8/2, pp. 177-192, <http://dx.doi.org/10.1080/14733281003691426>. [143]
- Zimmer-Gembeck, M. et al. (2017), “Is Parent–Child Attachment a Correlate of Children’s Emotion Regulation and Coping?”, *International Journal of Behavioral Development*, Vol. 41/1, pp. 74-93, <http://dx.doi.org/10.1177/0165025415618276>. [73]

3. Do children have the things they need?

This chapter reviews the available evidence on children’s economic and material well-being and highlights the data required to develop better policies targeting children’s material needs. It considers key child economic and material outcomes, such as access to basic necessities like food and clothing, housing and shelter, and to basic learning and leisure materials. It examines two key sets of resources for children’s economic and material well-being, which are family financial resources and resources provided by the communities in which children live. It also summarises key areas of public policy for promoting children’s material living standards. The chapter assesses the available cross-national data on child economic and material well-being and discusses the way forward, highlighting key data gaps and setting out priorities for data development.

3.1. Introduction and main findings

Children’s material living standards are central to child well-being. For children, having access to basic material goods and activities is important in and of itself. Children often attach great value to the things that have, own, and want, with potential implications for wider life satisfaction (Bradshaw and Rees, 2017^[1]; Main and Bradshaw, 2012^[2]; Main, 2014^[3]). But material well-being is also important for other aspects of children’s lives. At the most fundamental level, access to basic necessities like proper food, clothing, and shelter is central to children’s physical health and well-being. In a similar vein, access to things like age appropriate books and developmental toys and games are important for children’s learning and skill development, while other material goods and activities – like internet access – allow children to engage with friends and peers and participate fully in society.

To a large extent, children’s access to material goods and activities is shaped by family finances. Children in income-poor families are often at particular risk of experiencing material deprivation, that is, of lacking access to goods and activities that are typical in their society (Thévenon et al., 2018^[4]; European Commission, 2018^[5]). Those growing up in better-off families, by contrast, often benefit from a wider and higher quality set of basic material goods. But finances are not the only driver of material well-being. Not all children suffering material deprivation live in income-poor families, and not all children living in income-poor families suffer material deprivation. Many families try hard to prioritise children when making spending decisions, often sacrificing basic necessities for themselves. To some degree, some children may also be able to draw on goods and activities provided by the community to meet their material needs.

This chapter reviews the available evidence on children’s economic and material well-being and highlights the data required to develop better policies targeting children’s material needs. It starts in sections 3.2-3.4 with an overview of key aspects of child economic and material well-being. Section 3.2 looks at key child economic and material outcomes, including children’s access to basic necessities like food and clothing, their access to housing and shelter, and to basic learning and leisure materials. Section 3.3 examines two key sets of resources for children’s economic and material well-being: family financial resources, and resources provided by the communities in which children live. Section 3.4 then provide a summary of key areas of public policy for promoting children’s material living standards.

In section 3.5, the chapter turns to consider the data available on child economic and material well-being. It starts by reviewing the available cross-national data on child economic and material well-being outcomes, followed by cross-national data on resources for child economic and material well-being, and cross-national data on public policy for child economic and material well-being.

The chapter concludes in section 3.6 with a discussion of the way forward for data on child economic and material well-being, highlighting key gaps and setting out priorities for data development.

The main findings from the chapter are as follows:

- Comparable cross-national data on child economic and material well-being outcomes is, in general, both scarce and inadequate. While at least some cross-national data are available for most of the key well-being outcomes highlighted in section 3.2, these data series are in almost all cases limited in one or more ways. These data are often limited in their conceptual relevance, in country coverage, and/or in the age-range covered.
- Child-centred data on child economic and material well-being outcomes is especially lacking. There is a clear need for better data that reflects the material situation of children as individuals, and not together with other children in the household or, worse, all household members together.
- Cross-national data on resources for child economic and material well-being is generally better and more widely available. While they have their limits, comparable data on family income in particular is readily available. There are, however, still important gaps in this area. For example, data on the costs of raising children – which are vital for policy formation – are imperfect. There is also little

cross-national data on children’s access to resources provided by schools, local authorities, or community groups.

- One specific area where data and measurement should be improved is the financial resilience of families with children. Where there is good cross-national data on family income levels, there is far less information available on family wealth, assets, and the ability of families to withstand income shocks.
- Cross-national data on children with complex and/or precarious living arrangements is severely lacking. There is a general lack of detailed information on children’s living arrangements in mainstream surveys, making it difficult to properly establish the material living conditions of those living between two homes, for example.
- Similarly, there is also a general lack of information on children in the most vulnerable or marginalised positions, including children with disabilities, children in out-of-home care, children in homeless families, and children experiencing maltreatment. These children are frequently either not easily identifiable or missing entirely in the data.
- As with other areas of child well-being, there is a strong need to better connect data on the many different aspects of child economic and material well-being. While at least some data exist on most of the key aspects of child economic and material well-being, these data come from a range of separate and disconnected datasets. This makes it difficult to identify clearly and cleanly the drivers of child material deprivation and isolate those most at risks. More connected data requires better data linking and/or new and better survey sources.

3.2. Key child material outcomes

All children have a basic and fundamental right to a range of material goods. First and foremost, children need access to food and nutrition, to appropriate clothing, and to shelter and housing. Just as for adults, they are essential for children’s basic survival.

But good child material well-being goes far beyond just ensuring that children’s subsistence needs are met. To flourish and thrive, children need to have access to things that allow them to learn and develop, to engage with peers and adults, and to be connected and accepted within the societies in which they live (Sen, 1999^[6]; Lahire, 2019^[7]). For children growing up in OECD countries today, depending on their age, this often means access to things like a computer and the Internet, certain types of clothing and footwear, holidays, day trips, and a little money to spend on themselves (“pocket money”), as well as books, toys and other resources important for learning and development. These kinds of things are important to children – they tell us so, when asked (Main and Bradshaw, 2012^[21]) – but also have wider implications. Material deprivation can have knock-on effects for other areas of children’s lives and compromise their wider physical-, cognitive-, and socio-emotional well-being.

Table 3.1 summarises key aspects of children’s economic and material well-being. The top panel (Panel A) covers key child material outcomes. These are summarised versions of the material goods and activities that emerge from the literature as central to children’s well-being. They are organised into three broad categories – food, clothing and basic necessities; housing; and learning and leisure materials – and by age group. Panels B and C cover key aspects of children’s settings and environments and key public policies for child economic and material outcomes, respectively. These aspects are discussed later sections 3.3 and 3.4.

Food, clothing and basic necessities

Food and nutrition

Adequate food and nutrition is a fundamental necessity for all human beings, but one that is especially important for children. As discussed in Chapter 4, access to adequate nutrition is critical for child development, especially (but not only) during the early years. Nutrition may also play an important role in children's learning capabilities and behaviours (Dani, Burrill and Demmig-Adams, 2005^[8]). Undernutrition during early childhood in particular is linked to lower educational attainment and lower earnings later in life (Victora et al., 2008^[9]).

However, access to proper food and nutrition remains an all-too-common challenge for many children. For many, getting at least one hot meal a day is not guaranteed (Andresen, 2014^[10]; Lahire, 2019^[7]). In 2014, on average across European OECD countries, about 9% of children lived in households where at least one child (age 1-15) did not have either fruits and vegetables at least once a day or one meal with meat, chicken or fish (or vegetarian equivalent) at least once a day (OECD, 2020^[11]). For children in low-income families, this rate increases to about 16%.

Access to clean and safe drinking water is a related challenge that continues to affect too many communities in OECD countries. Estimates from the WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP) database suggests that, while clean water access is close to universal in most OECD countries, there are important exceptions (WHO/UNICEF, 2021^[12]). In Mexico, for example, roughly only 43% of the population have access to water sources that can be considered "safely managed" – that is, improved sources that are accessible on premises, available when needed, and free from contamination (WHO/UNICEF, 2021^[12]). Even in countries where clean water access is close to universal, some communities can continue to face issues. In Canada, for instance, access to clean drinking water is an ongoing issue for a number of First Nations communities (Indigenous Services Canada, 2021^[13]). (See Chapter 4 for a discussion of the child health effects of pollution and contaminants.)

Clothing and footwear

Possession of appropriate clothing and footwear is a second basic necessity for children. On an objective level, children, like adults, have a basic need for climate- and situation-appropriate clothing. Clothing has protective functions that are important for physical health, especially for children living in extreme climates. Certain types of clothing are also needed for children to engage in essential activities. Schools often impose uniforms or dress codes, for example.

But access to appropriate clothing also has a strong subjective element. Clothing is often seen as reflecting status and can have important consequences for both parents' and children's social lives. For disadvantaged families, the inability to provide children with clothing that is new, in good condition, or of the right type or brand may lead to social discrimination. Parents who do not want their children to be stigmatised may feel under pressure to decline invitations their children receive from their peers or classmates (Lahire, 2019^[7]). Later in children's life (i.e. from middle childhood on), clothing and dress code often become one way in which children themselves demonstrate status within their peer groups (Andresen and Meiland, 2019^[14]). Evidence from studies such as the *Children's Worlds* survey shows that children often attach great importance to their choice of clothes (Bradshaw and Rees, 2017^[1]).

Table 3.1. Key aspects of children's economic and material well-being

		Pregnancy and infancy (0- to 2-year-olds)	Early childhood (3- to 5 year-olds)	Middle childhood (6- to 12-year-olds)	Late childhood (13- to 17-year-olds)
Panel A. Key child economic and material outcomes					
Food, clothing, and basic necessities		Age-appropriate food and nutrition			
		Age-appropriate clothing and footwear			
		Age-appropriate hygiene and personal care products			
Housing	Basic shelter	Basic shelter and residential stability			
	Housing space and quality	Housing space (e.g. free from overcrowding)			
		Basic housing facilities (e.g. indoor flushing toilet)			
		Basic housing conditions (e.g. free from damp, rot)			
Leisure and learning materials	Learning materials	Age-appropriate educational books, toys, and games, etc.			
		-	-	Study supports (e.g. desk, place to work)	
	Leisure materials	Holidays and regular leisure activities			
		Access to digital tools (e.g. computers, tablets, video games, internet)			
		-	-	Pocket money	
Panel B. Children's settings and environments					
Family and home environment	Family financial resources and income adequacy	Household disposable income and income poverty			
		Costs of pre- and post-natal care and delivery	Costs of raising children		
		Family financial stress			
		-	Child perceptions of family financial stress		
	Family work arrangements	Household work status			
School and ECEC environment	Family living and custody arrangements	Presence of parents			
		Custody arrangements and presence of step-family			
	School- and ECEC-provided material supports and activities	-	School- (or ECEC-) provided food and nutrition		
	-	School- (or ECEC-) provided trips and extra-curricular activities			
Community and physical environment	Local cultural and learning services/facilities	Affordable age- and stage-appropriate cultural and learning services/facilities (e.g. libraries, museums, performing arts)			
	Local play and leisure services/facilities	Affordable age- and stage-appropriate play and leisure services/facilities (e.g. play parks, recreation centres)			
	Community material support services and activities	Food banks and other charitable/non-profit in-kind provisions			
Panel C. Public policies					
Family policies	Family financial support policies	Public family financial supports (e.g. family and child cash benefits, family and child tax credits)			
		Tax-benefit policies and work incentives for parents			
	Family employment-related policies	Statutory leave entitlements	-	-	-
		Public ECEC support			-
Child support regulations	Child support regulations				
Housing policies	Public family housing supports	Public family housing supports (e.g. housing allowances, social housing)			

Despite its importance, many children continue to lack access to even basic appropriate clothing and footwear. Financial hardship forces families into tough spending decisions, and clothing is one area in which many parents cut back (Feeding America, 2013^[15]). On average across European OECD countries, around 20% of children in low-income families live in households where at least one child does not have either some new (not second-hand) clothes or to two pairs of properly fitting shoes (including a pair of all-weather shoes) (OECD, 2020^[16]). In some European countries, these rates increase to 30% or more of children in low-income families.

Hygiene and personal care products

Hygiene and personal care product needs vary considerably across groups of children. While some needs are common (e.g. access to soap, toothpaste and toothbrush, etc.), others are specific to children of certain ages or gender.

Babies and infants are one group with specific hygiene product needs. The parents of very young children need access to specific products such as diapers, baby wipes, and baby soap that cannot be easily substituted. One survey, from the United States in 2012, found that many families who cannot afford these basic goods opt for coping strategies such as delaying changing a diaper (48%), reusing paper towels (43%), brushing teeth without toothpaste (37%), and skipping washing dishes or not doing laundry (69%) (Feeding America, 2013^[15]).

Teenage girls are another group with specific hygiene needs. One issue that is receiving increasing attention is so-called “period poverty”, that is, the inability of teenage girls to afford or access appropriate sanitary products. For instance, in the United Kingdom in 2017, one in ten girls from age 14 to 21 were estimated to have been unable to afford sanitary wear, and more than one in ten girls (12 per cent) reported improvising sanitary wear due to affordability issues (Plan International UK, 2018^[17]). 49 per cent of girls also reported to have missed an entire day of school because of their period. Similar evidence is reported in New Zealand where nineteen percent of Māori youth have experienced period poverty, and 16 per cent missed school because they couldn’t afford menstrual products (Fleming et al., 2020^[18]). A lack of access to menstrual products such as pads, tampons or menstrual cups can also cause infections and health problems, as well as embarrassment and shame.

Housing

Having a stable home (“residential stability”) is central to many aspects of child well-being. It promotes security and continuity in many areas of children’s lives. It allows children to remain near to their support networks (e.g. extended family and friends, the family doctor, etc.), to avoid frequent moves of schools, and to maintain friendships and activities over time. By contrast, frequent residential changes are found to affect school readiness and educational achievements, as well as increasing the likelihood of children developing behavioural issues (Nathan et al., 2019^[19]; Jolleyman and Spencer, 2008^[20]). However, not all residential changes have the same impact on children; some can be more traumatic than others. For instance, in New Zealand, longer-distance moves and moves to areas of higher socio-economic deprivation have both been linked to increased socio-emotional and behavioural difficulties (Nathan et al., 2019^[19]; Growing Up in New Zealand, 2020^[21]).

Housing evictions are particularly destabilising events. They increase family stress and remove the psychological and material security of having a secure family home. Housing evictions are found to negatively affect children’s sense of emotional security and educational outcomes (Gaitan, 2019^[22]). In addition, as housing evictions disproportionately affect poor families, they are likely to combine with other forms of deprivations, such as food (in)security. For instance, in the United States, the prevalence of food insecurity among five year olds was twice as high for children who have experienced an eviction from the family home over the first five years of life, (Leifheit et al., 2020^[23]).

Homelessness is the most extreme form of housing insecurity. In addition to being deprived of stable home, homelessness brings with it a set of stressors and challenges for families and children. Homelessness involves not only repeated accommodation moves, loss of independence, overcrowding and a lack of privacy, but also frequently poor diet and missing meals, school placement disruption, loss of contact and support from family and friends, and in some cases loss of parental care if children and parents are accommodated separately (Cutuli et al., 2013^[24]; Samuels, Shinn and Buckner, 2010^[25]; Radcliff et al., 2019^[26]; Buckner, 2008^[27]; Schmitz, Wagner and Menke, 1995^[28]). Homelessness also increases children's risk of being bullied, experiencing stigmatisation and/or being excluded from social activities with peers (Kilmer et al., 2012^[29]; Johnson, 2013^[30]).

Homelessness (including people living in emergency accommodation) appears to affect a growing number of families with children (OECD, 2020^[31]). For example, in Ireland, the number of homeless families almost quadrupled between 2014 and 2018. In England, it increased by 42% between 2010 and 2017. Often, these increases take place against a background where employment conditions are improving, but house prices are rising faster than wages, meaning that the possibilities for families to find affordable housing are diminishing (OECD, 2020^[31]).

Beyond children's basic need for stable shelter, housing *quality* also matters. About 4 in 10 school-age children in European OECD countries live in housing in which there are problems with basic sanitary facilities, overcrowding, or a combination of housing problems (OECD, 2019^[32]). Housing quality is a key component of children's home environment and has an impact on various dimensions of child well-being across childhood (Clair, 2018^[33]; Gaitan, 2019^[22]). First, housing deficiencies can affect children's physical health. For instance, housing dampness issues are found to increase risks of respiratory issues of children, as they do also for adults (Beasley, Semprini and Mitchell, 2015^[34]; CPAG, 2015^[35]; Ingham T, 2019^[36]). These effects may be long-lasting, as children can suffer lifelong consequences or even die prematurely from the effects of living in unhealthy homes (CPAG, 2015^[35]; New Zealand Human Rights Commission, 2016^[37]).

Housing overcrowding refers to situations where the number of people in a household exceeds the capacity of the dwelling to provide adequate shelter and services to its members. The simplest measures of overcrowding provide comparisons between numbers of people and either rooms or bedrooms. The key measure is that there should be no more than 2 people per bedroom, adjusted for the age, sex and relationship of the people concerned. On average in European OECD countries, slightly less than 1 child in 4 is estimated to live in overcrowded households (OECD, 2020^[38]).

Housing overcrowding raises health risks for children, including increased infection risks (Baker et al., 2013^[39]). For instance, a New Zealand study found that children have at least twice the risk of being admitted to hospital with pneumonia if they lived in an overcrowded house (Grant et al., 2012^[40]). Overcrowding is also identified as the most important risk factor for rheumatic fever (Jaine, Baker and Venugopal, 2011^[41]) and a factor raising children's risk to develop meningococcal disease (Baker et al., 2013^[39]).

Children's social and emotional well-being can also be affected by poor housing quality. For example, one study found that children who resided in lower quality housing during childhood showed greater emotional and behavioural problems in late adolescence than peers in higher quality homes (Coley et al., 2013^[42]). One reason is that low-quality housing may induce stress in both children and parents and limit parent's ability to regulate family activities, in turn affecting children's socio-emotional functioning. In addition, adolescents in poorer quality housing seem to have lower average reading and math skills than others. Growing up in low-quality housing seems also to be associated with poorer mental health outcomes (Rollings et al., 2017^[43]). Hence, rather than providing security and a space to escape life's pressures, a home with quality deficiencies may add to other stresses experienced by poor families and children.

Learning and leisure materials

Children’s material needs go much further than just what is necessary for survival. In addition to basic necessities and shelter, children need access to goods and activities that allow them to learn and develop and to engage and participate in society. During early childhood, this means access to things like age-appropriate books and developmental toys and games. As children grow older, they also need access social and recreational activities and resources like the Internet that allow them to engage with friends and peers. Children themselves stress the importance of things like day trips and holidays with the family and a little pocket money to spend on themselves (Main and Bradshaw, 2012^[2]).

Available evidence suggests that relatively few children are completely deprived of toys, books and other materials for their education or leisure. For example, in France, the *French Longitudinal Childhood Survey* (ELFE) shows that at the age of one year 96% of children have baby books, 94% have balls, and 88% have playground equipment (Octobre, Berthomier and Facq, 2018^[44]). In general, families ensure that children have access to toys designed to develop the senses (e.g. hearing, touch, sight) as well as various aspects of development (motor and cognitive). However, children from culturally or economically disadvantaged families tend to have fewer and a less diversified set of toys (Octobre, Berthomier and Facq, 2018^[44]).

From late childhood, many leisure activities occur outside the home and carry at least some financial cost, either in the form of purchase costs (e.g. riding a bicycle), entrance and/or travel fees (e.g. swimming), or participation fees (e.g. organised play events, such as football club fees). However, not all children participate in regular leisure activities: in 2014, almost 60% of school aged children from low-income families in European OECD countries, and 21% of their peers from high-income families, lived in households where at least one child does not take part in a regular leisure activity or go on holiday away from home at least one week per year (OECD, 2020^[45]).

Home internet and computer equipment is also critical for children’s access to online educational and recreational resources. Children’s social lives are increasingly lived online, through social networks and video games. The COVID-19 crisis and shift to remote learning seen in many OECD countries have only underscored the importance of digital tools for learning as well as social connections. However, not all children have access to the Internet and digital resources. Data from OECD PISA 2018, for instance, show that, in some countries, children from disadvantaged backgrounds are far less likely than those from advantaged backgrounds to have access to a computer at home (OECD, 2020^[46]). (See Chapter 5 for more discussion on digital tools and their potential impact on children’s social and emotional outcomes).

Many children start receiving pocket money from their parents in middle childhood as soon as they think children are old enough to understand the value of money and goods. For instance, in Denmark, two-thirds of children from age seven received pocket money in 2013, and older children (age 12 to 17) receive on average higher amounts than the younger (Bonke, 2013^[47]). For parents, giving pocket money to their kids is one way for children should to learn how to spend money and be encouraged to save, to do their homework and contribute to household chore as a condition of receiving money (Furnham, 2001^[48]; Furnham and Milner, 2017^[49]). For children, pocket money is one way to purchase a few things that parents may not consider as essential. It also helps contribute to the sense of autonomy that children progressively develop with age.

The evidence available on spending money practices suggest that wealthier families place more importance on regular pocket money giving and financial education than doing those from poorer backgrounds (Furnham and Milner, 2017^[49]; Wolff and Barnet-Verzat, 2008^[50]; Bonke, 2013^[47]). How children spend their pocket money yet depends on gender and age. For instance, in Denmark, boys receiving pocket money spend more than those who are without on food, sweets and drinks when they are aged 7-11, while adolescents aged 12-17 spend more money on clothes and shoes (Bonke, 2013^[47]).

Danish female adolescents on average spend less on food than their male counterpart, but they spend almost twice as much as boys on clothes and shoes.

With respect to the causal effects of pocket money on children's behaviours and outcomes, the evidence remains fairly sparse. There is little evidence of any clear relationship between pocket money received and children's contribution to unpaid work in the home and or school efforts (Wolff and Barnet-Verzat, 2008^[50]; Bonke, 2013^[47]). Some studies point out that pocket money may carry risks for children's eating behaviours and health status: compared with children receiving no pocket money, those receiving money show a higher propensity to consume unhealthy foods and are more likely to be overweight or obese (Punitha et al., 2014^[51]; Ma et al., 2020^[52]; Grammatikopoulou et al., 2018^[53]; Van Ansem et al., 2014^[54]). Positive associations are also reported between receipt of spending money and tobacco use (Cui et al., 2019^[55]; Scragg, Laugesen and Robinson, 2002^[56]; Wong et al., 2007^[57]). However, there is overall little data on how children spend their pocket money. This is an area that warrants further research.

3.3. Key aspects of children's settings and environments for child material outcomes

Family and home environment

Families play a central role in the provision of good and services for children's material needs. In many cultures, including most cultures in OECD countries, the family unit has first and primary responsibility for delivering food and nutrition, clothing, housing, and goods and services for leisure and recreation. To a slightly lesser extent, the family also plays an important role in providing children with material goods for learning and education, especially during the early years.

To a large degree, families' abilities to meet children's material needs are determined by household income. All else being equal, families with higher disposable incomes have the option of purchasing more and better quality material goods and services for their children. They are also more likely to live in good housing and in neighbourhoods that provide greater access to opportunities, such as good quality early childhood services, better schools and greater leisure amenities. Families with lower incomes are typically more restricted in their abilities to purchase material goods and services and, although many low-income families prioritise children's needs, many children in income-poor families still experience material deprivation, often in several ways all at once (Cooper and Stewart, 2013^[58]; Thévenon et al., 2018^[4]; Chzhen, 2014^[59]; Bray et al., 2019^[60]).

However, finances are not the only determinant of families' abilities to meet children's material needs. In addition to income, differences across families in information, education, norms, values and attitudes all also contribute to differences in household consumption patterns (Lahire, 2019^[7]). These factors often co-vary with income. In disadvantaged families, many parents face multiple constraints (e.g. time, education, social connections and networks) that may limit their capacity to search for, identify, and pay for goods to meet children's material needs. Societal pressure can also play a role. For example, parents in low-income families may feel a need to prioritise certain types of material goods, such as clothing, in order to avoid stigmatisation and shield children from the hardships of poverty (Hamilton and Catterall, 2006^[61]; Lahire, 2019^[7]). Location is another potential driver: on top of the effects of geographic variations in employment, wages and the costs of living (see later in this section), some children may experience deprivation at least in part because they live in localities with fewer facilities or with comparatively inaccessible or low-quality services.

Family financial resources and income adequacy

To a large extent, child economic and material well-being depends on the adequacy of family income. Among the many effects that low income can have on children (Box 3.1), one is that it restricts the ability of families to provide for children’s material needs. By many measures, children growing up in low-income households are among the most likely to suffer material deprivation and live without access to one or more basic material goods (Thévenon et al., 2018^[4]; European Commission, 2018^[5]; OECD, 2020^[11]). Children from higher income households, by contrast, are often (but not always) shielded from material deprivation.

The degree to which low family income leads to child material deprivation depends in part on the costs of living, and especially the costs of raising children. These costs can vary a lot both across countries and within countries between geographic regions. One reason is that price levels can differ considerably. Housing costs are one example (Box 3.2). Another reason is that, in some countries (or regions), certain types of material goods and services for children (e.g. housing, child care, schooling) are heavily subsidised or provided free to at least some families (Förster and Verbist, 2012^[62]; Verbist, Förster and Vaalavuo, 2012^[63]). In others, they are not.

Box 3.1. How does family poverty affect children?

Family poverty involves three aspects that may arise separately or simultaneously: low income, material deprivation and financial stress. Most families experience only one of these dimensions at a time, but a few may experience all three (Bradshaw and Finch, 2003^[64]; Schenck-Fontaine and Panico, 2019^[65]).

The lack of income affects children through different channels (Duncan and Magnuson, 2013^[66]). It may first limit households’ ability to purchase or produce important “inputs” for child development, such as good quality housing, healthy food, or good quality care and education services, etc. The lack of income may also affect the quality of the home learning environment (for instance through no budget capacity to purchase books, educational toys or to provide children with a quiet space to do their homework). Low income families are also more likely to live in neighbourhoods with poor transportation infrastructure, few care and education facilities, low quality schools, as well as in neighbourhoods with higher exposure to air pollution or criminality (Gustafsson and Osterberg, 2010^[67]; Chetty and Hendren, 2018^[68]; Adrian et al., 2020^[69]).

Each of the various dimensions of family poverty have a distinct effect on the many domains of child well-being (Gundersen, B.; Boushey, 2001^[70]; Gauthier and Furstenberg, 2010^[71]; Iceland and Bauman, 2007^[72]; Marks, 20^[73]; Leininger and Kalil, 2014^[74]; Schenck-Fontaine and Panico, 2019^[65]). For instance, one of the main effect of income poverty seems to prevent parents from investing money on child care and the education resources, which in turn primarily affects children’s cognitive development (Gershoff et al., 2007^[75]; Cooper and Stewart, 2017^[76]). In a comprehensive literature survey, (Cooper and Stewart, 2013^[58]) emphasise that children from lower-income households have worse outcomes at later ages for a range of topics such as: scoring lower on tests of cognitive skill in early childhood, being more likely to drop out of school and less likely to attain tertiary education. By contrast, higher family permanent income during early childhood appears to be associated with higher verbal cognition at age 11 (Moulton et al., 2020^[77]).

By contrast, material deprivation seems to mainly affect parenting behaviours and to increase parental stress which then seem to be primarily associated with higher incidence of children’s health and behavioural issues (Gershoff et al., 2007^[75]; Heflin and Iceland, 2009^[78]; Lee and Lee, 2016^[79]; Newland et al., 2013^[80]; Lai et al., 2019^[81]; Schenck-Fontaine and Panico, 2019^[65]). Last but not least, financial stress appears to cause higher levels of children’s internalising and externalizing behaviour problems regardless of family income, in which case parental depression and intra-family conflicts seem to be important mediating mechanisms (Leininger and Kalil, 2014^[74]; Ponnet, 2014^[82]). When these three

dimensions of child poverty are combined, child behavioural problems are more likely to be observed than when a single stressor is involved (Schenck-Fontaine and Panico, 2019^[65]). Moulton et al. (2020^[77]) also found Housing wealth was associated with fewer emotional and behavioural problems in middle childhood.

The *timing* of poverty matters, and for some outcomes later in life, particularly those related to achievement skills and cognitive outcomes, poverty early in a child's life seems to be particularly harmful (Duncan et al., 2012^[83]; Cooper and Stewart, 2013^[58]). By contrast, for behavioural outcomes, income in later childhood seems to be more important. For instance, using longitudinal data from Denmark, data Lesner (2018^[84]) found that individuals who experienced childhood poverty had lower earnings, labour market attachment and lower quality jobs. In the marriage market, childhood poverty was found to have negative consequences for the probability of marriage, cohabitation, and having children around the age of 30. The effect sizes was also found to peak during adolescence, i.e. at a time when key decisions are made for education and for developing networks impacting many life outcomes. Evidence on the effect of the age at which children are exposed to poverty on their later outcomes is, however, rather mixed and does not justify targeting public intervention to combat poverty exclusively at early childhood.

The *duration* and *repetition* of low income episodes are also important: longer durations of poverty throughout childhood seems to have a more severe effect on children's outcomes than short or episodic periods of poverty (Cooper and Stewart, 2013^[58]). For instance, Rees (2019^[85]) found that in the United Kingdom children who had experienced persistent poverty (at least five out of six instances) were four times as likely to have emotional and behavioural difficulties as children who had not experienced poverty. Persistent poverty is also associated with worse physical and mental health outcomes (Lai et al., 2019^[81]).

Child-raising costs also vary considerably across childhood; some periods of childhood are more costly for families than others. As discussed in later chapters, the pre-natal period and, more broadly, the first years of children's life are particularly important for their physical development (Chapter 4) and for socio and emotional (Chapter 5) and cognitive (Chapter 6) outcomes. The early years are also one of the most costly for parents. During this period, families may need to cover (at least some of) the costs pre- and post-natal care and delivery, as well as equipment for the home, for travelling, and for nursing and feeding. Regular expenses to care for infants also kick in: food, clothing, and diapers make up most of the necessities in the cost of raising children. For working parents, early childhood education and care (ECEC) costs are likely to be one of the most important budget item during early childhood (Box 3.5). In some OECD countries, high net ECEC costs can substantially weaken incentives for single parents and second-earner parents to engage in paid work and frustrate families' efforts to escape poverty (see also below) (OECD, 2020^[86]).

For expectant parents, it is often very difficult to anticipate the cost of the arrival of a new child to the household budget. Household expenditures during the prenatal period and the first few years after a childbirth are not well documented in general household expenditure surveys and therefore are often rather poorly measured. The available but patchy evidence nonetheless suggests that prenatal expenses can be sizeable, with large cross-country differences. For instance, the cost of a hospital admission for standard child delivery was on average USD 11 200 in 2017 in the United States, three to four times the cost in the Netherlands (IFHP, 2019^[87]). In the United States, the average proportion of costs paid by patients for delivery care has increased since 2008 (Moniz et al., 2020^[88]).

Given the importance of the early years and the considerable costs involved, several OECD countries (including Australia, Finland, France, New Zealand and the United Kingdom) emphasise the need to strengthen their support during the early years with screening and preventive measures and a coordinated and tailored provision of services to best meet the needs of children and their families (Riding et al., 2021^[89]). It is particularly important that parents and infants have access to pre- and post-natal services,

as well as to appropriate nutrition and hygiene and personal care products, such as infant food, diapers or products that are specific to the hygiene of babies and toddlers. Austria's Early Childhood Interventions Programme (*Frühe Hilfen*) provides one example of an integrated intervention programme that aims to support families in need during pregnancy and the early years through health, material and social supports (NZFH, 2021^[90]; WHO Europe, 2017^[91]).

As children grow up, other expenses become progressively more important, such as those related to education, transportation and leisure, which seem to become prominent for families with adolescents (Box 3.5). Housing costs are also likely to become prominent in the budget of large families and of households with middle-age children who move to larger dwellings to ensure that each child can have their own bedroom (Box 3.2).

Box 3.2. Housing costs and their impact on children

The share of households spending on housing cost has increased for all households over the past decade, and estimates of household expenditures suggest that low-income households have seen the most significant rise (OECD, 2020^[92]). On average across the OECD for which estimates are available, the share of housing costs in households budgets among those in the bottom quintile increased by more than 9 percentage points between 2005-2015, compared to an increase of around 5 percentage points for middle-income households and 3 percentage points for high-income households. On average in the OECD, about 14% of renter households pay a total housing cost of 40% or more of disposable income, and more than one-third of low-income households pay such a high cost (OECD, 2020^[93]).

High housing costs affect the material situation of children. First, high housing costs can crowd out spending on other essentials, including food and educational resources. Second, they increase the risk for families of living in overcrowded dwellings. Growing up in crowded housing implies that children do not always have a quiet space to study, privacy, or a space to play or rest, and this has adverse consequences on many dimensions of child well-being, including children's academic achievement and health (Clair, 2018^[33]; Evans, Saltzman and Cooperman, 2001^[94]; Solari and Mare, 2012^[95]).

While typically captured through objective measures, there is also an important subjective aspect to family income adequacy and its relationship with child well-being. Over and above the impact of income on families' abilities to provide material goods, perceived poor finances can lead to family stress, in turn compromising relationships and damaging children's well-being. Children pick up on financial stress within the family, and often adjust their requests accordingly, even if they have no clear knowledge of family budgets (Andresen and Meiland, 2019^[14]; Ridge, 2011^[96]; Pardali, 2019^[97]). For example, children may not mention their preferences, or not tell their parents about the money they need for school excursions or leisure (Ridge, 2011^[96]; Pardali, 2019^[97]).

Family work arrangements

Household income is determined primarily by the employment situation of parents and/or other adults in the household. Joblessness is a strong determinant of poverty, and jobless families with children are on average six to seven times more likely in the OECD to experience income poverty than families where at least one parent works (OECD, 2020^[98]).

Available evidence shows that parental joblessness or unemployment can have short- to long-term effects on children, especially if parental unemployment occurs at critical stages in a child's educational trajectory. Parental unemployment is found to negatively affect children's health and psychological well-being (Mork, Sjogren and Svaleryd, 2014^[99]; Bubonya, Cobb-Clark and Wooden, 2017^[100]; Schaller and Zerpa, 2019^[101]; Sleskova et al., 2006^[102]), educational ambitions and performance (Andersen, 2013^[103]; Rege, Telle and

Votruba, 2011^[104]; Lindemann and Gangl, 2019^[105]; Brand, 2015^[106]; Coelli, 2011^[107]), as well as attitudes towards work (Müllera, Riphahn and Schwientek, 2017^[108]; Mooi-Reci et al., 2019^[109]) and labour market outcomes (Mäder et al., 2015^[110]; Oreopoulos, von Wachter and Heisz, 2012^[111]; Brand, 2015^[106]; Lehti, Erola and Karhula, 2019^[112]). These adverse effects could arise because of negative consequences of unemployment such as reduced family income and increased levels of stress (Brand, 2015^[106]). Parental joblessness and unemployment may have a significant role in enhancing educational inequalities and, in turn, economic and labour market inequalities further down the line.

The flip side of the coin is that parental employment provides protection against income poverty and is a key lever for influencing to the economic and material well-being of children (Thévenon et al., 2018^[4]). Parental employment can be encouraged by multiple policy supports, including tax and benefit policies and leave entitlements. For single parents and second earners in couples with young children, access to affordable and high-quality ECEC can be central to efforts to engage in paid work (OECD, 2020^[86]). For parents with school-age children, access to out-of-school-hours services (OSH) is also important for those who wish to work full-time (OECD, 2017^[113]).

Family living and custody arrangements

In many OECD countries, family living arrangements are becoming increasingly diverse. The number of children born to and/or growing up with unmarried cohabiting parents is growing (OECD, 2020^[114]), while separations and reconstitution have become more frequent. As a result, child living and custody arrangements are diversifying and can be rather complex, with various implications on children's material and non-material well-being (Steinbach, 2019^[115]; Dinisman et al., 2017^[116]; OECD, 2019^[117]).

Family living and custody arrangements are also important determinants of families' living standards and poverty risks. On average across OECD countries, around 17% of children under age 15 are estimated to live with a single parent, and poverty risks for single-parent households are on average about three times higher than for households with two or more adults (OECD, 2020^[98]).

One reason is that family living arrangements can have a direct effect on family income. Separation provides the simplest example: following separation, the household loses any income (such as wages and salaries) directly tied to the departing member. Where eligible, public financial supports and child support payments may help make up some of the shortfall, although social protection systems are not always well placed to provide support to some more diverse forms of family unit (Miho and Thévenon, 2020^[118]) (see later in this section). To counter income loss, parents may look to increase paid work. However, child care and family responsibilities often restrict separated parents' abilities to engage in paid employment, especially in the case of parents with sole or primary custody.

But family living arrangements can also impact the costs of raising children. Shared custody provides children with the opportunity to maintain a close caregiving relationship with both parents, and has become increasingly common. It also, however, comes with costs, such as the requirement for two dwellings to be equipped to accommodate children (Mortelmans, 2020^[119]; Miho and Thévenon, 2020^[118]). Moreover, shared custody imposes additional material constraints on children's daily lives since, for example, children sharing their time between two residences after family separation sometimes have to give up some of the leisure activities that they were doing before the separation (Merla and Nobels, 2019^[120]).

School-based, local authority, and community material supports

While families usually have primary responsibility for children's material needs, schools, local authorities, and community organisations can also play an important role in providing or facilitating children's access to material necessities. Sometimes (but not always) aimed at disadvantaged families, school-, local authority- and community-level provisions can help ensure children have access to at least a basic range of material goods and services.

School and local authority provisions

In many OECD countries, it is common for a range of goods and services through schools and the education system. For example, in many OECD countries, school-meal programmes are used as one mechanism for ensuring (school-age) children receive adequate food and nutrition (Riding et al., 2021^[89]). These meals are often subsidised or provided free to children from low-income or disadvantaged backgrounds. In a similar vein, in many countries, school trips and visits are used to ensure children have access to cultural and recreational activities, as well as for educational purposes. School-based out-of-school-hours services can also be used to provide children with access to extra-curricular arts, sports and cultural activities at reduced or no cost to parents.

School-based provisions have their drawbacks, however. For one, they rely on children being physically present at school for delivery. Although an extreme case, the limits of this approach have been well illustrated through the COVID-19 crisis, where school closures have complicated the delivery of school-meal programmes and other provisions (OECD, 2020^[121]). However, even in “normal times”, delivery may be compromised by non-attendance, which is often higher among children from disadvantaged background. For example, children who experience food insecurity at home are more likely than others to regularly miss school (Tamiru and Belachew, 2017^[122]). School holidays and other breaks also limit the ability of school-based provisions to consistently reach those most in need.

Outside of schools, local authorities often provide local facilities and services aimed at meeting children’s material needs, sometimes in partnership with non-government organisations and/or other voluntary or community bodies. Public libraries are one example: libraries help ensure that children have access to books and learning materials, usually at little or no charge. Local authorities may support children’s access to cultural, sporting and leisure/recreational activities through subsidised facilities (e.g. public recreation centres) and services or activities (e.g. lessons). In some countries, local authorities may also have action programmes that provide material assistance to families in emergency situations (Riding et al., 2021^[89]). Social housing provisions (see below) may also be provided through or with the assistance of local authorities.

Community provisions

In addition to school and local authority provisions, community organisations can also provide goods and services to help meet children’s material needs. Food banks – organisations that collect and distribute food to those in need – are one of the most common and high profile examples. Although sometimes operating with public financial assistance and/or in co-operation with local authorities, food banks are typically run as non-profit, charitable organisations. Other examples include children’s charitable organisations and religious organisations, which may provide a range of material goods and services to disadvantaged families, including clothing, personal care products, and books and toys.

3.4. Key public policies for child material outcomes

All OECD countries provide policies aimed at supporting families and ensuring that children’s material needs are met, though the levels and types of support, as well as the exact underlying objectives, differ widely (OECD, 2011^[123]; Adema, Clarke and Thévenon, 2020^[124]; Thévenon et al., 2018^[4]). Some OECD countries, most notably the Nordic countries, provide service-heavy family supports aimed primarily at promoting full-time dual-earning by parents. One of the basic goals is to ensure that families can meet children’s material needs mostly through employment and labour earnings. Other OECD countries put more emphasis on supporting family living standards through family cash benefits and tax breaks, either in the form of universal cash benefits for all families, or targeted benefits aimed at specific vulnerable groups, such as single-parent families or families on low incomes. A small number of OECD countries

provide only limited public family supports, though this is usually combined with comparatively low tax rates and tax incentives for parents to engage in dual-earning.

Family policies

Leave and child care policies

Over the past few decades, paid maternity, paternity, and parental leaves have become common features of family support packages in most OECD countries. Designed to be used around childbirth and when children are very young, paid leaves can have a range of objectives, from protecting and promoting the health of mothers and their new-born children, to promoting gender equality and a more even distribution of unpaid work at home. Perhaps most important from the perspective of child material well-being, paid leave helps keep mothers in paid work and promotes parental employment continuity (Adema, Clarke and Frey, 2015^[125]; Rossin-Slater, 2017^[126]). Depending on the level of payment, paid leave also helps families maintain income when one or more parents are off work when children are very young.

Following leave, parents looking to engage in paid work need access to affordable, quality, early childhood education and care (ECEC). All OECD governments support and help fund ECEC in one way or another, but the scale, means, and methods of assistance are diverse (OECD, 2020^[86]). Some countries, like the Nordic countries, provide comprehensive publicly operated ECEC systems, with children entitled to a place in subsidised public care from a young age. Others provide extensive pre-primary services for children from around age three but offer less support for parents with younger children, or make greater use of market-based services, with public support instead directed through cash supports to parents (OECD, 2020^[86]). The net out-of-pocket costs of ECEC after public support can differ sharply from country to country (OECD, 2020^[86]). (See Chapters 5 and 6 for more detail on ECEC and ECEC policies.)

Parents with school-age children also need access to affordable care services if they are to engage in full-time paid work. Out-of-school-hours (OSH) services provide formal care for school-age children both before- and after-school, and also during school holidays. However, while participation in OSH services is common in some OECD countries, only a relatively small number provide extensive public out-of-school-hours services or support (OECD, 2017^[113]). In many countries, parents must still look for private solutions or adapt their working hours to the needs of school-going children.

Family financial supports and tax-benefit policies

Separate from paid leave and child care supports, cash transfers and other forms of financial assistance are common features of family support packages in OECD countries. All OECD countries provide financial support to families in some form (OECD, 2019^[127]). The exact design and objectives of supports differ considerably but, in almost all cases, the broad aim is to boost families' living standards and support families with the costs of raising children. In many countries, public financial supports to families are critical for protecting children from poverty (Thévenon et al., 2018^[4]).

Cash supports for families can be separated into two main types. The first are family-related cash benefits, most often taking the form of family allowances (also known as child benefits or child allowances). These benefits can be universal or means-tested (i.e. with eligibility and/or payment levels conditional on income and/or assets). Payment levels frequently vary with child age and family size. Some countries also provide benefits targeted at specific groups or for specific purposes based on family situations (e.g. single-parent benefits), child characteristics, and/or the parents' labour market situation (OECD, 2019^[127]).

The second main type is tax-based financial support for families. Over three-quarters of OECD countries provide some kind of family-related financial support through the tax system, most often either through a child tax allowances or through tax credits (OECD, 2019^[127]). In many (but not all) countries, the amounts

directed through tax breaks for families are only small in comparison to the amount spent on family cash benefits (OECD, 2020^[128]).

In many countries, public financial assistance depends at least in part on the civil status of the parents, which can lead to substantial inequalities in children's economic security (Miho and Thévenon, 2020^[118]). While families with informally cohabiting parents can sometimes benefit from individual tax systems, children with non-married parents may get a lower level of legal protection in the event of parental separation or death if protections do not systemically apply to children with non-married parents.

In combination with the broader tax-benefit system, public family financial supports can further influence child economic and material well-being through the incentives (or disincentives) they create for parental employment. Women's employment, and especially mothers' employment, tends to be particularly responsive to the incentives created by the tax-benefit system (OECD, 2011^[129]). The overall work incentives produced by tax-benefit systems are the result of a number of factors, including the tax unit, the level and progressivity of the tax schedule, the structure of social security contribution systems, and the ways in which any tax credits, in-work benefits, and means-tested benefits interact with earnings and the number of earner in the family (OECD, 2016^[130]; OECD, 2017^[131]).

Child support policies

Child support (also called child maintenance) refers to cash transfers made between parents following separation or in cases where children are born outside of a relationship. For low-income single parents, these payments are an important source of income and can help protect children against income poverty (OECD, 2011^[123]).

Most OECD countries have formal child support systems that aim to ensure parents meet their child support obligations (OECD, 2011^[123]). In many countries, governments first allow parents an opportunity to agree privately on support payments, with intervention occurring only when an agreement cannot be reached. Even so, non-payment of child support is frequent and can undermine the material well-being of children. In order to avoid immediate shortfalls in case of non- or late payment, some countries make advance child support to resident parents, which are then recovered from non-resident parents through enforcement mechanisms (Miho and Thévenon, 2020^[118]).

Housing policies

Housing support policies

Although not usually considered a part of “family” or “child” policy, housing policy and public housing supports can play a key role in child material well-being and in ensuring that children's material needs are met. As discussed above, housing costs are consuming an increasingly large share of household budgets (Box 3.1). High housing costs not only limit the extent to which families are able to meet their children's housing needs, but also, through their impact on after-housing disposable income, damage families' abilities to provide other material goods and services for children.

OECD countries use a range of policy supports to help families with the costs of housing. Housing allowances – that is, means-tested transfers to households aimed at supporting households with housing costs – are one common option, and can be valuable in reducing family income poverty (Thévenon et al., 2018^[4]). However, allowances have their limits, particularly as they cannot guarantee housing quality, and may adversely affect rent prices (Salvi del Pero et al., 2016^[132]). Social housing is another frequent measure, albeit with considerable differences in the size, scope, and target population of the sector across OECD countries. In many OECD countries, social housing is targeted at low-income households that cannot otherwise afford market-rate housing, but others (e.g. Austria, Denmark and the Netherlands) have traditionally adopted a more universalist approach, with social housing open to many middle-income as

well as low-income households (OECD, 2020^[133]). Other forms of public housing support include rent controls – where the state specifies rules for how rents are set – and other types of support for private rental housing, such as the provision of guarantees and rent tax relief for tenants (Thévenon et al., 2018^[4]).

Homelessness policies

Policies aimed at preventing and reducing homelessness are diverse. In many countries, policy responses to support the homeless comprise of a patchwork of services managed by different public and non-public agencies, including emergency shelter, supported housing and subsidised housing, plus also various types of social supports and services (e.g. health services) (OECD, 2020^[31]). One promising model for policy support is the Housing First approach to homelessness – an increasingly common approach in OECD countries, which prioritises immediate, permanent housing to the chronically homeless, along with integrated service delivery (OECD, 2020^[31]; OECD, 2020^[92]). Emergency support, including rapid rehousing, can help the transitionally homeless (OECD, 2020^[31]; OECD, 2020^[92]).

3.5. Data on children’s economic and material well-being

Obtaining internationally comparable data on children’s economic and material well-being can be challenging. While researchers and national statistical offices have developed a range of sophisticated household surveys and other tools aimed at collecting information on the living standards of populations generally, these surveys are not always well suited to delivering information on children. In some cases, children are not included. In others, the survey or data collection doesn’t contain many or all of the items most relevant to children.

A particular issue is that surveys and data collections do not always focus on child-centred information i.e., information that reflects the situation of each child as an individual (Dickerson and Popli, 2018^[134]; Leturcq and Panico, 2019^[135]). Instead, it is common for data to be collected at household level and refer to the situation of the household as a whole. For example, information on income usually relates to the household, and does not take into account differences in intra-family allocations whereby children in a low-income households may not be deprived because their needs are prioritised. In the absence of detailed information on household budget allocations, variations in household income provide a proxy for differences in living standards and in households’ capacity to invest in children.

Annex Table 3.A.1 provides an overview of available and comparable cross-national data on children’s economic and material well-being, arranged by the aspects of child economic and material well-being highlighted in Table 3.1. The availability (or not) of relevant data in each area is discussed below.

Data on children’s material outcomes

Detailed, quality, comparable data on children’s material environment and the fulfilment of children’s basic material needs is generally relatively scarce. At least some data is available for many of the main aspects of children’s material needs highlighted above, but in many cases, this information is limited in scope, detailed, and/or regularity.

Child-specific surveys are one source of information on children’s material environment. The information available can be more or less detailed, depending on the focus of the survey. National child cohort surveys often provide rich information on children’s material environment, including the goods and services available to children at different ages (see for instance the UK Millennium Cohort study in Box 3.3). However, these cohort studies are often highly country-specific, and thus comparability may be limited. The *Children’s Worlds* survey, a child-centred cross-national survey that covers children from age 8 to 12, includes valuable questions on both children’s possessions *and* children’s satisfaction with money and the things they own.

Box 3.3. Information on child material deprivation in the Millennium Cohort Study

The Millennium Cohort Study (MCS) is a nationally representative cohort study carried out in the United Kingdom. The initial sample included 18 818 children in 18 552 families living in the United Kingdom who were born between the years 2000 and 2002. Five waves of data are considered, starting when the cohort children were about nine months of age (MCS1), then at age three (MCS2), five (MCS3), seven (MCS4), 11 (MCS5) and 14 (MCS6) and most recently at age 17 (MCS7).

The study contains some general questions on the home environment that are asked in almost all survey waves. These include questions on overcrowding, the type of home heating used, any issues with dampness, and whether parents could afford to replace or repair major electrical goods such as a refrigerator or a washing machine, when they are broken. Certain questions particular to the age and developmental stage of the child were asked in specific survey waves, for example, a question on the temperature of the baby's bedroom in MCS1 (Leturcq and Panico, 2019^[135]).

The MCS deprivation indicators also include child-specific information, with some of the questions changing across survey waves (Bradshaw and Holmes, 2010^[136]). For example, in MC3 the five item indicators were whether the child had a weatherproof coat and owned two pairs of all-weather shoes, and whether the child's parent had 'a small amount of money to spend on her/himself weekly', and whether the parent could afford a yearly holiday (not staying with relatives), and to hold celebrations on birthdays or religious festivals. MCS5 and 6 waves also included questions on whether they had friends around for tea or a snack once a fortnight and if money was a barrier (Rees, 2019^[85]).

Some general purpose cross-national surveys also include questions on children's material well-being, even if it is not the main focus. For example, in 2014, an ad-hoc module in the European Statistics on Income and Living Conditions survey contained a few child-centred or child-relevant questions designed to capture whether children's (perceived) basic needs with regards to food, clothing, education, leisure and social areas were being met (Box 3.4); in the case of needs not being met, parents are asked if the main reason was that the household cannot afford to. An analysis of the items included in the survey shows that they coincide with what parents consider as desirable, making them "reliable" in the sense that they represent a coherent set to describe a situation of relative deprivation (Guio et al., 2018^[137]). However, the main limitation of this source is that it covers children in European countries, only. While a few OECD countries outside Europe do ask similar or related questions in national household surveys (e.g. New Zealand through their Household Economic Survey), either regularly or on an ad-hoc basis, this is not the case for most. A further limitation is that questions were asked in reference to all of the children together in a family, whereas in practice children's experiences of deprivation may differ, even within the same family unit (Box 3.4).

Box 3.4. Child material deprivation in EU-SILC

In 2014, the *European Union Statistics on Income and Living Conditions* survey (EU-SILC) included information on whether children's material needs are met or not. The information was collected for the 28 countries of the European Union and covered children's nutrition, clothing, study resources and leisure activities. The information was collected at household level, i.e. a single response is given for all children together. As a result, information can be derived only on the proportion of children living in a household where at least one child is or is not experiencing some form of deprivation. The domains of material deprivation covered include whether all children in the household had access to/could:

- Some new (not second-hand) clothes
- Two pairs of properly fitting shoes, including a pair of all-weather shoes
- Fruits and vegetables at least once a day
- One meal with meat, chicken or fish (or vegetarian equivalent) at least once a day
- Books at home suitable for their age
- A suitable place to study or do homework
- Age-appropriate indoor games
- Outdoor leisure equipment
- Leisure activities on regular basis
- Celebrations on special occasions (e.g. birthdays, name days, religious events, etc.)
- Invite friends round to play or eat from time to time
- Participate in school trips and school events that cost money
- Go on holiday away from home for at least one week per year.

Source: EU-SILC, Ad hoc modules: <https://ec.europa.eu/eurostat/web/income-and-living-conditions/data/ad-hoc-modules>.

Many household surveys also include basic information on housing conditions and dwellings characteristics, which can be used to capture children's material housing well-being. This typically includes information on the surface area and/or number of rooms in the dwelling, which can be used to develop indicators on the share of children living in overcrowded housing, as well as information on the state of the dwelling. For European OECD countries, EU SILC provides comparable information on housing quality issues, such as the lack of basic sanitary facilities, a leaking roof, darkness in the dwelling, dampness, difficulties to keep the dwelling warm and/or other housing quality issues (OECD, 2020^[138]; OECD, 2020^[11]). These data are particularly useful to assess children's exposure to severe housing deprivation, defined as the simultaneous occurrence of overcrowding together with at least one of the following housing deprivation measures: leaking roof, no bath/shower and no indoor toilet, or a dwelling considered too dark (Eurostat, 2016^[139]). Some child surveys (and some ad-hoc modules in general purpose household surveys) also ask for more specific information on the availability of a quiet space for children to study or play.

However, comparable information on children's access to basic shelter and residential stability is harder to come by. Even at the national level, data on children exposed to extreme forms of housing deprivation such as homelessness, living in emergency shelters or evictions from the family home are scarce. The situation of homeless people is, by its nature, difficult to assess. Homeless people are more or less "invisible" to authorities and support agencies. Authorities may use administrative data (e.g. registers of shelters and local authorities), point estimates (e.g. street counts), or a combination of both. However, these methods give an incomplete picture of the situation and none of them capture 'hidden homeless', i.e.

those whose homelessness is not visible or who do not appear in official statistics because they do not apply for public assistance, or are accommodated by relatives, etc. (OECD, 2020_[31]). The situation of children experiencing homelessness is particularly difficult to assess. These children may have been left in the care of family members, or placed temporarily in foster or residential care (Berg and Brännström, 2018_[140]). Similarly, there are very few official statistics at national level on the numbers of children who have experienced an eviction as this would require a statistical reporting of court decisions, which in many countries is not the practice.

Data on children's settings and environments

Data on family financial resources and income adequacy

Given the importance of family income for children's access to material goods, measures of family income – and in particular, measures of low family income, such as the relative income poverty rate – are often used as indicators of children's economic and material well-being. Indeed, in many instances, measures of low family income are used as some of *the* default indicators of children's material well-being. Building on research into income, poverty, and inequality more generally, researchers have developed a range of comparable cross-national data series capturing family income levels and families and children living in income poverty. For OECD countries, detailed comparable information on family income and income poverty is available in databases such as the *OECD Income Distribution Database*. This information is available in most countries where household income and living standards surveys are conducted and is usually updated on a regular, often annual, basis.

One of the strengths of income poverty indicators is that they allow comparisons to be made according to the severity of income poverty (and hence poverty lines), and to consider how the risk of poverty changes with factors such household working status and children's living arrangements. Poverty rates are generally estimated on the basis of 'disposable' household income (i.e. after receipt of social benefits and net of tax), but it is also possible to calculate poverty rates before payments of benefits to determine the impact of redistributive policies on child poverty.

However, while valuable, existing measures of low family income and poverty have their limits. A first issue is that, even where information on family income is available, it is difficult to pinpoint exactly how much is actually devoted to children themselves. Accurate data on children's actual living standards requires detailed data on intra-family budget allocations and expenditures, and complex decisions on how to allocate income spent on shared family goods, like housing. Where this data is not available, a common approach is to "proxy" children's access to income based on aggregated household disposable income, adjusted for household size and/or composition. However, this approach assumes all families allocate a certain share of household income to children, and does not account for the ways in which families may (or may not) prioritise spending on children's needs over other goods.

A second issue is that it is complicated to determine exactly how much income families need in order to meet children's needs, that is, how much income is adequate to cover the "costs" of raising children. These costs vary a lot across time and place. Price levels differ considerably across and within countries, and while economists have developed sophisticated tools for correcting price differences (e.g. purchasing power parity indices), these tools may not always be well suited to capturing the prices of material necessities for children. In an effort to better capture how much income family needs to meet children's needs, researchers have developed a range of measures to identify the costs of raising children (Box 3.5). However, these measures all build on complex methodologies, involve a series of debatable assumptions, and themselves have their drawbacks.

A further issue is that, in general, the underlying survey sources used to produce data on family income and child costs (e.g. household income and household expenditure surveys) are not well-equipped to deal with children between two households and/or in other complex living arrangements. Indeed, in many

surveys, individuals (including children) can be classified as living in one household only, with no ability to link to or even indicate that they live between two households (see below). This can have major implications when looking to produce estimates of children’s living standards (Miho and Thévenon, 2020^[118]). Child income poverty estimates, for example, are almost always based on the income level of the child’s “main” household only, and cannot take into account the income they may (or may not) enjoy in a second home.

Box 3.5. The cost of raising children

Measures of the costs borne by families to raise children are crucial for evaluating how income redistribution policies towards families contribute to reducing costs. These costs involve household expenditures on children’s consumption of goods and services, but they also include the increases in household level costs expenditures associated with the presence of children, such as housing, transportation or holidays’ costs. One issue is to determine what proportion of indivisible goods can be attributed to the presence of children.

Two main approaches exist to measure the cost of raising children: (i) the first approach seeks to objectively measure the cost by using household expenditure surveys to estimate the effect of child-related expenditures on the living standards of households with children compared to childless households; (ii) the second approach defines the cost of children as the impact of children on the subjective financial well-being of households.

While it is important to identify how the presence of children impacts on households living standards, this information does not indicate whether children’s needs are met or not. For this reason, another method to grasp the cost of raising children relies on reference budgets aimed at measuring the size of budget needed to cover children’s basic needs in goods and services. However, reference budgets have limitations, as they require characterising families’ needs which vary greatly by households’ socio-economic status. Moreover, they depend on good and services market which differ across regions. Overall, this approach is difficult to apply on a large scale basis.

Despite different methodologies, three broad results emerge from the literature:

1. A child accounts for approximately 15 to 30% of the budget of a couple without children. The variation depends on several factors like the child’s rank of birth, their age, the parents’ education and income level and the bargaining power of household members.
2. The cost of the first child is often found to be greater than that for each subsequent child, because of economies of scale related to shared infrastructure (e.g. bedrooms) or the re-use of clothes and other articles.
3. The cost of children increases with age, with the highest expenditures concentrated during adolescence and the transition towards adulthood. During the early years, costs mainly concern food and housing (Ekert-Jaffé, 1998^[141]), but later on increase with entry into post-secondary education, and consumption of transport and leisure (e.g. (Claus, Leggett and Wang, 2009^[142]) for New Zealand; (Hourriez and Olier, 1998^[143]); (Henman, 2005^[144]) for Australia; (Lino et al., 2017^[145]) for the United States).

Housing accounts for a large proportion of the total cost of children. For instance, in the United States in 2015, housing accounted for the largest share of children’s cost across income groups, comprising 26 to 33 percent of total expenses on a child in a two-child married-couple family (Lino et al., 2017^[145]). For families in the middle-income group, food and child care/education are the next largest average expenditures on a child, accounting for 18 and 16 percent of child-rearing expenses, respectively.

Given the limits of standard income and cost measures, as well as the degree of subjectivity involved with family income adequacy (see above), “hard” income measures like those outlined above can be complemented by “softer” measures that look to capture families’ and children’s perceptions of their financial situation. Some household surveys, including EU SILC, include household-level questions asking for the degree to which the household has difficulty “making ends meet”, or similar. And some child surveys also include questions on children’s perceptions of family finances. For example, the *Children’s Worlds* survey asks children about the frequency with which they worry about how much money their family has (Children’s Worlds, 2020_[146]). The *OECD PISA* study asks an almost identical question to its sample of 15-year-old students (OECD, 2020_[147]).

Data on family work arrangements, family living and custody arrangements, and other important aspects of children’s backgrounds

Some level of information on children’s backgrounds and family environments is often available through household, income, and labour force surveys. This includes information on basic family living arrangements and household working status. Labour force surveys in particular are relatively standardised and can provide (mostly) comparable information on household working status across countries. These surveys usually have large samples, which allows for data to be disaggregated by children’s age group and other socio-demographic characteristics (OECD, 2020_[148]).

However, there are limits to the information that standard household, income, and labour force surveys can provide on children’s backgrounds and family environments. For example, as mentioned above, these surveys are generally poorly suited to capturing children’s increasingly complex living arrangements, making it difficult to properly establish the material living conditions of those children living between two homes, for example. For European OECD countries, plans to collect more detailed information on children’s living arrangements through an ad-hoc module in EU-SILC 2021 (Box 3.6) may go some way towards addressing this.

Household surveys are generally also not well suited to providing information on the material situation of children in the most vulnerable positions, such as children with disabilities, children in out-of-home care, children in homeless families, and children experiencing maltreatment. These children are frequently either not easily identifiable or a missing entirely in the data. Similar issues apply to many child-focused cross-national surveys too (Richardson and Ali, 2014_[149]). Part of the reason why vulnerable children are poorly covered by these surveys comes from the survey questions often asked: relatively few household surveys contain the questions needed to identify children with disabilities, for example. But part of the reason also lies in survey coverage and design: many of the most relevant surveys cover private households only, for instance, and exclude people (including children) living in other types of living arrangement, such as homeless families and those in care institutions. Even where relevant information is collected – such as, for example, information on children with a migrant background – issues relating to sample size can limit the reliability and usefulness of results.

Box 3.6. Additional information on children’s living arrangements in EU-SILC 2021

For the first time in 2021, EU-SILC will contain an ad-hoc subject module on “Living arrangements and conditions of children in separated and blended families”. In addition to EU-SILC’s new “household grid” detailing the relationship status between all household members (introduced in 2019), the ad-hoc module will contain child-centred questions on whether or not children have parents living outside the household, their access to a bedroom, the number of nights per month they spend in the household, and their legal custody situation, as well as a range of questions on parents with children living outside the household, including parents’ distance to and frequency of contact with children living outside the household, and time spent with children living outside the household.

As part of a new three-yearly cycle, EU-SILC 2021 will also contain information on child-specific material deprivation, similar in scope and format to the collection in 2014 (Box 3.4). In combination with the additional information on children’s living arrangements, this collection could provide valuable new comparable information on the material situation of children with complex living arrangements.

Source: Commission Implementing Regulation (EU) 2019/2242, (2019), *Official Journal of the European Union*, L 336/133-273, data.europa.eu/eli/reg_impl/2019/2242/oj.

Data on school-based, local authority and community material supports

Comparable cross-national data on children’s use of or access to school-, local authority- and community-level resources are relatively scarce. There is little existing cross-national information available on children’s use of free or subsidised school meals, for example, or on children’s use of/access to local authority services and facilities, such as public libraries. The OECD’s *PISA* study does provide some information on children’s extra-curricular activities at school. However, as with all *PISA*-based measures, this information is limited to 15-year-olds only, and does not cover younger ages. There is also little existing reliable cross-national information on the proportion of children whose family make use of food banks or other community-level resources.

Part of the reason for the lack of data in this area lies in the scope of many existing comparable/cross-national child-centred or child-relevant surveys. Many are household surveys that mostly capture children’s economic and material well-being inside the home, only. Some surveys (e.g. *OECD PISA*, the *Children’s Worlds* survey, and the *Health Behaviour in School-age Children* survey) are more cross-cutting and cover several aspects of children’s lives but provide limited information in this particular area, most likely because their focus lies elsewhere (e.g. on learning, in the case of *OECD PISA*). However, to differing extents across countries, data on children’s use of or access to many school-, local authority- and community-level resources may be available from government databases, national surveys, and administrative records. New data collection and co-ordination efforts could be one way to produce cross-national data in this area.

Data on key public policies for child material outcomes

OECD and other cross-national databases provide a great deal of valuable comparable information on public policies aimed at supporting families’ and children’s material and economic well-being. One example is the *OECD Social Expenditure Database*, a cross-national database containing comparable information on public and private social expenditures in a range of policy areas, including on families (OECD, 2020_[128]). Another is the *OECD Family Database* (OECD, 2020_[150]), which contains detailed information on a variety of family- and child-relevant public policies, as well as on family demographics and the labour market situation of families.

In terms of specific policies, detailed cross-country policy information on statutory paid leave entitlements and public support for early childhood education and care is available in the *OECD Family Database*. The *OECD Family Database* also contains some information on the actual use and uptake of leave, as well as, together with the *OECD Education Database* (OECD, 2020_[151]), valuable information on the coverage and use of early childhood education and care and out-of-school-hours care. This information is itself drawn from a combination of administrative data, household surveys and dedicated child care surveys. Generally speaking, administrative data do not provide information on differences in coverage according to income level or other socio-demographic characteristics, whereas survey data allow information to be disaggregated, particularly by family income level.

Data on levels of public spending and financial support for families with children are available in the *OECD Social Expenditure Database* and *OECD Family Database*. The *Family Database* also provides a valuable breakdown of public spending on families and children by child age, which shows that the distribution of spending by stage of childhood varies widely across countries (OECD, 2020_[152]). Unfortunately, the update schedule for this data series is currently uncertain.

Information on public financial support entitlements and how these entitlements can affect family income is available in the *OECD Tax-Benefit Data Portal* and from the *OECD Tax-Benefit* microsimulation model more generally (OECD, 2020_[153]). Assessing how tax and benefit systems support families with children is not straightforward, as it is necessary to take into account the multiple interactions between the tax system and the payment of family, welfare and housing support. The *OECD's Tax-Benefit Model* provides a methodological framework for how these considerations can be managed, and can be used to simulate the amount of financial support received by families according to the number and age of children, for typical cases of household income levels and distribution. It can also provide information on the work incentives (or disincentives) faced by parents with children looking to enter or expand paid work. However, a key limitation of many microsimulation models is that they typically provide information for hypothetical or “model” families, only; they do not provide information on the actual situation of families, such as in this case, the real-world use of public financial supports and their impact on family income. There is a need for greater and more detailed information on the use of family- and children-related supports, and their adequacy for lifting families out of poverty and to cover part of the cost of the children. The difficulty in gathering such information lies in that family cash transfers take various forms including, family and child allowances or family-related refundable/non-wastable tax credits (OECD, 2020_[154]).

One area of public policy where comparable information is severely lacking is child support. While some household surveys contain information on child support payments received by families, comparable information on the *non*-payment of child support is scarce. This complicates efforts to assess child support policies and their impact on child poverty, to measure progress made, and to identify what needs to be done to strengthen policies in this area (Miho and Thévenon, 2020_[118]).

3.6. The way forward

Families' socio-economic status has a crucial bearing on children's well-being and development. It has an impact on the quality of the home environment in which children learn, play and spend much of their time; and, it influences household expenditures and practices regarding child health, nutrition, clothing, education, leisure and social activities. Collecting information on the economic and material situation of children and families is therefore key for developing policies to enhance child well-being.

The information available on the economic and material well-being of children and families covers, to differing extents and with limitations, a fairly wide range of dimensions: children's material needs in terms of food, clothing, housing, education, and recreation, income levels and living standards, household working status, and public policies aimed at supporting the economic and material well-being of children. However, data collection can be improved to fill the gaps. As highlighted in the previous section, there is a

need for more and better child-centred cross-national data on children's material outcomes, on the costs of raising children, and on the provision of material goods and activities by the community. In addition, there are several further areas where information on children's economic and material well-being could be improved.

Develop better information on children in vulnerable positions

The information available on children's living standards and material living conditions mainly covers children living in private households that are the subject of household surveys. By definition, some groups of children living in particularly vulnerable situations are not covered. This includes children from evicted or homeless families, refugee children or Roma children (Frazer, Guio and Marlier, 2020^[155]), as well as children in out-of-home care. Some other groups of children – including children with disabilities and children experiencing violence – are also not well covered and/or are poorly identified in household surveys. These children are too often "invisible" in mainstream statistics, and as a result there is little regular statistical information on their economic and material well-being. A big challenge is to develop better data on children in these situations, as well as on the flows of children entering or leaving vulnerable situations.

Better track family financial vulnerability and resilience

Child income poverty rates are key indicators to measure the risk of children of experiencing material deprivation and/or family financial stress. However, as pointed out in the previous section, the economic and material situation of children in non-nuclear family living arrangements is often poorly assessed. In order to improve, it is necessary to collect good quality information on the resources available to children in all the households in which they reside, particularly when they are in alternating custody arrangements, as well as to know more about any transfers and/or sharing of resources across households (Toulemon, 2012^[156]; Miho and Thévenon, 2020^[118]).

In addition, the COVID-19 crisis has shown that earnings losses can be extremely rapid and sharp, suggesting that traditional poverty measures may not sufficiently reflect family financial vulnerability. A significant number of households are financially vulnerable yet would not be classified as "poor" based on conventional income thresholds. For instance, before the pandemic, in the OECD, it was estimated that more than one in three individuals did not have enough financial assets to keep their family above the poverty line for more than three months, should their income suddenly stop (Balestra and Tonkin, 2018^[157]). In such situation, it is important to monitor financial vulnerability of families, that is, their financial capacity to cope with a rapid drop in income without falling into extreme poverty. From a child's perspective, it is important to be able to measure financial vulnerability in order to put in place rapid responses when crises arise.

Family financial vulnerability has several determinants, including their level of constrained expenditures and indebtedness. Constrained expenditures are those which are essential to daily life, such as food consumption at home, or those realised within the framework of contracts that are difficult to renegotiate in the short-term – e.g. rents, utilities, etc. These expenditures represent, on average, almost 75% of disposable income of the poorest 20% of households (OECD-Eurostat, 2021^[158]). Housing costs have a substantial bearing on families' financial situation and risk of experiencing poverty. For example, in the United Kingdom, around 30% of children are found to be income poor in 2017/18 when housing costs are deducted from income – more than 7 percentage points higher than the rate obtained when housing costs are not accounted for. Another measure of children's exposure to financial vulnerability could be the share of children living in households paying high housing costs, along the lines of the OECD indicator on housing cost overburden, which measures the share of population spending more than 40% of disposable income on mortgage or rent (OECD, 2020^[138]).

Tracking debt burdens of families with children is also a way to measure their financial vulnerability. Across the OECD, one in five middle-income households spend more than they earn. Around 11% of middle-income households on average across the OECD are over-indebted, a share that is higher than the over-indebtedness rates among households with lower or higher incomes (OECD, 2019^[159]). High levels of both constrained expenditure and over-indebtedness leave many households with very few resources to cope with income shocks.

Foster the development of child-centred and age-sensitive data

Significant progress has been made in recent decades to develop child-centred data that takes the child as the unit of analysis, rather than the household. As a result, it is now possible to obtain measures of various dimensions of children's economic and material well-being, specifically. However, there are limits to this data, and available data series might not always provide an accurate reflection of the actual situation of children.

One reason is that some data on family resources are still collected at household level with no information on intra-family distribution, making it impossible to accurately identify the resources directed to children. For example, households are frequently asked whether they have an internet connection and a computer, with this information is used to estimate the proportion of children who live in households with or without access to an internet connection. However, these data do not allow an assessment of whether children themselves can effectively use the resources that are available at home. The data on child material deprivation available in EU SILC 2014 are similarly limited, in that they take all children in the household together. Child-specific information is crucial to enabling a better monitoring of children's needs. The COVID-19 crisis, with its many implications for children and child well-being, has only underlined the importance of child-specific data. For instance, having better information on the number of children with real access to the Internet and a computer for their own use at home is key to understanding how many children can receive remote education.

Data on children's material resources and sources of deprivation are unevenly distributed across stages of childhood. Most international child surveys cover only school-age children. For younger children, a few countries collect data in child cohort surveys from childbirth, but these data are developed to follow children over time and not to provide the regular updates on children's well-being that are needed to monitor child policies. One notable information gap concerns children under three years of age, who, as noted earlier, have specific and relatively costly material needs for families. Information on whether or not the material needs of children are fulfilled is important to collect especially in the early years of life as infancy is a period that lays the foundations for children's development. Similarly, there is also a need for better information access to personal care products generally, especially with respect to teenage girls' exposure to period poverty.

A more systematic collection of information on how children use pocket money would also help to better identify the health risks for children that may be associated with particular uses, and thereby possibly highlight the need to inform children and families about the proven risks.

Connecting the dots: family economic status, child outcomes and policies

Information on the economic and material well-being of children is valuable in itself. Children attach importance to their material living environment and the goods they can buy. This can vary with age and differ from parents' views. But information on children's economic and material resources is also important because these resources have implications for other areas of children's well-being and development. It is therefore critical to have indicators measuring the strength of the relationship between family economic status and child outcomes, and to assess whether measures taken to tackle economic inequalities translate into a reduction of disparities in child well-being more generally.

In order to improve children’s living conditions, it is important to target support at the dimensions of economic well-being where policies can have the most influence. For this purpose, policy-relevant information on whether children experience material hardship, along with the main driving factors, is crucial. For example, material deprivation could result from a lack of adequate income, or it could arise from service supply shortages in the communities where families live. The type of family support that should be prioritised depends on whether this hardship arises primarily as a result of low income, a lack of affordable services, or a lack of information or trust in the goods and services offered.

As noted earlier, some children experience severe material deprivation in the sense that they encounter material deprivation in several areas. Experiencing severe deprivation is often due to the fact that more vulnerable children and families live in localities with fewer facilities or with comparatively relatively low quality services (OECD, 2018^[160]; Thévenon et al., 2018^[4]). This highlights the need for a coordinated provision of services to address different patterns of child material deprivation.

Last but not least, deprivation in multiple life areas is described as extreme poverty, and is much more frequent among families with low incomes. For instance, data from EU-SILC 2014 suggests that 25 to 40% of school-aged income poor children experience “severe” deprivation (severity being defined as being deprived in at least four domains among nutrition, clothing, housing, educational materials and social and leisure opportunities). The identification of factors that increase the risk of exposure to forms of extreme poverty – of which low income is only one of the factors – would enable policies to better identify the groups of children and families for which public support could be prioritised. Pinpointing the links between income poverty and child material deprivation also provides important background information highlighting that policy effectiveness to reach the most vulnerable families can be strengthened by combining cash and in-kind support (Riding et al., 2021^[89]).

References

- Adema, W., C. Clarke and V. Frey (2015), “Paid parental leave: Lessons from OECD countries and selected U.S. states”, *OECD Social, Employment and Migration Working Papers*, No. 172, OECD Publishing, Paris, <http://dx.doi.org/10.1787/5jrqqvqgb4vb-en>. [125]
- Adema, W., C. Clarke and O. Thévenon (2020), “Family policies and family outcomes in OECD countries”, in *The Palgrave Handbook of Family Policy*, Springer International Publishing, http://dx.doi.org/10.1007/978-3-030-54618-2_9. [124]
- Adrian, N. et al. (2020), *Climate Change & Child Poverty in OECD Countries Prepared for the Organisation for Economic Co-operation and Development*, <http://www.lafollette.wisc.edu/research-public-service/workshops-in-public-affairs-> (accessed on 20 November 2020). [69]
- Andersen, S. (2013), “Common genes or exogenous shock? disentangling the causal effect of paternal unemployment on children’s schooling efforts”, *European Sociological Review*, Vol. 29/3, pp. 477-488, <http://dx.doi.org/10.1093/esr/jcr088>. [103]
- Andresen, S. (2014), “Childhood vulnerability: Systematic, structural, and individual dimensions”, *Child Indicators Research*, Vol. 7/4, pp. 699-713, <http://dx.doi.org/10.1007/s12187-014-9248-4>. [10]

- Andresen, S. and S. Meiland (2019), "Being poor from children's point of view. The potential of childhood theory and qualitative methods for child poverty research: Findings from two qualitative studies of poverty in Germany", *Children and Youth Services Review*, Vol. 97, pp. 94-99, <http://dx.doi.org/10.1016/j.childyouth.2017.07.010>. [14]
- Baker, M. et al. (2013), *Infectious Diseases Attributable to Household Crowding in New Zealand: A systematic review and burden of disease estimate* | Ministry of Health NZ, Ministry of Health, <https://www.health.govt.nz/publication/infectious-diseases-attributable-household-crowding-new-zealand-systematic-review-and-burden-disease> (accessed on 7 January 2021). [39]
- Balestra, C. and R. Tonkin (2018), "Inequalities in household wealth across OECD countries: Evidence from the OECD Wealth Distribution Database", *OECD Statistics Working Papers*, No. 2018/01, OECD Publishing, Paris, <https://dx.doi.org/10.1787/7e1bf673-en>. [157]
- Beasley, R., A. Semprini and E. Mitchell (2015), *Risk Factors for Asthma: Is Prevention Possible?*, Lancet Publishing Group, [http://dx.doi.org/10.1016/S0140-6736\(15\)00156-7](http://dx.doi.org/10.1016/S0140-6736(15)00156-7). [34]
- Berg, L. and L. Brännström (2018), "Evicted children and subsequent placement in out-of-home care: A cohort study", *PLoS ONE*, Vol. 13/4, <http://dx.doi.org/10.1371/journal.pone.0195295>. [140]
- Bonke, J. (2013), *Do Danish Children and Young People Receive Pocket Money?*, The Rockwool Foundation Research Unit, <http://www.rff.dk> (accessed on 22 September 2020). [47]
- Bradshaw, J. and N. Finch (2003), "Overlaps in dimensions of poverty", *Journal of Social Policy*, Vol. 32/4, pp. 513-525, <http://dx.doi.org/10.1017/S004727940300713X>. [64]
- Bradshaw, J. and J. Holmes (2010), "Child poverty in the first five years of life", in Hansen, K., H. Joshi and S. Dex (eds.), *Children of the 21st Century: The First Five Years*, The Policy Press, Bristol, <http://10.1332/policypress/9781847424761.001.0001> (accessed on 4 June 2021). [136]
- Bradshaw, J. and G. Rees (2017), "Exploring national variations in child subjective well-being", *Children and Youth Services Review*, Vol. 80, pp. 3-14, <http://dx.doi.org/10.1016/j.childyouth.2017.06.059>. [1]
- Brand, J. (2015), "The far-reaching impact of job loss and unemployment", *Annual Review of Sociology*, Vol. 41, pp. 359-375, <http://dx.doi.org/10.1146/annurev-soc-071913-043237>. [106]
- Bray, R. et al. (2019), *The Hidden Dimensions of Poverty*, International Movement ATD Fourth World, Pierrelaye, https://www.atd-fourthworld.org/wp-content/uploads/sites/5/2019/05/Dim_Pauvr_eng_FINAL.pdf (accessed on 29 July 2020). [60]
- Bubonya, M., D. Cobb-Clark and M. Wooden (2017), "Job loss and the mental health of spouses and adolescent children", *IZA Journal of Labor Economics*, Vol. 6/1, <http://dx.doi.org/10.1186/s40172-017-0056-1>. [100]
- Buckner, J. (2008), "Understanding the impact of homelessness on children", *American Behavioral Scientist*, Vol. 51/6, pp. 721-736, <http://dx.doi.org/10.1177/0002764207311984>. [27]
- Chetty, R. and N. Hendren (2018), "The impacts of neighborhoods on intergenerational mobility I: Childhood exposure effects", *The Quarterly Journal of Economics*, Vol. 133/3, pp. 1107-1162, <http://dx.doi.org/10.1093/qje/qjy007>. [68]

- Children's Worlds (2020), *International Survey of Children's Well-Being (ISCWeB)*, [146]
<https://iscweb.org/> (accessed on 4 February 2021).
- Chzhen, Y. (2014), "Child poverty and material deprivation in the European Union during the [59]
 Great Recession", *Innocenti Working Paper No.2014-06*, UNICEF Office of Research,
 Florence, https://www.unicef-irc.org/publications/pdf/wp_2014_yc.pdf (accessed on
 11 July 2018).
- Clair, A. (2018), "Housing: An under-explored influence on children's well-being and becoming", [33]
Child Indicators Research, pp. 1-18, <http://dx.doi.org/10.1007/s12187-018-9550-7>.
- Claus, I., G. Leggett and X. Wang (2009), *Costs of raising children*, [142]
<http://www.ird.govt.nz/childsupport> (accessed on 3 December 2020).
- Coelli, M. (2011), "Parental job loss and the education enrollment of youth", *Labour Economics*, [107]
 Vol. 18/1, pp. 25-35, <http://dx.doi.org/10.1016/j.labeco.2010.04.015>.
- Coley, R. et al. (2013), "Relations between housing characteristics and the well-being of low- [42]
 income children and adolescents", *Developmental Psychology*, Vol. 49/9, pp. 1775-1789,
<http://dx.doi.org/10.1037/a0031033>.
- Cooper, K. and K. Stewart (2017), *Does Money Affect Children's Outcomes? An Update*, [76]
<http://sticerd.lse.ac.uk/dps/case/cp/casepaper203.pdf> (accessed on 9 April 2018).
- Cooper, K. and K. Stewart (2013), *Does Money Affect Children's Outcomes? A Systematic [58]
 Review*, Joseph Rowntree Foundation,
<https://www.jrf.org.uk/sites/default/files/jrf/migrated/files/money-children-outcomes-full.pdf>
 (accessed on 9 April 2018).
- CPAG (2015), *Every Child Deserves the Best Start in a Warm, Dry, Secure Home*, Child Poverty [35]
 Action Group,
<https://www.cpag.org.nz/assets/HousingCampaign/150923HousingCampaignFAQ.pdf>
 (accessed on 7 January 2021).
- Cui, Y. et al. (2019), "The effects of cigarette price and the amount of pocket money on youth [55]
 smoking initiation and intensity in Canada", *Canadian Journal of Public Health*, Vol. 110/1,
 pp. 93-102, <http://dx.doi.org/10.17269/s41997-018-0123-9>.
- Cutuli, J. et al. (2013), "Academic achievement trajectories of homeless and highly mobile [24]
 students: Resilience in the context of chronic and acute risk", *Child Development*, Vol. 84/3,
 pp. 841-857, <http://dx.doi.org/10.1111/cdev.12013>.
- Dani, J., C. Burrill and B. Demmig-Adams (2005), "The remarkable role of nutrition in learning [8]
 and behaviour", *Nutrition and Food Science*, Vol. 35/4, pp. 258-263,
<http://dx.doi.org/10.1108/00346650510605658>.
- Dickerson, A. and G. Popli (2018), "The many dimensions of child poverty: Evidence from the UK [134]
 Millennium cohort study", *Fiscal Studies*, Vol. 39/2, pp. 265-298,
<http://dx.doi.org/10.1111/1475-5890.12162>.
- Dinisman, T. et al. (2017), "Family structure and family relationship from the child well-being [116]
 perspective: Findings from comparative analysis", *Children and Youth Services Review*,
 Vol. 80, pp. 105-115, <http://dx.doi.org/10.1016/j.childyouth.2017.06.064>.

- Duncan, G. and K. Magnuson (2013), "The importance of poverty early in childhood", *Policy Quarterly*, Vol. 9/2, pp. 12-17, http://dx.doi.org/file:///C:/Users/thevenon_o/Downloads/4448-157-5923-1-10-20180213.pdf. [66]
- Duncan, G. et al. (2012), *The Importance of Early Childhood Poverty*, Springer, <http://dx.doi.org/10.2307/23261304>. [83]
- Ekert-Jaffé, O. (1998), "Le coût de l'enfant: des résultats qui varient selon les types de familles et les hypothèses formulées?", *Dossiers Solidarité Santé Politiques familiales et redistribution*, pp. 69-80, <http://bdsp-ehesp.inist.fr/vibad/index.php?action=getRecordDetail&idt=173882> (accessed on 4 June 2021). [141]
- European Commission (2018), *Feasibility Study for a Child Guarantee - Inception Report*, European Commission, Brussels, <https://ec.europa.eu/social/main.jsp?catId=1428&langId=en&preview=cHJldkVtcGxQb3J0YWwhMjAxMjAyMTVwcmV2aWV3>. [5]
- Eurostat (2016), "Statistics Explained: EU Statistics on income and living conditions (EU-SILC) methodology - housing deprivation", Eurostat, [http://ec.europa.eu/eurostat/statistics-explained/index.php/EU_statistics_on_income_and_living_conditions_\(EU-SILC\)_methodology_-_housing_deprivation](http://ec.europa.eu/eurostat/statistics-explained/index.php/EU_statistics_on_income_and_living_conditions_(EU-SILC)_methodology_-_housing_deprivation) (accessed on 24 November 2020). [139]
- Evans, G., H. Saltzman and J. Cooperman (2001), "Housing quality and children's socioemotional health", *Environment and Behavior*, Vol. 33, pp. 389-399, <http://dx.doi.org/10.1177/00139160121973043>. [94]
- Feeding America (2013), *In Short Supply: American Families Struggle to Secure Everyday Essentials 2*, Feeding America, <https://www.feedingamerica.org/research/poverty-and-unemployment/in-short-supply> (accessed on 9 September 2020). [15]
- Fleming, T. et al. (2020), *Youth19 Rangatahi Smart Survey, Initial Findings: Introduction and Methods*, Youth19 Research Group, The University of Auckland and Victoria University of Wellington, <http://www.youth19.ac.nz> (accessed on 8 January 2021). [18]
- Förster, M. and G. Verbist (2012), "Money or kindergarten? Distributive effects of cash versus in-kind family transfers for young children", *OECD Social, Employment and Migration Working Papers*, No. 135, OECD Publishing, Paris, <https://dx.doi.org/10.1787/5k92vxbgpmnt-en>. [62]
- Frazer, H., A. Guio and E. Marlier (2020), *Feasibility Study for a Child Guarantee - Intermediate report*, European Commission, Brussels, <https://ec.europa.eu/social/main.jsp?catId=1428&langId=en>. [155]
- Furnham, A. (2001), "Parental attitudes to pocket money/allowances for children", *Journal of Economic Psychology*, Vol. 22/3, pp. 397-422, [http://dx.doi.org/10.1016/S0167-4870\(01\)00040-X](http://dx.doi.org/10.1016/S0167-4870(01)00040-X). [48]
- Furnham, A. and R. Milner (2017), "Parent's beliefs and behaviours about the economic socialisation, through allowances/pocket money, of their children", *Psychology*, Vol. 08/08, pp. 1216-1228, <http://dx.doi.org/10.4236/psych.2017.88078>. [49]
- Gaitan, V. (2019), "How housing affects children's outcomes", *How Housing Matters*, <https://howhousingmatters.org/articles/housing-affects-childrens-outcomes/> (accessed on 26 July 2019). [22]

- Gauthier, A. and F. Furstenberg (2010), "The experience of financial strain among families with children in the United States", *Working paper 10-17*, National Center for Family and Marriage Research, Bowling Green State University, <http://www.firelands.bgsu.edu/content/dam/BGSU/college-of-arts-and-sciences/NCFMR/documents/WP/WP-10-17.pdf> (accessed on 1 June 2021). [71]
- Gershoff, E. et al. (2007), "Income is not enough: Incorporating material hardship into models of income associations with parenting and child development", *Child Development*, Vol. 78/1, pp. 70-95, <http://dx.doi.org/10.1111/j.1467-8624.2007.00986.x>. [75]
- Grammatikopoulou, M. et al. (2018), "Growth, the Mediterranean diet and the buying power of adolescents in Greece", *Journal of Pediatric Endocrinology and Metabolism*, Vol. 31/7, pp. 773-780, <http://dx.doi.org/10.1515/jpem-2018-0039>. [53]
- Grant, C. et al. (2012), "Risk factors for community-acquired pneumonia in pre-school-aged children", *Journal of Paediatrics and Child Health*, Vol. 48/5, pp. 402-412, <http://dx.doi.org/10.1111/j.1440-1754.2011.02244.x>. [40]
- Growing Up in New Zealand (2020), *Key Findings*, <https://www.growingup.co.nz/key-findings-0#4> (accessed on 7 January 2021). [21]
- Guio, A. et al. (2018), "Towards an EU measure of child deprivation", *Child Indicators Research*, Vol. 11/3, pp. 835-860, <http://dx.doi.org/10.1007/s12187-017-9491-6>. [137]
- Gundersen, B.; Boushey, H. (2001), *When Work Just Isn't Enough: Measuring Hardships Faced by Families after Moving from Welfare to Work*, Economic Policy Institute, Washington, https://www.epi.org/publication/briefingpapers_hardships/ (accessed on 12 December 2019). [70]
- Gustafsson, B. and T. Osterberg (2010), "Neighbourhood child poverty in Sweden", *IZA Discussion Paper*, No. 4881, IZA, Bonn, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1595522## (accessed on 9 April 2018). [67]
- Hamilton, K. and M. Catterall (2006), *Keeping Up Appearances: Low-Income Consumers' Strategies Aimed At Disguising Poverty*, <http://www.acrwebsite.org/volumes/13002/volumes/ap07/AP-07http://www.copyright.com/> (accessed on 2 December 2020). [61]
- Heflin, C. and J. Iceland (2009), "Poverty, material hardship, and depression", *Social Science Quarterly*, Vol. 90/5, pp. 1051-1071, <http://dx.doi.org/10.1111/j.1540-6237.2009.00645.x>. [78]
- Henman, P. (2005), *Updated Costs of Children Using Australian Budget Standards*, https://www.dss.gov.au/sites/default/files/documents/updated_costs_of_children.pdf (accessed on 3 December 2020). [144]
- Hourriez, J. and L. Olier (1998), "Niveau de vie et taille du ménage : Estimations d'une échelle d'équivalence", *Economie et Statistique*, Vol. 308/1, pp. 65-94, <http://dx.doi.org/10.3406/estat.1998.2591>. [143]
- Iceland, J. and K. Bauman (2007), "Income poverty and material hardship: How strong is the association?", *Journal of Socio-Economics*, Vol. 36/3, pp. 376-396, <http://dx.doi.org/10.1016/j.socec.2006.12.003>. [72]
- IFHP (2019), *2017 Comparative Price Report International Variation in Medical and Drug Prices*, International Federation of Health Plans. [87]

- Indigenous Services Canada (2021), *Ending Long-Term Drinking Water Advisories*, Government of Canada, <https://www.sac-isc.gc.ca/eng/1506514143353/1533317130660> (accessed on 12 May 2021). [13]
- Ingham T, K. (2019), "Damp mouldy housing and early childhood hospital admissions for acute respiratory infection: A case control study", *Thorax*, Vol. 74, pp. 849-857, <http://dx.doi.org/10.1136/thoraxjnl-2018-212979>. [36]
- Jaine, R., M. Baker and K. Venugopal (2011), "Acute rheumatic fever associated with household crowding in a developed country", *Pediatric Infectious Disease Journal*, Vol. 30/4, pp. 315-319, <http://dx.doi.org/10.1097/INF.0b013e3181fbd85b>. [41]
- Jelleyman, T. and N. Spencer (2008), "Residential mobility in childhood and health outcomes: A systematic review", *Journal of Epidemiology & Community Health*, Vol. 62/7, pp. 584-592, <http://dx.doi.org/10.1136/jech.2007.060103>. [20]
- Johnson, A. (2013), *Give Me Shelter*, <http://www.salvationarmy.org.nz/socialpolicy> (accessed on 7 January 2021). [30]
- Kilmer, R. et al. (2012), "Understanding the ecology and development of children and families experiencing homelessness: Implications for practice, supportive services, and policy", *American Journal of Orthopsychiatry*, Vol. 82/3, pp. 389-401, <http://dx.doi.org/10.1111/j.1939-0025.2012.01160.x>. [29]
- Lahire, B. (2019), *Enfances de classe*, Editions Seuil, <https://www.seuil.com/ouvrage/enfances-de-classe-collectif/9782021419603> (accessed on 9 January 2020). [7]
- Lai, E. et al. (2019), "Poverty dynamics and health in late childhood in the UK: Evidence from the Millennium Cohort Study", *Archives of Disease in Childhood*, Vol. 104/11, pp. 1049-1055, <http://dx.doi.org/10.1136/archdischild-2018-316702>. [81]
- Lee, J. and K. Lee (2016), *Material hardships and social support among Australian families with children - University of New South Wales*, https://www.unsworks.unsw.edu.au/primo-explore/fulldisplay/unsworks_modsunsworks_47391/UNSWORKS (accessed on 13 December 2019). [79]
- Lehti, H., J. Erola and A. Karhula (2019), "The heterogeneous effects of parental unemployment on siblings' educational outcomes", *Research in Social Stratification and Mobility*, Vol. 64, p. 100439, <http://dx.doi.org/10.1016/j.rssm.2019.100439>. [112]
- Leifheit, K. et al. (2020), "Eviction in early childhood and neighborhood poverty, food security, and obesity in later childhood and adolescence: Evidence from a longitudinal birth cohort", *SSM - Population Health*, Vol. 11, p. 100575, <http://dx.doi.org/10.1016/j.ssmph.2020.100575>. [23]
- Leininger, L. and A. Kalil (2014), "Economic Strain and Children's Behavior in the Aftermath of the Great Recession", *Journal of Marriage and Family*, Vol. 76/5, pp. 998-1010, <http://dx.doi.org/10.1111/jomf.12140>. [74]
- Lesner, R. (2018), "The long-term effect of childhood poverty", *J Popul Econ*, Vol. 31, pp. 969-1004, <http://dx.doi.org/10.1007/s00148-017-0674-8>. [84]
- Leturcq, M. and L. Panico (2019), "The Long-Term Effects of Parental Separation on Childhood Multidimensional Deprivation: A Lifecourse Approach", *Social Indicators Research*, Vol. 144/2, pp. 921-954, <http://dx.doi.org/10.1007/s11205-018-02060-1>. [135]

- Lindemann, K. and M. Gangl (2019), “The intergenerational effects of unemployment: How parental unemployment affects educational transitions in Germany”, *Research in Social Stratification and Mobility*, Vol. 62, p. 100410, <http://dx.doi.org/10.1016/j.rssm.2019.100410>. [105]
- Lino, M. et al. (2017), *Expenditures on Children by Families, 2015*, United States Department of Agriculture, <http://www.cnpp.usda.gov> (accessed on 13 October 2020). [145]
- Mäder, M. et al. (2015), “Intergenerational transmission of unemployment - Evidence for German sons”, *Jahrbucher fur Nationalokonomie und Statistik*, Vol. 235/4-5, pp. 355-375, <http://dx.doi.org/10.1515/jbnst-2015-4-503>. [110]
- Main, G. (2014), “Child poverty and children’s subjective well-being”, *Child Indicators Research*, Vol. 7/3, pp. 451-472, <http://dx.doi.org/10.1007/s12187-014-9237-7>. [3]
- Main, G. and J. Bradshaw (2012), “A child material deprivation index”, *Child Indicators Research*, Vol. 5/3, pp. 503-521, <http://dx.doi.org/10.1007/s12187-012-9145-7>. [2]
- Ma, L. et al. (2020), “A 3-year Longitudinal Study of Pocket Money, Eating Behavior, Weight Status: The Childhood Obesity Study in China Mega-Cities”, *International Journal of Environmental Research and Public Health*, Vol. 17/23, p. 9139, <http://dx.doi.org/10.3390/ijerph17239139>. [52]
- Marks, G. (20), *Income Poverty, Subjective Poverty and Financial Stress*, <http://dx.doi.org/10.2139/ssrn.1728587>. [73]
- Merla, L. and B. Nobels (2019), “Children Negotiating their Place through Space in Multi-local, Joint Physical Custody Arrangements”, in *Families in Motion: Ebbing and Flowing through Space and Time*, Emerald Publishing Limited, <http://dx.doi.org/10.1108/978-1-78769-415-620191005>. [120]
- Miho, A. and O. Thévenon (2020), “Treating all children equally?: Why policies should adapt to evolving family living arrangements”, *OECD Social, Employment and Migration Working Papers*, No. 240, OECD Publishing, Paris, <https://dx.doi.org/10.1787/833307d97-en>. [118]
- Moniz, M. et al. (2020), “Out-Of-Pocket Spending For Maternity Care Among Women With Employer-Based Insurance, 2008–15”, *Health Affairs*, Vol. 39/1, pp. 18-23, <http://dx.doi.org/10.1377/hlthaff.2019.00296>. [88]
- Mooi-Reci, I. et al. (2019), “Why Parental Unemployment Matters for Children’s Educational Attainment: Empirical Evidence from the Netherlands”, *European Sociological Review*, Vol. 35/3, pp. 394-408, <http://dx.doi.org/10.1093/esr/jcz002>. [109]
- Mork, E., A. Sjogren and H. Svaleryd (2014), “Parental Unemployment and Child Health”, *CESifo Economic Studies*, Vol. 60/2, pp. 366-401, <http://dx.doi.org/10.1093/cesifo/ifu016>. [99]
- Mortelmans, D. (2020), “Economic Consequences of Divorce: A Review”, Springer, Cham, http://dx.doi.org/10.1007/978-3-030-44575-1_2. [119]
- Moulton, V. et al. (2020), “Parental Wealth and Children’s Cognitive Ability, Mental, and Physical Health: Evidence From the UK Millennium Cohort Study”, <http://dx.doi.org/10.1111/cdev.13413>. [77]

- Müllera, S., R. Riphahn and C. Schwientek (2017), "Paternal unemployment during childhood: Causal effects on youth worklessness and educational attainment", *Oxford Economic Papers*, Vol. 69/1, pp. 213-238, <http://dx.doi.org/10.1093/oen/gpw046>. [108]
- Nathan, K. et al. (2019), "Residential mobility and socioemotional and behavioural difficulties in a preschool population cohort of New Zealand children", *J Epidemiol Community Health*, Vol. 0, pp. 1-7, <http://dx.doi.org/10.1136/jech-2019-212436>. [19]
- New Zealand Human Rights Commission (2016), *Inadequate Housing in New Zealand and its Impact on Children*, Thematic snapshot report to the UN Committee on the Rights of the Child, https://www.hrc.co.nz/files/7014/7407/6639/Thematic_snapshot_report_of_NZHRC_for_UNC_RC_73rd_session_final.pdf (accessed on 7 January 2021). [37]
- Newland, R. et al. (2013), "The family model stress and maternal psychological symptoms: Mediated pathways from economic hardship to parenting.", *Journal of Family Psychology*, Vol. 27/1, pp. 96-105, <http://dx.doi.org/10.1037/a0031112>. [80]
- NZFH (2021), *Early Childhood Interventions Programme in Austria*, <https://www.fruehehilfen.at/de/Service/English-Information.htm> (accessed on 15 May 2021). [90]
- Octobre, S., N. Berthomier and L. Facq (2018), "La primo-socialisation culturelle durant la première année de la vie à travers l'enquête ELFE", *Revue de l'OFCE*, Vol. 2/156, pp. 43-76, <https://www.cairn.info/revue-de-l-ofce-2018-2-page-43.htm>. [44]
- OECD (2020), *Benefits and Wages*, <http://www.oecd.org/social/benefits-and-wages.htm> (accessed on 4 February 2021). [153]
- OECD (2020), "Better data and policies to fight homelessness in the OECD", *Policy Brief on Affordable Housing*, OECD, Paris, <https://www.oecd.org/social/affordable-housing-database/> (accessed on 2 October 2020). [31]
- OECD (2020), *Children deprived of basic clothing*, OECD Child Well-Being Data Portal, <http://www.oecd.org/els/family/child-well-being/data/> (accessed on 24 November 2020). [16]
- OECD (2020), *Children in overcrowded households*, OECD Child Well-Being Data Portal, <http://www.oecd.org/els/family/child-well-being/data/>. [38]
- OECD (2020), *Children not participating in basic leisure activities*, OECD Child Well-Being Data Portal, <http://www.oecd.org/els/family/child-well-being/data/> (accessed on 22 September 2020). [45]
- OECD (2020), *CO2.2: Child poverty*, OECD Family Database, <http://www.oecd.org/els/family/database.htm> (accessed on 16 April 2020). [98]
- OECD (2020), *Combatting COVID-19's effect on children*, OECD Publishing, Paris, <https://doi.org/10.1787/2e1f3b2f-en> (accessed on 18 September 2020). [121]
- OECD (2020), *HC1.2 Housing costs over income*, OECD Affordable Housing Database, <http://www.oecd.org/housing/data/affordable-housing-database/housing-conditions.htm> (accessed on 7 January 2021). [93]
- OECD (2020), *Housing and Inclusive Growth*, OECD Publishing, Paris, <https://doi.org/10.1787/6ef36f4b-en> (accessed on 23 November 2020). [92]

- OECD (2020), "Is childcare affordable?", *Policy brief on Employment, Labour and Social Affairs*, OECD, Paris, <http://oe.cd/childcare-brief-2020> (accessed on 6 January 2021). [86]
- OECD (2020), "Learning remotely when schools close: How well are students and schools prepared? Insights from PISA", *OECD Policy Responses to Coronavirus (COVID-19)*, OECD Publishing, Paris, <https://doi.org/10.1787/3bfda1f7-en> (accessed on 4 February 2021). [46]
- OECD (2020), *LMF1.1 Children in households by employment status*, OECD Family Database, <http://www.oecd.org/social/family/database.htm> (accessed on 24 November 2020). [148]
- OECD (2020), *OECD Affordable Housing Database*, <https://www.oecd.org/social/affordable-housing-database/> (accessed on 8 October 2020). [138]
- OECD (2020), *OECD Child Well-Being Data Portal*, <http://www.oecd.org/els/family/child-well-being/data/> (accessed on 6 August 2018). [111]
- OECD (2020), *OECD Education Database*, <http://www.oecd.org/education/database.htm> (accessed on 4 February 2021). [151]
- OECD (2020), *OECD Family Database*, <http://www.oecd.org/els/family/database.htm> (accessed on 4 February 2021). [150]
- OECD (2020), *OECD Family Database, Indicator SF1.2: Children in Families*, OECD, Paris, http://www.oecd.org/els/soc/SF_1_2_Children_in_families.pdf (accessed on 4 February 2021). [114]
- OECD (2020), *OECD Social Expenditure Database (SOCX)*, <http://www.oecd.org/social/expenditure.htm> (accessed on 4 February 2020). [128]
- OECD (2020), *PF1.3. Family cash benefits*, OECD Family Database, http://www.oecd.org/els/soc/PF1_3_Family_Cash_Benefits.pdf. [154]
- OECD (2020), *PF1.6 Public spending by age of children*, OECD Family Database, <http://www.oecd.org/social/family/database.htm> (accessed on 24 November 2020). [152]
- OECD (2020), *Programme for International Student Assessment (PISA)*, <https://www.oecd.org/pisa/> (accessed on 4 February 2021). [147]
- OECD (2020), "Social housing: A key part of past and future housing policy", *Employment, Labour and Social Affairs Policy Briefs*, OECD, Paris, <http://oe.cd/social-housing-2020>. (accessed on 14 January 2021). [133]
- OECD (2019), *Changing the Odds for Vulnerable Children: Building Opportunities and Resilience*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/a2e8796c-en>. [32]
- OECD (2019), *OECD Family Database, Indicator PF1.3: Family Cash Benefits*, OECD, Paris, http://www.oecd.org/els/soc/PF1_3_Family_Cash_Benefits.pdf (accessed on 4 February 2021). [127]
- OECD (2019), "Treating all children equally? Why policies should adapt to evolving family living arrangements", *Policy brief on child well-being*, OECD Publishing, Paris, <http://www.oecd.org/els/family/child-well-being/Treating-all-children-equally-Policy-brief-2019.pdf>. [117]

- OECD (2019), *Under Pressure: The Squeezed Middle Class*, OECD Publishing, Paris, [159]
<https://dx.doi.org/10.1787/689afed1-en>.
- OECD (2018), *A Broken Social Elevator? How to Promote Social Mobility*, OECD Publishing, [160]
 Paris, <https://dx.doi.org/10.1787/9789264301085-en>.
- OECD (2017), *Dare to Share: Germany's Experience Promoting Equal Partnership in Families*, [131]
 OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264259157-en>.
- OECD (2017), *The Pursuit of Gender Equality: An Uphill Battle*, OECD Publishing, Paris, [113]
<https://dx.doi.org/10.1787/9789264281318-en>.
- OECD (2016), *Taxing Wages 2016*, OECD Publishing, Paris, [130]
https://dx.doi.org/10.1787/tax_wages-2016-en.
- OECD (2011), *Doing Better for Families*, OECD Publishing, Paris, [123]
<https://dx.doi.org/10.1787/9789264098732-en>.
- OECD (2011), "Taxation and Employment", *OECD Tax Policy Studies No. 21*, OECD Publishing, [129]
 Paris, <https://doi.org/10.1787/9789264120808-en>. (accessed on 29 August 2020).
- OECD-Eurostat (2021), *Measuring the joint distribution of household income, consumption and [158]
 wealth at the micro-level: Methodological issues and experimental results*, OECD Publishing,
 Paris.
- Oreopoulos, P., T. von Wachter and A. Heisz (2012), "The Short- and Long-Term Career Effects [111]
 of Graduating in a Recession", *American Economic Journal: Applied Economics*, Vol. 4/1,
 pp. 1-29, <http://dx.doi.org/10.1257/app.4.1.1>.
- Pardali, E. (2019), *Ten years living in crisis: Children's experience and perceptions under [97]
 austerity in Greece*, <https://ntnuopen.ntnu.no/ntnu-xmlui/handle/11250/2614475> (accessed on
 5 December 2019).
- Paris Seminar on Economic Demography, 5. (ed.) (2012), *Consumption units and equivalence [156]
 scales in a mult-residence framework*, <http://>,
http://psed.site.ined.fr/fichier/rte/46/PSED/Toulemon_PSED_5-6-2012.pdf.
- Plan International UK (2018), *Break the Barriers: Girls' Experiences of Menstruation in the UK*, [17]
 Plan International, [https://plan-uk.org/file/plan-uk-break-the-barriers-report-
 032018pdf/download?token=Fs-HYP3v](https://plan-uk.org/file/plan-uk-break-the-barriers-report-032018pdf/download?token=Fs-HYP3v) (accessed on 8 January 2021).
- Ponnet, K. (2014), "Financial stress, parent functioning and adolescent problem behavior: An [82]
 actor-partner interdependence approach to family stress processes in low-, middle-, and high-
 income families", *Journal of Youth and Adolescence*, Vol. 43/10, pp. 1752-1769,
<http://dx.doi.org/10.1007/s10964-014-0159-y>.
- Punitha, V. et al. (2014), "Pocket money: Influence on body mass index and dental caries among [51]
 urban adolescents", *Journal of Clinical and Diagnostic Research*, Vol. 8/12, pp. JC10-JC12,
<http://dx.doi.org/10.7860/JCDR/2014/10498.5310>.
- Radcliff, E. et al. (2019), "Homelessness in Childhood and Adverse Childhood Experiences [26]
 (ACEs)", *Maternal and Child Health Journal*, Vol. 23/6, pp. 811-820,
<http://dx.doi.org/10.1007/s10995-018-02698-w>.

- Rees, G. (2019), *Poverty and children's wellbeing at 14 year old*, Child Poverty Action Group, London, <https://cpag.org.uk/welfare-rights/resources/article/poverty-and-children%E2%80%99s-wellbeing-14-years-old> (accessed on 3 December 2020). [85]
- Rege, M., K. Telle and M. Votruba (2011), "Parental job loss and children's school performance", *Review of Economic Studies*, Vol. 78/4, pp. 1462-1489, <http://dx.doi.org/10.1093/restud/rdr002>. [104]
- Richardson, D. and N. Ali (2014), *An Evaluation of International Surveys of Children*, <http://dx.doi.org/10.1787/5jxzmjrqvntf-en>. [149]
- Ridge, T. (2011), "The Everyday Costs of Poverty in Childhood: A Review of Qualitative Research Exploring the Lives and Experiences of Low-Income Children in the UK", *Children & Society*, Vol. 25/1, pp. 73-84, <http://dx.doi.org/10.1111/j.1099-0860.2010.00345.x>. [96]
- Riding, S. et al. (2021), "Looking beyond COVID-19: Strengthening family support services across the OECD", *OECD Social, Employment and Migration Working Papers*, No. 260, OECD Publishing, Paris, https://www.oecd-ilibrary.org/social-issues-migration-health/looking-beyond-covid-19_86738ab2-en (accessed on 18 May 2021). [89]
- Rollings, K. et al. (2017), "Housing and neighborhood physical quality: Children's mental health and motivation", *Journal of Environmental Psychology*, Vol. 50, pp. 17-23, <http://dx.doi.org/10.1016/J.JENVP.2017.01.004>. [43]
- Rossin-Slater, M. (2017), "Maternity and Family Leave Policy", *IZA Discussion Paper Series*, No. 10500, <http://ftp.iza.org/dp10500.pdf> (accessed on 28 November 2017). [126]
- Salvi del Pero, A. et al. (2016), "Policies to promote access to good-quality affordable housing in OECD countries", *OECD Social, Employment and Migration Working Papers*, No. 176, OECD Publishing, Paris, <https://dx.doi.org/10.1787/5jm3p5gl4djd-en>. [132]
- Samuels, J., M. Shinn and J. Buckner (2010), *Homeless Children: Update on Research, Policy, Programs, and Opportunities* | ASPE, Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health and Human Services, <https://aspe.hhs.gov/report/homeless-children-update-research-policy-programs-and-opportunities> (accessed on 28 August 2020). [25]
- Schaller, J. and M. Zerpa (2019), "Short-run effects of parental job loss on child health", *American Journal of Health Economics*, Vol. 5/1, pp. 8-41, http://dx.doi.org/10.1162/ajhe_a_00106. [101]
- Schenck-Fontaine, A. and L. Panico (2019), "Many Kinds of Poverty: Three Dimensions of Economic Hardship, Their Combinations, and Children's Behavior Problems", *Demography*, <http://dx.doi.org/10.1007/s13524-019-00833-y>. [65]
- Schmitz, C., J. Wagner and E. Menke (1995), "Homelessness as one component of housing instability and its impact on the development of children in poverty", *Journal of Social Distress and the Homeless*, Vol. 4/4, pp. 301-317, <http://dx.doi.org/10.1007/BF02087868>. [28]
- Scragg, R., M. Laugesen and E. Robinson (2002), "Cigarette smoking, pocket money and socioeconomic status: Results from a national survey of 4th form students in 2000", *New Zealand Medical Journal*, Vol. 115/1158, pp. U108-U108, <https://europepmc.org/article/med/12362183> (accessed on 8 January 2021). [56]

- Sen, A. (1999), *Commodities and Capabilities*, Oxford University Press, Oxford. [6]
- Sleskova, M. et al. (2006), "Does parental unemployment affect adolescents' health?", *Journal of Adolescent Health*, Vol. 38/5, pp. 527-535, <http://dx.doi.org/10.1016/j.jadohealth.2005.03.021>. [102]
- Solari, C. and R. Mare (2012), "Housing crowding effects on children wellbeing", *Social Science Research*, Vol. 41, pp. 464-476, <https://doi.org/10.1016/j.ssresearch.2011.09.012> (accessed on 28 August 2020). [95]
- Steinbach, A. (2019), "Children's and Parents' Well-Being in Joint Physical Custody: A Literature Review", *Family Process*, Vol. 58/2, pp. 353-369, <http://dx.doi.org/10.1111/famp.12372>. [115]
- Tamiru, D. and T. Belachew (2017), "The association of food insecurity and school absenteeism: systematic review", *Agriculture & Food Security*, Vol. 6/1, p. 5, <http://dx.doi.org/10.1186/s40066-016-0083-3>. [122]
- Thévenon, O. et al. (2018), "Child poverty in the OECD: Trends, determinants and policies to tackle it", *OECD Social, Employment and Migration Working Papers*, No. 218, OECD Publishing, Paris, <https://dx.doi.org/10.1787/c69de229-en>. [4]
- Van Ansem, W. et al. (2014), "Socio-economic inequalities in children's snack consumption and sugar-sweetened beverage consumption: The contribution of home environmental factors", *British Journal of Nutrition*, Vol. 112/3, pp. 467-476, <http://dx.doi.org/10.1017/S0007114514001007>. [54]
- Verbist, G., M. Förster and M. Vaalavuo (2012), "The Impact of Publicly Provided Services on the Distribution of Resources: Review of New Results and Methods", *OECD Social, Employment and Migration Working Papers*, No. 130, OECD Publishing, Paris, <https://dx.doi.org/10.1787/5k9h363c5szq-en>. [63]
- Victora, C. et al. (2008), "Maternal and child undernutrition: consequences for adult health and human capital", *The Lancet*, Vol. 371/9609, pp. 340-357, [http://dx.doi.org/10.1016/S0140-6736\(07\)61692-4](http://dx.doi.org/10.1016/S0140-6736(07)61692-4). [9]
- WHO Europe (2017), *Investment in health equality early in childhood pays off in Austria*, World Health Organization Regional Office for Europe, <https://www.euro.who.int/en/health-topics/Life-stages/child-and-adolescent-health/news/news/2017/10/investment-in-health-equality-early-in-childhood-pays-off-in-austria> (accessed on 15 May 2021). [91]
- WHO/UNICEF (2021), *JMP Global Database*, <https://washdata.org/> (accessed on 12 May 2021). [12]
- Wolff, F. and C. Barnett-Verzat (2008), "Pocket money and child effort at school", *Economics Bulletin*, Vol. 9/13, pp. 1-10, <https://ideas.repec.org/a/eb/ebull/eb-08i20009.html> (accessed on 8 January 2021). [50]
- Wong, G. et al. (2007), "Young people, money, and access to tobacco", *New Zealand Medical Journal*, Vol. 120/1267, pp. U2864-U2864, <https://europepmc.org/article/med/18157190> (accessed on 8 January 2021). [57]

Annex 3.A. Overview of available and comparable cross-national data on children's economic and material well-being

Annex Table 3.A.1. Overview of available and comparable cross-national data on children's economic and material well-being

	Aspect	Example measure	Age coverage	OECD country coverage	Main data source	Regular update?	Disaggregation
Child economic and material outcomes	Age-appropriate food and nutrition	Percent of children in households where at least one child aged 1-15 does not have either fruits and vegetables at least once a day or one meal with meat, chicken or fish (or vegetarian equivalent) at least once a day	All ages (except under age 1)	Medium (European countries only)	EU SILC survey	Yes	Yes
	Age-appropriate clothing and footwear	Percent of children in households where at least one child aged 1-15 does not have either some new (not second-hand) clothes or to two pairs of properly fitting shoes (including a pair of all-weather shoes)	All ages (except under age 1)	Medium (European countries only)	EU SILC survey	Yes	Yes
	Age-appropriate hygiene and personal care products	-	-	-	-	-	-
	Basic shelter and residential stability	-	-	-	-	-	-
	Housing space	Percent of children in overcrowded households	All ages	Good	Household income and living conditions surveys	Yes	Yes
	Basic housing facilities	Percent of children in households that lack either a bath or shower or an indoor flushing toilet	All ages	Medium	Household income and living conditions surveys	Yes	Yes
	Basic housing conditions	Percent of children in households with a leaking roof, damp walls, floors or foundation, or rot in window frames or floor	All ages	Medium	Household income and living conditions surveys	Yes	Yes
	Age-appropriate educational books, toys, and games, etc	Percent of children in households where at least one child aged 1-15 does not have books	All ages (except under age 1)	Medium (European countries)	EU SILC survey	Yes	Yes

	Aspect	Example measure	Age coverage	OECD country coverage	Main data source	Regular update?	Disaggregation
		at home suitable for their age		only)			
		Percent of children in households where at least one child aged 1-15 does not have indoor games and/or outdoor leisure equipment	All ages (except under age 1)	Medium (European countries only)	EU SILC survey	Yes	Yes
	Home study supports	Percent of children with a desk and quiet place to study at home	Late childhood	Good	OECD PISA Database	Yes	Yes
	Holidays and regular leisure activities	Percent of children in households where at least one child aged 1-15 does not take part in a regular leisure activity or go on holiday away from home at least one week per year	All ages (except under age 1)	Medium (European countries only)	EU SILC survey	Yes	Yes
	Access to digital tools (e.g. computers, tablets, video games, internet)	Percent of children without access to a computer and the internet at home	Middle childhood	Medium	Children's Worlds Survey	Yes	Yes
		Percent of children without access to a computer (or tablet) and the internet at home	Late childhood	Good	OECD PISA Database	Yes	Yes
	Pocket money	Percent of children receiving regular pocket money	Middle childhood	Medium	Children's Worlds Survey	Yes	Yes
Family and home environment	Household disposable income and income poverty	Average disposable household income for children	All ages	Good	OECD Income Distribution Database	Yes	Yes
		Child relative income poverty rates	All ages	Good	OECD Income Distribution Database	Yes	Yes
	Costs of raising children	Child-related expenditures as a percent of family disposable income	All ages	Low	Households expenditure surveys	No	Yes
	Family financial stress	Percent of children living in households reporting difficulties making ends meet	All ages	Good	Households income and living conditions surveys	Yes	Yes
	Child perceptions of family financial stress	Percent of children reporting "often" or "always" worrying about how much money their family has	Middle childhood	Medium	Children's Worlds Survey	Yes	Yes
		Percent of children reporting "often" or "always" worrying about how much money their family has	Late childhood	Good	OECD PISA Database	Yes	Yes
	Household working status	Percent of children living in jobless	All ages	Good	Households labour force	Yes	Yes

	Aspect	Example measure	Age coverage	OECD country coverage	Main data source	Regular update?	Disaggregation
		households			surveys		
	Presence of parents	Distribution of children by presence and marital status of parents in the household	All ages	Good	Households income and living conditions surveys	Yes	Yes
		Percent of children living in foster homes and children's homes	Middle childhood	Medium	Children's Worlds Survey	Yes	Yes
	Custody arrangements and presence of step-family	Distribution of children by type of living arrangement in main home	Late childhood	Medium	Health Behaviour in School-age Children Survey	Yes	Yes
		Distribution of children by type of parental arrangement in second home (if any)	Late childhood	Medium	Health Behaviour in School-age Children Survey	Yes	Yes
School- and ECEC-provided material supports and activities	School-provided food and nutrition and other in-kind provisions	-	-	-	-	-	-
	School-provided trips and leisure activities	Percent of children in schools offering creative extra-curricular activities	Late childhood	Good	OECD PISA Database	Yes	Yes
Community and physical environment	Affordable age- and stage-appropriate cultural and learning services/facilities (e.g. libraries, museums, performing arts)	-	-	-	-	-	-
	Affordable age- and stage-appropriate play and leisure services/facilities (e.g. play parks, recreation centres)	-	-	-	-	-	-
	Food banks and other charitable/non-profit in-kind provisions	-	-	-	-	-	-
Family policies	Public family financial supports (e.g. family and child cash benefits, family and child tax credits)	Public spending on children by age	All ages	Good	OECD Family Database	Uncertain	-
		Public spending on cash benefits for families	-	Good	OECD Family Database	Yes	-
		Public spending on tax breaks for families	-	Good	OECD Family Database	Yes	-
	Tax-benefit policies and work	Adequacy of Guaranteed Minimum	Early childhood	Good	OECD Tax-Benefit Data	Yes	Yes*

	Aspect	Example measure	Age coverage	OECD country coverage	Main data source	Regular update?	Disaggregation
	incentives for parents	Income benefits			Portal		
		Participation tax rates for parents using centre-based childcare	Early childhood	Good	OECD Tax-Benefit Data Portal	Yes	Yes *
	Statutory leave entitlements	Paid maternity and parental leave available to mothers	-	Good	OECD Family Database	Yes	-
		Paid paternity and parental leave reserved for fathers	-	Good	OECD Family Database	Yes	-
	Public ECEC support	Public expenditure on early childhood education and care	-	Good	OECD Family Database	Yes	-
		Net childcare costs for parents using centre-based childcare	Early childhood	Good	OECD Tax-Benefit Data Portal	Yes	Yes *
	Child support regulations	-	-	-	-	-	-
Housing policies	Public housing supports	Public spending on housing allowances	-	Good	OECD Affordable Housing Database	Yes	-
		Public spending on support to social rental housing	-	Good	OECD Affordable Housing Database	Yes	-

Note: The Children's Worlds surveys include: Belgium, Chile, Estonia, Finland, France, Germany, Greece, Hungary, Israel, Ireland, Italy, Norway, Poland, Portugal, Spain, Switzerland, South Korea, Turkey, the United Kingdom and the United States. "Disaggregation" means that the publicly available data allows for disaggregation by at least basic socio-economic and demographic groups, such as by sex, age, family status, and family income.

4. Are children active and physically healthy?

This chapter reviews the available data on child physical health and well-being, and highlights the information required to develop better policies to promote children's health. It considers key child health outcomes such as birth outcomes, physical development and self-reported health status. It examines how children's activities and behaviours shape their physical health as well as the effects of children's family situation and the community and built environment. It also considers the role of public policies in supporting child health. The chapter considers the cross-national data available on child physical health and discusses the way forward, highlighting key data gaps and setting out priorities for data development.

4.1. Introduction and main findings

The purpose of this chapter is to review the data on child physical health and highlight the information required to develop better policies to promote child health. The chapter assesses the available cross-national information to monitor children's health at different stages of childhood, and also makes use of national evidence to illustrate how some data gaps could be addressed. It draws on the scientific literature on child physical health and the relationship with later adult health highlighting the data gaps and priorities for data development. There are complex interactions between child physical health and other aspects of well-being, for example, mental health and material living conditions, which are discussed in Chapters 3 and 5, respectively.

Children's physical health is a major component of well-being from early life through to adolescence. It is a key determinant of health status in later adult life (Palloni et al., 2009^[1]; Conti and Heckman, 2013^[2]; Currie, 2020^[3]; Almond, Currie and Duque, 2018^[4]; Mallo and Wolfe, 2020^[5]). Having good physical health during childhood has been linked to higher levels of educational attainment and better employment and economic outcomes later in life; it also lays the foundation for greater psychological well-being and life satisfaction (Currie, 2005^[6]; Currie, 2009^[7]; Jackson, 2010^[8]; Jackson, 2015^[9]; Patton et al., 2016^[10]; Poulton et al., 2002^[11]). By contrast, adverse health events during childhood can have long-lasting effects on later adult health and other key outcomes, such as employment status and earnings (Currie, 2020^[3]; Mallo and Wolfe, 2020^[5]). Much evidence underlines that fact that social inequalities in health evident in middle-age actually first begin to emerge in childhood.

To promote child health, policy makers need a full understanding of the key determinants of child health and age specific vulnerabilities and risks. They need to understand the shortfall in family resources to invest in child health, and where policy interventions could be the most effective. The chapter provides the following key messages:

- A large body of evidence underlines the linkages between physical health in childhood and later life outcomes. Illness and deprivation during childhood may have long-term consequences for health during adulthood, either directly through the illness itself or indirectly through socio-economic impacts (Mallo and Wolfe, 2020^[5]). Policies aimed at improving children's health have long-lasting benefits for both the individual and society because of increased human capital accumulation, better employment opportunities and health later in life (Currie, 2020^[3]).
- The "sensitive period model" suggests adverse experiences during sensitive periods of development (e.g., gestation, birth, childhood, and adolescence) lead to functional changes in organisms through biological programming. (Yang et al., 2017^[12]). The importance of prenatal and perinatal conditions for later health is evidenced by many studies (Almond, Currie and Duque, 2018^[4]), and there is large scientific evidence showing that the first 1 000 days of a child's life are particularly important for their development and future health outcomes (Clark et al., 2020^[13]).
- Priority should be given to the development of age-appropriate data to capture the physical health status of children at different stages of childhood. Longitudinal data collection could track health outcomes at different life stages.
- Good assessment of children's and families access to resources protecting children from diseases and ensure they develop healthy is needed, as well as information on the main risks to child health at different ages. Protective and health-enhancing factors can be promoted from the early days of life to enhance child health resilience and foster child physical development. Access to high quality preventative and curative services are key resources to support children's healthy development.
- Important protective factors for child health include good neighbourhood environmental and housing quality, healthy nutrition and dietary intake, up-to-date vaccination, regular physical activity, respecting sleep patterns and nap time, etc. Conversely, high levels of air pollution, unsafe outdoor equipment, poor housing quality, poor dietary intakes, and lack of physical activity put child

health at risk (and indirectly other well-being outcomes are also jeopardised). As children grow up, they are subject to additional health risks due to the development of risk-taking behaviours and exposure to toxic substance.

Key areas for improvement of data collection are also identified, including:

- The need of data to better capture the significant social gradients affecting child health and to enable a better tracking of the formation of health inequalities from the early years, including in the first 1 000 days of life. Deprivation during childhood has important effects on health that can endure long into adulthood, even for adults who escape poverty and disadvantage (Poulton et al., 2002_[11]). However, while there is good data on inequalities and social gradients in adolescent health and health behaviours, thanks mostly to the Health Behaviour in School-age Children (HBSC), there is a clear blind spot when it comes to younger children.
- The lack of data on children who are exposed to high risk to physical health, such as child victims of maltreatment. Information on physical health of children in other vulnerable situation (e.g. children with disabilities, in out-of-home, homeless) is also sparse and beset by several measurement challenges.
- The data needed to track children's exposure to environmental risks such as unsafe air, contaminated water and food, including for infants and toddlers, who can be exposed to chemicals through contaminants in foods, toys and other products targeted at young children.
- The need to improve data availability on maternal and child health care services coverage, as well as on the specific reasons for children not receiving service or treatment (e.g. lack of service or treatment availability or affordability). Systematic collection of data on children's health checks at different stages of childhood is also needed to develop stronger preventative policies. Better information of countries spending on health services for children at different ages, including on preventative services, would also help countries assess where to prioritise public spending.
- The need to better track the implementation and outcomes of recommendations on child health.
- The lack of information on children's knowledge on various health issues, including the main challenges for current and future health and well-being, what they can do to improve their physical health, and any support they can receive if needs be.
- The need to develop data that allows to better examine how physical health affects other dimensions of children's well-being, such as cognitive and social and emotional well-being.

The chapter starts with a discussion of the main aspects of children's physical health, organised to cover the different stages of childhood, i.e. birth (and the pre-natal period), early childhood, middle childhood and adolescence, respectively. The subsequent sections review the availability of data and indicators and discusses the key priorities that can guide the further development of indicators according to the trade-off that may exist between their relevance and the feasibility of collecting comparable data across countries. Finally, the chapter concludes by connecting the dots between future policy development and the need for an evidence-informed framework on children's physical health.

4.2. Physical health as a key driver of well-being across childhood

Genetics are an important determinant of individual health. Lifestyle and environmental factors also have a significant role to play. For example, protective health behaviours, such as regular physical activity, decrease susceptibility to chronic diseases and reduce the risk of obesity (Haskell, Blair and Hill, 2009_[14]). Whereas air quality and pollution levels, dependant on where a person lives and works, can contribute to a number of adverse health outcomes, including respiratory diseases and cardiovascular conditions (Dominici et al., 2006_[15]; OECD/European Union, 2020_[16]). The availability, affordability and quality of health care services is also crucial to prevent or treat health problems.

Table 4.1 offers an overview of the central aspects of children’s physical health and well-being throughout childhood, considering four different stages: pregnancy and infancy, early childhood, middle childhood and late childhood (adolescence). Key health outcomes and their behavioural and environmental determinants are taken into account in accordance with the dimensions normally used to categorise the determinants of health (WHO, 2017^[17]):

- Panel A highlights child key physical health outcomes which includes direct measures of health status and physical development. This includes birth outcomes, such as low birth weight and preterm birth rates, physical development such as and anthropometric development (e.g. weight, height and head circumference) and body mass index (BMI). It also cover physical health status, considering outcomes such as the prevalence of certain diseases, injuries and self-reported health status.
- Panel B focuses on children’s health-related behaviours, activities and processes. This includes nutrition and eating behaviours (e.g. breastfeeding, fruit and vegetable consumption, and sugar consumption). It also includes protective health behaviours such sleep patterns and levels of physical or sedentary activity. Also important here are risky health behaviours, for instance, substance use and unprotected and early sexual activity in older children. Accounting for different stages of childhood is important, as children’s nutritional needs evolve as well as them being able to exercise autonomy over what they do and what they eat as they older.
- Panel C covers children’s settings and environments, broken down between the family and the home, and the community and built environment. Important family and home conditions include parental health and health behaviours, family financial resources and material conditions, and family violence and child maltreatment. Aspects of children’s physical and built environments include air and noise pollution, and considerations of neighbourhood crime and violence.
- Lastly, Panel D covers public policies that can impact children’s physical health outcomes. Many different policies can play a role in shaping children’s health, through mechanisms that operate through various channels (Box 4.1). As a result, promoting child health involves considering policies that don’t specifically focus on health (such as cash or in-kind assistance, housing quality policies, environmental policies, or parenting education programs), in addition to policies focusing on access to health care or the direct provision of medical services (Currie and Reichman, 2015^[18]).

Table 4.1. Key aspects of children’s physical health throughout childhood

	Pregnancy and infancy (0-2 years)	Early childhood (3-5 years)	Middle childhood (6-12 years)	Adolescence (Late childhood) (13-17 years)
Panel A. Key physical health outcomes				
Birth outcomes	Pre-term births, low birth weight, infant mortality	-	-	-
Physical development	Anthropometrics (stunting, wasting, overweight, underweight), motor development		BMI (overweight, obesity, underweight)	
Physical health status	Illnesses (infectious and non-communicable), injuries, oral health (caries, paradontitis), sensory impairments (refractive disorders, vision loss, hearing loss)			
	-	-	Self-reported health status	
Panel B. Child activities and behaviours				
Health behaviours and other health activities	Nutrition & eating behaviours	Micro- & macronutrient supply		
		Breastfeeding	Healthy eating (e.g. fruit & vegetable consumption), sweets and sugared soft drink consumption	
	-	-	Eating disorders*	
	Protective health behaviours	Sleep behaviours		
-		Physical activity (and sedentary behaviour)		

		Pregnancy and infancy (0-2 years)	Early childhood (3-5 years)	Middle childhood (6-12 years)	Adolescence (Late childhood) (13-17 years)
		-	-	-	Oral hygiene behaviours
	Risky health behaviours	-	-	Substance use (e.g. alcohol, tobacco, cannabis)*	
		-	-	-	Early and unprotected sex
Panel C. Children's settings and environments					
Family and home environment	Family physical and mental health and pre-natal parental health behaviours	Maternal physical health (e.g. pre-pregnancy health status, infections and non-communicable diseases), parental (maternal and paternal) mental health (e.g. anxiety, stress, depression), maternal health behaviours (e.g. physical activity, smoking and use of substances)	-	-	-
	Family financial resources and household material conditions		Housing and material living conditions**		
	Family violence and child maltreatment		Child abuse and neglect		
Community and physical and built environment	Crime and violence	-	-	Neighbourhood crime rates, risk of violence*	
	Noise, pollution and air quality	Air pollution, water & food contamination, noise pollution			
	Local green spaces	Access to green spaces (e.g. parks, gardens and playing fields)*			
	Local play and leisure services/facilities	Access to affordable age- and stage-appropriate play and leisure services/facilities (e.g. play parks, sports facilities and lessons)*			
	General built environment	Safety from road injuries, age-appropriate independent mobility			
Panel D. Public policies					
Family policies	Family employment-related support policies	Statutory leave policies	-	-	-
Housing and built environment policies	Public family housing supports	Public housing supports (e.g. housing allowances, social housing)			
	Housing and built environment regulations and policies	Support for housing renovation, heating assistance, child-friendly city policies (e.g. footpaths and bicycle paths, traffic calming)*, green space policies and regulations			
Health policies	Physical and mental health services	Pre- and post-natal health care and monitoring, vaccination	Regular hearing, vision screenings, body & dental health checks		
		Public health and health insurance systems (e.g. access to paediatricians, emergency care)			
Environmental policies	Environmental quality regulations and policies	Air quality regulations, food and water quality regulations, wider chemical and contaminant regulations.			

Note: Aspects indicated with * are covered in Chapter 5 instead, aspects indicated with ** are covered in Chapter 3.

Child health policy represents a patchwork of various efforts at national and regional levels. In some countries, the government has no affirmative obligation to promote child health and, more often than not, steps in only after a severe health risk has been identified. Responsibility is fragmented at national and regional levels, and among entities that control different aspects of children's well-being, such as health care, education, social assistance and child protection. The result is a largely uncoordinated jumble of resources and services that can be extremely difficult to navigate. Children's access to services can be dependent on where they reside.

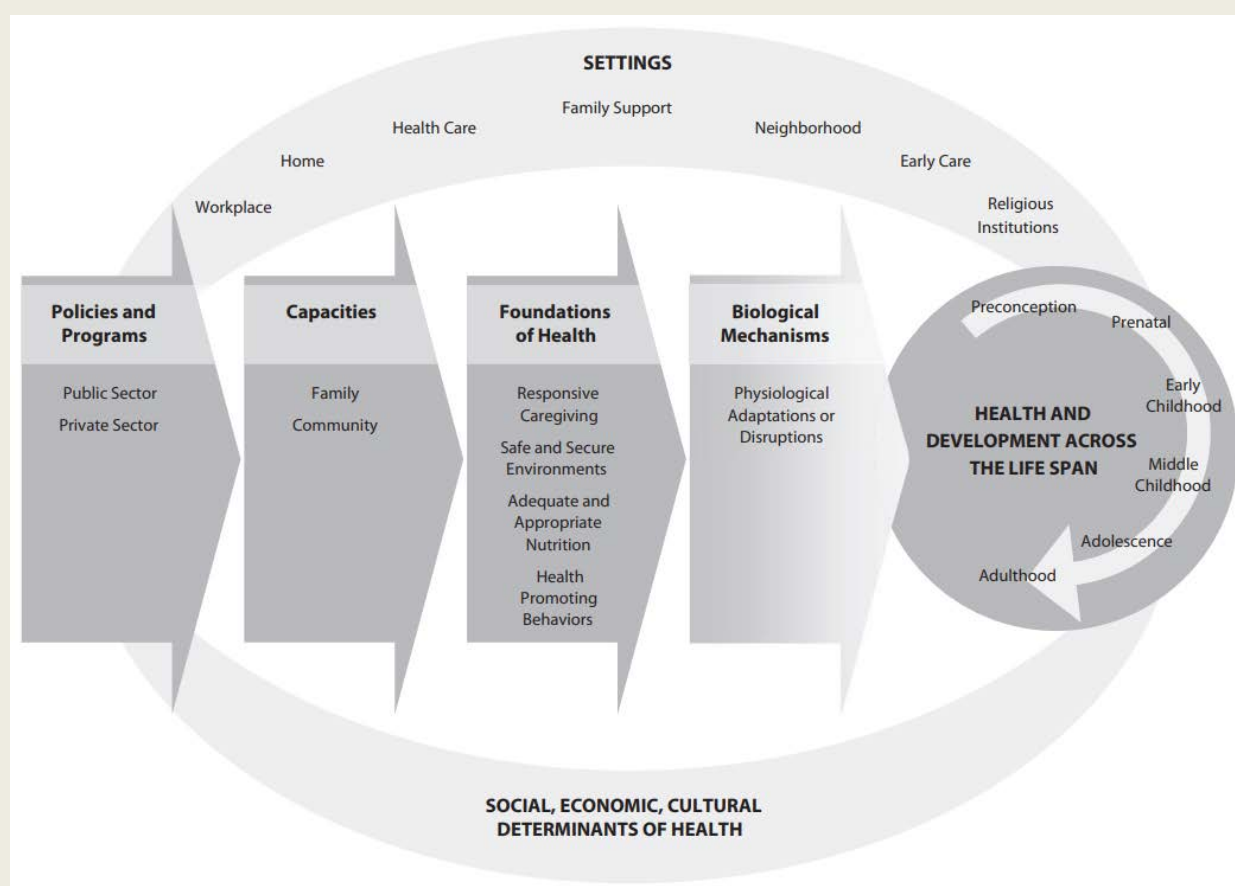
Some health-related policies attempt to prevent the emergence of child health problems (e.g. by regular body and dental health checks), while others aim to treat them once they occur. A few policies such as maternal leave entitlements target women during or before pregnancy with the goal of improving the health of both mothers and new-borns. Some policies have a universal scope (e.g. health checks of new-borns), while others target low-income families children, as it is particularly the case when children grow up (OECD, 2009^[19]). Health insurance systems also play a key role in raising health services affordability and accessibility by low income children. For instance, many OECD countries exempt children from co-payments (i.e. fixed charges) to guarantee access to health services (Paris, Devaux and Wei, 2010^[20])

A broader range of policies influence child health by improving the quality of the settings and environments in which children live. These include housing and built environment policies, and environmental quality regulations and policies. These policies not only impact child health, but they also are crucial to enhancing child material and social well-being. Meeting the basic needs for food, shelter, safety, housing and economic security is fundamental to good health (Chapter 3). Children's health and safety are also strongly influenced by children's physical security at home and in the neighbourhood. Chronic and acute conditions such as obesity, asthma, lead poisoning, and injuries are associated with risk factors within a child's built environment (APHA, 2010^[21]). Other policies may also have an effect, such as those that allow parents to stay employed and thereby increase their income and escape poverty, but the link to child health is indirect and the evidence on the effects is not robust enough to be further explored.

Box 4.1. How policies affect child health

Policies and programmes primarily operate to enhance family and community capacities to support the foundations of good child health (Figure 4.1). These foundations encompass the basic needs of all children, which are safe and secure environments, responsive caregiving, adequate and appropriate nutrition, and health-promoting behaviours. They, in turn, influence basic biological mechanisms that shape child development and health across the life span. There are two important contexts that play a moderating role in child health. The first context is the social, economic, and cultural determinants of health, which includes the direct and indirect effects of poverty, education, and discrimination. The second is the settings – or places – in which children and their families live, work, and develop.

Figure 4.1. Channels through which policies impact child health



Source: Mistry et al. (2012^[22]), *A New Framework for Childhood Health Promotion: The Role of Policies and Programs in Building Capacity and Foundations of Early Childhood Health*, American Public Health Association, <http://dx.doi.org/10.2105/AJPH.2012.300687>.

4.3. Physical health outcomes

Birth outcomes and key pre-natal determinants

A child's physical health in the first few months of life is critical for survival beyond infancy and to prevent developmental issues that can have long-reaching effects on many aspects of child to adult outcomes (see Box 4.2 as well as Conley and Bennett (2000_[23]) and Almond, Currie and Duque (2018_[4])). Infant mortality has traditionally been used to measure the outcomes of infants, but as infant mortality rates have dropped sharply across OECD countries over the past few decades, it has increased the need to complement it with many other indicators of infant/child health (OECD, 2019_[24]). A greater focus is thus given to birth outcomes, such as birth weight and gestational age, and prenatal conditions that critically impair health and wellbeing.

The incidence of low birth weight is widely used to assess health status of children at birth, as it is associated with an increased risk of poor health. For example, children born with a low weight are at an elevated risk of experiencing developmental problems in the short- and long-term (Scharf and DeBoer, 2016_[25]). In 2017, on average across OECD countries, 6.5% of babies were classified as having a low birth weight weighing less than 2 500 grams (OECD, 2019_[26]).

Preterm births (i.e. births occurring before 37 completed weeks of gestation) are one of the leading causes of death in children below five years of age (Vogel et al., 2018_[27]). In addition, preterm births often bring a series of health complications, as well as feeding difficulties, visual and hearing problems, and a higher risk of experiencing behavioural or learning difficulties relative to term-born babies (De Araújo et al., 2012_[28]; Platt, 2014_[29]; Mangin, Horwood and Woodward, 2017_[30]; Moreira, Magalhães and Alves, 2014_[31]; Johnson et al., 2015_[32]; Cheong et al., 2017_[33]). Pre-term births also typically result in low birth weight. As preterm babies require special care, incidence data at population level is valuable to highlight the needs for countries to develop appropriate neonatal services. Available data for European countries show a variance in the frequency of preterm births by a ratio of almost two: In 2015, about 6% of births in Denmark, Estonia, Finland, Iceland, Latvia, Lithuania, Norway and Sweden were preterm compared to more than 11% in Greece (Euro-Peristat Project, 2015_[34]).

Children's health status at birth depends on many factors, including maternal physical health and both parents' mental health during the pregnancy period (see Box 4.2). The risk of adverse birth outcomes also increases by maternal consumption of alcohol, tobacco or drug use during pregnancy. For example, prenatal nicotine exposure can impair respiratory functioning and increase metabolic and cardiovascular risk factors (Gibbs, Collaco and McGrath-Morrow, 2016_[35]; Kelishadi et al., 2016_[36]; Li et al., 2016_[37]). Given these links, it is important to measure children's exposure to unhealthy environments during gestation to guide any required policy action.

Prenatal care is care provided before the birth, primarily to prepare the expectant mother for delivery and to monitor and respond to warning signs for mother and child during pregnancy and childbirth. Higher prenatal care coverage in a country is linked with fewer low-weight births (OECD/WHO, 2018_[38]). Prenatal maternal care consists of assessments and treatments, including estimates of the unborn child's anthropometrics to provide indications of the child's growth and development in the womb, which have been shown to predict later child physical and mental health conditions, for example overweight, asthma and hyperactivity. Using US data, Conti et al. (2018_[39]) found that foetal anthropometrics in the third trimester of pregnancy predicted child growth (height and BMI) at six years of age. At the population and public policy level, such a finding reinforces the importance of the in-utero environment for child health and development.

Box 4.2. Prenatal factors affecting birth outcomes

A large spectrum of factors beyond genetics are found to critically influence birth outcomes, including:

Maternal physical health impacts birth outcomes through a variety of complex mechanisms, including placental functioning (Byrne and Phillips, 2000^[40]; Skogen and Øverland, 2012^[41]) and inflammation or stress (Calkins and Devaskar, 2011^[42]; Skogen and Øverland, 2012^[41]). Maternal pre-pregnancy underweight increases the risk of giving birth to a child who is small for gestational age size or of low birth weight; conversely, maternal overweight and obesity increases the risk of high birth weight, macrosomia and subsequent offspring overweight/obesity (Agius, Savona-Ventura and Vassallo, 2013^[43]; Oken, 2009^[44]; Yu et al., 2013^[45]; De Jongh et al., 2014^[46]).

Parental mental health. There is a positive relationship between positive affect experienced by an expectant mother and gestational length. (Pesonen et al., 2016^[47]). Conversely, chronic stress and work stress exposure, as well as maternal mental depression symptoms are found to adversely impact gestational length and the birth weight of children (Lee et al., 2011^[48]; Dunkel Schetter and Lobel, 2012^[49]; Grote et al., 2010^[50]; Chang et al., 2014^[51]; Pesonen et al., 2016^[47]). Though fathers are less often questioned about their psychological well-being during their partner's pregnancy, episodes of paternal depression can be associated with an increased risk of preterm birth (Liu et al., 2016^[52]) and may influence the mothers state of well-being during pregnancy (Field et al., 2006^[53])

Health-related behaviours. Physical activity of pregnant women, as opposed to a sedentary lifestyle, is associated with a lower incidence of preterm birth and low birthweight (Both et al., 2010^[54]; Davenport et al., 2018^[55]). Pregnant women engaging in physical activity during their free time are at reduced risk of preeclampsia, gestational diabetes mellitus and preterm birth (da Silva et al., 2017^[56]). By contrast, poor nutrition (WHO, 2014^[57]; Ramakrishnan, 2004^[58]), as well as tobacco and alcohol use are associated with higher risk of pre-term and/or underweight births (Dubois and Girard, 2006^[59]; Magnus et al., 2008^[60]; Agrawal et al., 2010^[61]; Knopik et al., 2016^[62]; Pereira et al., 2017^[63]; Goetzinger et al., 2012^[64]; Panico, Tô and Thevenon, 2015^[65]). Drug use is one factor posing the highest risk to preterm birth. For instance, a 2011 analysis in the United States found that the risk of preterm birth among expectant mothers using cocaine stood at three and a half times more likely to deliver a preterm infant while using opioid increased the risk by almost three times (Ruane, 2018^[66]).

Working conditions and family socio-economic status. Long working hours, shift work, lifting, standing and heavy physical workload tend to raise the risk of preterm delivery (Klebanoff, Shiono and Carey, 1990^[67]; Mozurkewich et al., 2000^[68]; Croteau, Marcoux and Brisson, 2007^[69]; Bonzini et al., 2011^[70]). Similarly, women with low levels of education and low family income have a higher likelihood to have a child with a low birth weight (Dubois and Girard, 2006^[59]; Magnus et al., 2008^[60]; Panico, Tô and Thevenon, 2015^[65]).

Physical development

From the very first months of life, changes in children's height and weight (i.e. the anthropometric development) can be indicative of growth and developmental problems. Deviations from optimal growth are typically measured as stunting (low height relative to age), wasting (low weight relative to height) as well as under- (low weight relative to age) and overweight (high weight relative to height). Even though there are some recent critical discussions on the interpretation of these measures (see e.g. Scheffler et al. (2020^[71])), they are particularly useful for assessing child health and nutritional status in early childhood in the absence of other measurable aspects, given the persistent effects of children's height and weight of in the first years of life on later health outcomes, including adult obesity and cardio-vascular diseases (Victora et al., 2008^[72]; Martin-Calvo, Moreno-Galarraga and Martinez-Gonzalez, 2016^[73]; Liu et al., 2020^[74]).

Motor development is important in the first few years of life because of its impacts on other development areas. Motor development can instigate a *developmental cascade*, including changes in perceptual, cognitive, language and social development (Adolph and Robinson, 2015^[75]; Keenan, Evans and Crowley, 2016^[76]; Leonard and Hill, 2014^[77]; Gonzalez, Alvarez and Nelson, 2019^[78]). However, developing an indicator assessing child motor development in the first few months of life is not appropriate because there is a large degree of heterogeneity in the age pattern of motor development without persistent consequences on child development (Adolph and Robinson, 2015^[75]). Furthermore, measures of motor skills in the early years of life (i.e., before the age of two) have a limited power in predicting the development of children just a few years later (Santos et al., 2013^[79]; Spittle et al., 2013^[80]; Burakevych et al., 2017^[81]). Thus, for this reason, it may be more beneficial to focus on children's physical activity.

The nutritional status and physical development of children and adolescents lays the foundation for their later health outcomes. As such, deviations from recommended body and weight developments can have significant health consequences for children. Of importance is the weight-for-height Body-Mass-Index (BMI), which is used as a tool to classify individuals as over- or under-weight or obese. Obesity is persistent. More than half of children classified as obese will continue to be obese in adolescence; around three quarters of obese adolescents will stay obese later in life (Simmonds et al., 2016^[82]). Thus, measuring obesity prevalence among children and adolescent is important given its serious immediate and later-in-life effects on health, such as hypertension and diabetes, and implications for a range of other organ systems and psycho-social outcomes (Kelly et al., 2015^[83]; Güngör, 2015^[84]).

Child health status

Injuries and illnesses contracted in childhood can have serious and long-lasting consequences for children's health and well-being. While the prevalence of infectious diseases, such as diphtheria, tetanus, pertussis, and measles, has become very low in countries where vaccination in the early years of life is widespread, the health burden of non-communicable diseases remains significant (Silverwood et al., 2019^[85]). For example, the number of younger children suffering from respiratory diseases and allergies is increasing (Pearce et al., 2007^[86]; Björkstén et al., 2008^[87]). Table 4.2 ranks the health conditions that are a cause of mortality and disability adjusted life years (DALYs). DALYs measure the overall burden of a disease by accounting for the years lost due to premature death or illness, capturing the long-term consequences of child health conditions.

Among young children, neonatal disorders, in particular preterm births or neonatal encephalopathy, are the most important factors leading either to death or impaired quality of life (de Vries and Jongmans, 2010^[88]). Similarly, congenital birth defects, especially congenital anomalies of the heart, have high early-life mortality rates and implications for neurodevelopmental outcomes (Razzaghi, Oster and Reefhuis, 2015^[89]). Lower respiratory tract infections, such as pneumonia or bronchitis, have significant impacts on later-life respiratory functioning (Grimwood and Chang, 2015^[90]). Other important causes leading to death and DALYs for infants are sudden infant death syndrome or the presence of foreign objects in the body. Children between the ages of one and four years are also particularly susceptible to long-term impacts from dermatitis, asthma and diarrheal disease (Drucker et al., 2017^[91]). In terms of mortality, road injuries, drowning and interpersonal violence are key causes of death. The preventable or avoidable nature of these events means that they deserve the require attention to reduce the numbers by even further (Sleet, 2018^[92]). Overall, death rates and DALYs of child morbidities are particularly high for young children, especially those concentrated at birth or the first year of life.

In contrast to early childhood and infancy, the most common cause of mortality during middle childhood and adolescence differ from the risks leading to DALYs. Road injuries and interpersonal violence continue to be an important cause of mortality throughout middle-childhood and adolescence. Road injuries are a leading cause of death of adolescents worldwide, and a major cause of physical disability (Vos et al., 2016^[93]). Other risks that become significant at this stage in childhood include cancer, especially

leukaemia. Non-communicable diseases such as asthma has significant long-term and immediate quality of life consequences for children in middle childhood, increasing the susceptibility to chronic co-morbidities and reducing lung capacity (Fletcher, Green and Neidell, 2010^[94]; Dharmage, Perret and Custovic, 2019^[95]). Similarly, in adolescence pain disorders, such as migraine, and lower back pain, although are non-lethal, are important factors contributing to DALYs by reducing quality of life (Wöber-Bingöl, 2013^[96]; Dunn, Hestbaek and Cassidy, 2013^[97]). Mental health disorders, such as anxiety depression, become significant detriments to the quality of life from middle childhood on as well as substance use and incidences of self-harm. These topics are discussed in Chapter 5.

Table 4.2. Top 5 most significant child morbidities in the OECD

Causes with highest disability-adjusted life years (DALYs) and death rates in the OECD, by age, per 100 000 people

Disability-adjusted life years (DALYs)		Deaths	
<1 year			
Neonatal disorders	25 594.57	Neonatal disorders	285.22
Congenital birth defects	13 548.38	Congenital birth defects	151.05
Lower respiratory infections	2 536.55	Lower respiratory infections	28.85
Sudden infant death syndrome	2 108.43	Sudden infant death syndrome	24.11
Foreign body	1 382.017	Foreign body	15.78
1 to 4			
Congenital birth defects	636.70	Congenital birth defects	5.36
Neonatal disorders	588.66	Road injuries	2.53
Dermatitis	560.90	Lower respiratory infections	2.03
Asthma	251.99	Drowning	1.70
Diarrheal diseases	229.31	Interpersonal violence	1.52
5 to 9			
Dermatitis	405.80	Road injuries	1.96
Neonatal disorders	387.75	Congenital birth defects	1.19
Asthma	273.01	Leukemia	1.14
Congenital birth defects	247.28	Brain and nervous system cancer	1.00
Anxiety disorders	193.70	Interpersonal violence	0.68
10 to 14			
Headache disorders	524.06	Road injuries	2.19
Conduct disorder	485.05	Leukemia	1.19
Anxiety disorders	462.68	Interpersonal violence	1.16
Neonatal disorders	379.20	Self-harm	1.07
Low back pain	317.33	Congenital birth defects	1.02
15 to 19			
Headache disorders	834.73	Road injuries	9.97
Road injuries	760.63	Interpersonal violence	7.58
Drug use disorders	749.40	Self-harm	6.63
Depressive disorders	706.46	Drug use disorders	1.80
Low back pain	626.13	Leukemia	1.37

Note: Estimates of DALYs and death rates refer to all OECD countries.

Source: (IHME, 2018^[98]), Global Burden of Disease Study 2017, <http://ghdx.healthdata.org/gbd-results-tool>.

It important to also measure the prevalence of atopic conditions among child populations (although all types are not listed among the most significant child morbidities) Atopic conditions in children, such as asthma, eczema, hay fever and food allergies, have been on the rise over the last decades, potentially plateauing in developed countries more recently (Thomsen, 2015^[99]; Moreno, 2016^[100]). Due to similar

underlying causes, many children suffering from one atopic disease are also likely to develop additional ones over the course of childhood, leading to increased disease burdens.

Tooth decay and cavities are among the most common chronic childhood conditions across OECD countries (OECD, 2009^[101]; Griffin et al., 2016^[102]). When left untreated, dental caries lead to severe toothache that may reduce school performance and general quality of life (Peres et al., 2019^[103]). Despite the replacement of primary teeth with permanent dentition over the course of middle childhood, children with early caries are more likely to suffer from subsequent caries complications as well as insufficient physical development (Çolak et al., 2013^[104]; Sheiham, 2006^[105]). However, regular tooth-brushing, typically recommended at least twice a day, is an easy method of prevention (Kumar, Tadakamadla and Johnson, 2016^[106]). While the evidence base for routine visits to the dentist office from early age is weak, many countries currently recommend early and frequent (about twice a year) dentist consultations for children (Bhaskar, McGraw and Divaris, 2014^[107]; Sen et al., 2016^[108]).

In early childhood, hearing and vision screenings are of critical importance to detect sensory impairments, such as refractive disorders as well as vision and hearing loss, early on. Compromised vision or hearing abilities can affect not only children's quality of life, but can also literacy and language development (Lederberg, Schick and Spencer, 2013^[109]), and neurological processing (Kral and O'Donoghue, 2010^[110]), and lead to higher long-term economic costs (Wittenborn et al., 2013^[111]). Early detection of sensory impairments through vision and hearing screenings can help children receive more timely treatment – leading to higher efficacy and better developmental outcomes in the long-term (Mathers, Keyes and Wright, 2010^[112]; Evans, Morjaria and Powell, 2018^[113]) – as well as earlier access to equipment and supports, such as skills training (e.g. sign language training).

In addition to objective estimates of child illnesses and physical health, it is also valuable to have information on the self-assessed health status of children. This may provide a more general picture of the physical health status of all children, not limited to clinically identified diseases or disorders. If the assessment uses age-appropriate methodologies, which account for children's cognitive competencies and of their understanding of health and illness, these self-reports provide reliable summary information on the children's perceived health status (Bevans and Forrest, 2010^[114]; Greco, Lambert and Park, 2016^[115]). Children as young as 5 years of age can provide details on aspect of their health-related well-being, and may know things that may not be visible to parents and health care professionals (Varni, Limbers and Burwinkle, 2007^[116]).

4.4. Health behaviours

Nutrition and eating habits

While infants, children and adolescents grow and their bodies develop, it is important that their dietary intake supplies the necessary micro- and macronutrients critical for physical development. The optimal nutritional supply changes with the age of the child, ranging from breastmilk for infants and young children to iron- and protein-rich food for adolescents. The importance of early-life nutrition is further underlined by evidence that dietary patterns in childhood are mirrored into adulthood (Due et al., 2011^[117]).

Breastmilk has a wide range of significant health benefits for children, including increased protection against infections, improved cognitive development and a lower risk of child mortality overall (Victora et al., 2016^[118]; Sankar et al., 2015^[119]). The share of children ever-breastfed vary substantially across the OECD. The WHO and UNICEF recommend that new-borns are exclusively breastfed within the first hour after birth and throughout the first six months of life, while receiving a mix of breastfeeding and complementary foods thereafter for the following 18 months (WHO, 2020^[120]). After breast- and/or bottle-feeding, the contents of the regular childhood diet become critical. Undernutrition in children may hinder child development. It is important to focus on adequate nutrition and correction of nutritional deficiencies during

the early years, as reversal may become very difficult beyond 2 years of age (Aboud and Yousafzai, 2015_[121]).

Over the course of childhood and adolescence, some dietary requirements change as a result of maturation of the body. For example, the intake of amino acids and proteins becomes particularly important during adolescence to support growth and muscle development. Additionally, the required energy intake peaks over adolescence, and is higher for boys than for girls (Das et al., 2017_[122]).

An ideal daily intake of calories varies depending on age, metabolism and levels of physical activity, among other things. Estimated needs for young children range from 1 000 to 2 000 calories per day, and the range for older children and adolescents varies substantially from 1 400 to 3 200 calories per day, with boys generally having higher calorie needs than girls (US Department of Health & Human Resources, 2015_[123]). The general dietary recommendations made for children aged two years and older stress a diet that primarily relies on fruits and vegetables, whole grains, low-fat and non-fat dairy products, beans, fish, and lean meat (Association et al., 2006_[124]; WHO, 2014_[125]).

Consumption of food rich in micronutrients, especially fruits and vegetables, are a central part of healthy nutrition and may provide a wide range of protective health benefits (Wallace et al., 2019_[126]). The WHO recommends "a minimum of 400g of fruit and vegetables per day (excluding potatoes and other starchy tubers)". The regular consumptions of fruits and vegetables, along with whole grains, is associated with better cognitive development over adolescence than diets containing high amounts of processed food and red meat (Nyaradi et al., 2014_[127]). A higher consumption of fruit and vegetables in childhood may also reduce blood pressure and further protect from stroke and cancer later in life (Maynard et al., 2003_[128]; Ness et al., 2005_[129]; Moore et al., 2005_[130]). Conversely, the regular consumption of carbonated drinks is strongly linked to weight gain and obesity among children and adolescents (Malik et al., 2013_[131]; DeBoer, Scharf and Demmer, 2013_[132]). Frequent consumption of sugary foods and drinks causes tooth erosion, which is especially critical once permanent dentation has been established (Salas et al., 2015_[133]).

Growing evidence highlights the importance of regular breakfast consumption for children. Skipping breakfast in the morning has been linked to raised risk for overweight and cardiometabolic diseases (Smith et al., 2010_[134]; Monzani et al., 2019_[135]). While having a lower calorie intake over the whole day, children who skip breakfast show elevated appetite and a higher tendency to consume non-breakfast meals and snacks, leading to reduced intake of important nutrients and lower overall dietary quality (Kral et al., 2011_[136]; Ramsay et al., 2018_[137]). In addition, having breakfast is linked to improved school behaviour, with potential effects on academic performance (Adolphus, Lawton and Dye, 2013_[138]).

Risky and protective behaviours

Early in life, timely vaccination is a critical and low-cost means to protect infants and children from a range of infectious diseases, such as diphtheria, tetanus, pertussis, and measles. Vaccinated children benefit directly through immunisation against several communicable and non-communicable diseases, often with complete or above 90% prevention rates. For communicable diseases, high vaccination rates provide further protection for the wider community addition to the individual protection (Andre et al., 2008_[139]; Anderson et al., 2018_[140]). A critical factor influencing vaccine effectiveness and the susceptibility to subsequent infection is the timeliness of vaccination (Curran et al., 2016_[141]; Hughes et al., 2020_[142]). The WHO recommends age of first dose as well as intervals further doses, while most initial vaccinations should be administered before age one (WHO, 2019_[143]). Nevertheless, immunisation schedules may differ across countries. Any cross-country comparative data thus needs to account for actual immunization policies in the respective countries.

The behaviours and activities children engage in often have significant consequence for their development. Children become more autonomous as they grow older because they develop the capacity to make more of own choices and engage in a more varied range of behaviours. For example, children have more control

over their diet and whether they engage in physical activity. Adolescence often represents an individual's peak in risk-taking behaviour. Risk taking during the teenage years may be normative and functionally adaptive as the adolescent strives for independence from adults. These increases in risk-seeking can, in part, be attributed to an imbalance between the brain reward and cognitive control systems in the adolescent brain, as well as a lack of experience with new adult behaviours and activities (Romer, 2010^[144]; Braams et al., 2015^[145]; Shulman et al., 2016^[146]). While substance abuse is a prominent risk behaviour that can have significant consequences on child physical health.

Physical activity

Physical activity broadly refers to any bodily movement produced by skeletal muscles that requires energy expenditure, including exercise, active games, and participation in sports programs, as well as active transportation, such as walking and cycling. For infants, the WHO recommends 30 minutes of physical activity per day, as well as 180 minutes for children ages two-four years (of which 60 minutes should be moderate to vigorous between age three and four) (WHO, 2020^[147]). From middle childhood throughout adolescence, the WHO recommends also state 60 minutes of moderate to vigorous-intensity physical activity per day. Any additional activity will be provide additional health benefits at this stage. At the same time, activities that strengthen muscles and bones should be done at least three times per week.

The available evidence suggests that physical activity in early childhood has a positive effect on the development of motor skills (Zeng et al., 2017^[148]), and on child health (Timmons et al., 2012^[149]), spanning from cardio-vascular health (Proudfoot et al., 2019^[150]) to overweight or obesity (Ulrich and Hauck, 2016^[151]; Hills, Okely and Baur, 2010^[152]; Nemet et al., 2005^[153]). In addition, early physical activity appears to have ripple effects on children's cognitive development (Bidzan-Bluma and Lipowska, 2018^[154]; Zeng et al., 2017^[148]; Carson et al., 2016^[155]). Physical activity levels in adolescence also track into adulthood, setting important foundations for later-in-life health (Due et al., 2011^[117]). Finally, child physical activity is one aspect of infant and children's life that parents and caregivers can influence without requiring expert knowledge of how children's motor skills develop.

Sleep

Sleep is something that is critical for the well-being and development of children of all ages, though in different ways and in different amounts as children grow up. The WHO recommends that new-borns have 14-17 hours of sleep per day, including naps, reducing steadily to about 10-13 hours for three- to four-year-olds (WHO, 2019^[156]). The recommendation for adolescents often sits between 8-10 hours per day (Hirshkowitz et al., 2015^[157]).

Sudden Infant Death Syndrome (SIDS) – the sudden unexplained death of seemingly healthy infants during sleep is risk that parents need to take measures against (Kinney and Thach, 2009^[158]). Concerns around SIDS and associated risk factors have led to the introduction in many OECD countries of “safe sleep” guidelines and campaigns for infants, which typically include abstaining from bed-sharing and placing infants on their backs to sleep (CDC, 2018^[159]; NHS, 2018^[160]). These and similar initiatives have helped reduce the frequency of SIDS of the past few decades. In the United States, for example, the frequency of SIDS has fallen by almost 75% since the introduction of the American Academy of Paediatrics' safe sleep recommendations in 1992 (CDC, 2021^[161]).

Sleep patterns shift substantially across childhood, reflecting differences in developmental needs for sleep and biological changes in children's bodies as they age. Especially among adolescents, short sleep durations are wide-spread, resulting for example from shifting biological clocks and early school starting times. These non-optimal sleep patterns have been linked to a wide range of physical and mental health outcomes ranging from childhood obesity, cardio-metabolic risk, poorer emotional regulation and worse overall well-being (Shochat, Cohen-Zion and Tzischinsky, 2014^[162]; Chaput et al., 2016^[163]; Hanlon, Dumin

and Pannain, 2019^[164]). Cognitive functioning is also impacted, leading to lower academic achievement, due to impaired attention, learning and memory (Curcio, Ferrara and De Gennaro, 2006^[165]).

Sexual activity

Adolescence typically marks the beginnings of romantic relationships and becoming sexual active. Adolescents need to know about sexual health and safe sex practices to protect themselves from sexually transmitted diseases and unwanted pregnancies. In the United States in 2018, close to half of all sexually transmitted infections (STIs) occur among adolescents and young adults (Kreisel et al., 2021^[166]). STIs, especially when untreated, can have profound effects on the health and well-being of individuals. For example, chlamydia can lead to pelvic inflammatory disease and infertility among women and gonorrhoea in men is associated with increased prostate cancer risk (Caini et al., 2014^[167]; Price et al., 2016^[168]; Mathur, Mullinax and Santelli, 2017^[169]). Adolescents have different health-seeking behaviours than adults. They may worry about being judged and issues of confidentiality. Therefore, sexual health services and health promotion need to be adapted to young people's needs to encourage uptake and protective health behaviours (Slater and Robinson, 2014^[170]).

4.5. Environment and public policies

Children's physical health and health behaviours depend on a range of factors relating to the local, family, and institutional context in which they live (WHO, 2018^[171]). Environmental quality is one such dimension. Heavy exposure to air pollution and contaminants in food and water can have severe implications for children's physical health and development. Indeed, slightly more than a quarter (28%) of deaths among children under five worldwide are estimated to be accountable to modifiable environmental factors (WHO, 2018^[172]). Institutional and policy-related factors can also play an important role in shaping children's physical health and development. Children's safety, for example, can be promoted by measures to protect children from road injuries, to secure independent mobility, and to provide safe access to green and recreation spaces. The accessibility and quality of public health care systems, which is in part linked to the level of public health expenditure, also matters. Sufficient access to health care, as well as the quality of care provided, can affect the opportunities children and pregnant mothers' have for receiving appropriate medical care when needed. The material living conditions of children and their families – as discussed in Chapter 3 – represents another important environmental dimension.

Physical environment

The quality of the immediate environment and exposure to various particles, bacteria, substances and contaminants can have important effects children's physical health and well-being. For example, many children worldwide are affected by air pollution – especially in developing countries, but also in developed economies (WHO, 2019^[173]). And while adults too are also impact by pollution and contaminants, children are often at greater risk, in part because they consume more pollutants and contaminants per-kilogram body-weight than adults (Landrigan et al., 2019^[174]). Exposure early in life to even to low-doses of toxic chemicals, bacteria and pollutants can lead to illness, disability, and death in childhood, as well as complications later in life (Landrigan et al., 2018^[175]; WHO, 2016^[176]).

One example of a common and risky air pollutant is fine particulate matter (PM_{2.5}). In high-income countries, more than a half of children below the age of 5 are subject to greater fine particulate matter pollution than is recommended by the WHO (WHO, 2018^[177]), with substantial effects on health: the combined effects of ambient and residential particulate pollution leads to more than 1 200 premature deaths among children below the age of 15 in OECD countries each year (OECD, 2019^[178]). Other air pollutants that can have adverse health effects in children include polycyclic aromatic hydrocarbons (PAHs), ozone, and nitrous oxide (NO_x), among others (WHO, 2018^[177]; Bushnik et al., 2020^[179];

Lubczyńska et al., 2020^[180]). Air pollution in general can have a variety of effects on children's health, ranging from adverse birth outcomes, heart disease and neurodevelopmental difficulties, to respiratory conditions and childhood cancer (WHO, 2018^[177]). Combating air pollution can also promote children's outcomes in other areas, including learning outcomes, as the installation of air filters after industrial gas leaks has shown (Gilraine, 2020^[181]).

Box 4.3. Child health and climate change

Climate change is rapidly changing our realities, with severe consequences for child health outcomes. Extreme heat, air pollution, food insecurity and many other consequences of global warming are threatening the health and well-being of children, especially those from disadvantaged socio-economic backgrounds (Adrian et al., 2020^[182]). Exposure to heat and extreme temperature can have harmful effects on birth outcomes, including low birth weight, stillbirth, or increased neo-natal stress. It also puts many children at risk of severe dehydration and heat related morbidity. Rising temperatures have also been linked to increases in mortality rates for children under age 5 and infants under age 1 (Basu and Ostro, 2008^[183]).

Increases in air pollution are one aspect of climate change that can have a heavy impact on child health at all stages of their development. Pre-natal exposure to air pollution increases the frequency of adverse birth outcomes and neuro-developmental disorders. Additionally, changes in temperature and CO₂ are altering the dynamics of pollen seasons and rendering children more prone to developing diseases such as asthma or hay fever. Most importantly, exposure to air pollution at different points in their lives negatively affects children's long-term outcomes, exacerbating inter-generational inequalities. One study from Chile, for instance, found that an increase in foetal exposure to carbon monoxide is associated with lower fourth grade math tests scores (Bharadwaj et al., 2017^[184]). Similarly, greater exposure to air pollution in the first year after birth has been found to negatively impact labour force participation and earnings at age 30 (Isen, Rossin-Slater and Walker, 2017^[185]), while exposure during adolescence has been linked to the non-completion of secondary school and incarceration (Voorheis, 2017^[186]). Children from low-income families are particularly vulnerable to air pollution as they are more likely to live in more polluted neighbourhoods, and to live in families that are less able to engage in avoidant behaviours or make investments to compensate for pollution.

Vector-borne diseases are also likely to spread as a result of global warming, deforestation, and ecological disruption. Rising temperatures are expanding suitable mosquito habitats, while human mobility facilitates the spread of illnesses to previously disease-free regions. Children living in overcrowded spaces with limited access to clean water and proper sanitation are particularly susceptible.

Natural disasters such as floods and extreme precipitation also carry health risks for children. Children are more likely than others to contract water-borne diseases due to their immature immune systems. In addition, infectious diseases and mental illness can be exacerbated by the destruction of homes and infrastructure. Exposure to contaminated drinking water and mould resulting from such phenomena are a further risk.

Prolonged drought resulting in reduced arable land and crop yields is likely to result in food insecurity and, potentially, malnutrition for children. Indeed, rising sea temperatures and coral bleaching triggered by global warming are radically decreasing per-capita capture-based fish consumption (Watts et al., 2018^[187]). In addition, climate change may lead to smaller crop yields and degradation in the nutritional properties of plant foods, in turn potentially triggering price rises, with possible knock-on effects for child nutrient deficiencies and malnutrition, especially for disadvantaged children (Myers et al., 2017^[188]; Taub, Miller and Allen, 2008^[189]). Food insecurity already results in poorer families turning to more

affordable foods, including fast- and processed foods and beverages, which increases risks of obesity, asthma, and chronic disability.

In addition to physical health, climate change may also affect children's mental health in several ways. For instance, extreme weather events can lead to forced displacement, family loss, and/or changing social support systems. This may lead to children, especially those in poverty, developing diagnosable mental health issues such as post-traumatic stress disorder, depression or anxiety. In developed countries too, many children express anxiety and fear about the potential impact of climate change on their futures (Maibach and Feldman, 2010^[190]).

Besides air pollution, constant high levels of ambient noise in the immediate environment, originating from, for example, road- and air traffic as well as neighbours and industrial activity, can impact on children's health. Noise exposure can trigger stress responses in children and potentially impair cognitive skills, resulting in reduced memory, reading ability and test scores (Stansfeld and Clark, 2015^[191]). Traffic-related noise has been shown to increase risks of sleep disturbances, attention disorders and high blood pressure in children (Liu et al., 2014^[192]; Skrzypek et al., 2017^[193]). However, further evidence is needed to fully appreciate the causal consequences of environmental noise pollution on children's health. It may be that ambient noise exposure has a lower impact on child outcomes than personal noise exposure, such as from music and other portable devices, which appears to be associated with hearing loss (Swierniak et al., 2020^[194]; Le Clercq et al., 2018^[195]).

Noise and particulate matter pollution often originate from road traffic. Distance to high-volume traffic in itself has been linked to adverse health outcomes in children, including early cancer, especially leukaemia (Pearson, Wachtel and Ebi, 2000^[196]; Houot et al., 2015^[197]), atherogenesis (Armijos et al., 2015^[198]) and respiratory disorders (Brown et al., 2012^[199]; Skrzypek et al., 2013^[200]).

Children are often also exposed to toxic chemicals and bacteria in food, water, and consumer products, some of which have been found to be harmful to child health and development, while others have never been tested for their toxicity to children (Landrigan and Goldman, 2011^[201]). For example, contamination of drinking water with coliform bacteria can induce intestinal illnesses, such as diarrhoea or pneumonia, which can be especially dangerous for infants (Landrigan et al., 2019^[174]; Mathew et al., 2019^[202]). Even though death rates to chemical and bacterial contamination are relatively low in developed countries, exposure is still high and may potentially lead to adverse health outcomes (Landrigan et al., 2018^[175]; Haug et al., 2018^[203]).

Lead exposure is also a strong concern. A recent report by UNICEF and Pure Earth estimates that one third of the world's children have been poisoned to some degree by lead, and that at least 900 000 premature deaths globally, or 1.6% of all deaths, are attributable to lead poisoning (Rees and Fuller, 2020^[204]). Lead exposure is preventable, and there is no level of exposure to lead that is known to be without harmful effects (WHO, 2019^[205]). Endocrine disrupting chemicals (EDCs) are also a significant source of concern for child health and development (WHO, 2012^[206]). EDCs have been linked to a number of outcomes, including neuro-developmental conditions and learning disabilities, thyroid disorders, diabetes and obesity (Attina et al., 2016^[207]; Trasande et al., 2015^[208]),

Family and home environment

The family and home environment can play a key role in children's child health behaviours and outcomes. First, poor housing quality can have important effects on children's physical health, especially for very young children. Overcrowding, but also damp or difficulties in heating the home, are factors that contribute to the transmission of infectious diseases and the development of chronic lung diseases. Exposure to lead

contained in building materials makes young children particularly vulnerable to lead poisoning (Santé Publique France, 2020^[209]).

The role of parents is manifold. For instance, parents initiate healthy eating habits and have an important role to play in encouraging physical activity in infants. As children grow older, parents act as role models for healthy behaviours and can encourage and support their children to engage in healthy activities, such as practising sport and eating well. However, parental behaviour may not always be positive. Children can be exposed to neglect, maltreatment, and physical punishment, as well as to domestic violence, which can lead to severe injuries, death, or impair brain and nervous system development (Hillis et al., 2016^[210]; WHO, 2019^[211]).

The definition of child maltreatment is broad and includes neglect, physical and verbal abuse, sexual abuse and emotional abuse. Child maltreatment can lead to a number of health problems, such as non-organic failure to thrive (stunted growth associated with neglect and emotional abuse) (Nemeroff, 2016^[212]; Jud, 2018^[213]); non-accidental injuries (babies with fractured skulls, kids with broken bones caused by physical abuse) (Mulpuri, Slobogean and Tredwell, 2011^[214]); and sexually transmitted diseases or pregnancies (caused by sexual abuse) (Bechtel, 2010^[215]; Noll, Shenk and Putnam, 2009^[216]). It can also lead to toxic stress, which can disrupt early brain development and impair the development of nervous and immune systems (Nemeroff, 2016^[212]). As adults, maltreated children are at increased risk of behavioural, physical and mental health problems such as smoking, obesity, alcohol and drug misuse, depression, and perpetrating or being a victim of violence (Gilbert et al., 2009^[217]; Brown, Fang and Florence, 2011^[218]; Zielinski, 2009^[219]; Thielen et al., 2016^[220]; OECD, 2019^[221]; WHO, 2014^[222]). Child maltreatment often occurs “behind closed doors”, and is not always visible to the outside world. Nevertheless, good quality data on these exposures are highly valuable and should be centre stage in child health and well-being monitoring.

Passive tobacco smoke and nicotine exposure, especially early in life, can impair respiratory functioning as well as increase metabolic and cardiovascular risk factors (Gibbs, Collaco and McGrath-Morrow, 2016^[35]; Kelishadi et al., 2016^[36]; Li et al., 2016^[37]). Household exposure to tobacco smoke in early childhood has also been linked to impaired executive functioning and increases in the likelihood of attention deficit and hyperactivity disorder (Pagani, 2014^[223]). As a result, it is important to not only measure children and adolescent’s active use of tobacco, but also to monitor those exposed to second-hand tobacco smoke in the home.

Health care policies

Developing policies that can promote child health requires information on both the preventive and remedial aspects of health policy. It is also important to have information that covers the different stages of childhood: a preventive health policy will be more effective if potential health problems are identified at an early stage, but it requires medical vigilance to be maintained throughout childhood. The extent to which children are targeted by preventative measures can be assessed through different metrics, including whether the system is offering routine vaccination and regular health checks, and through the proportion of children regularly visiting doctors and dentists.

Measuring potentially avoidable hospitalisation is another way to assess the strength of preventive policies (DoPMC, 2020^[224]; Procter et al., 2020^[225]). Potentially avoidable hospitalisations include respiratory conditions (including asthma, pneumonia, bronchiolitis, etc.), gastroenteritis, skin infections, and vaccine-preventable illnesses. They also include unintentional injuries and, in some countries, hospitalisation due to assault or self-harm. Many childhood illnesses are preventable through more effective primary health care services or broader public health interventions that target health determinants. Poor housing conditions, inadequate or poor nutrition, failure to vaccinate, exposure to unsafe outdoor sport or leisure equipment, and exposure to tobacco smoke are examples of drivers of potentially avoidable hospitalisations for children.

Estimates of unmet needs for medical and dental care provide an indication of the extent to which health care services are accessible and effective in treating medical needs. Some children have special health care needs which may not be addressed to the same extent as other, more general needs. Some groups of children may be particularly vulnerable (e.g. children of immigrants or refugees, children in foster care or in the juvenile justice system), and special policies may be needed to ensure that these children have access to health care services.

Data on public spending on children's health care services provide an indication of countries' efforts to meet children's health needs. As most health spending is directed toward older populations, in particular through end-of life services, the share of overall health care spending going to child health is low (OECD, 2016_[226]). Data on early life public health care spending is sparse. To understand how expenditures relate to child well-being, one positive step would be to collect data on expenditure on health care for children in the early years, as well as expenditure on care services for pregnant mothers.

Overall health care expenditure can mask differences in the distribution of spending between services that prevent and treat health conditions. The United States, for example, has the highest level of health care spending in the OECD (in general and on children, see Thakrar et al. (2018_[227])), yet also has poorer child health outcomes and higher child mortality rates than many other member countries. This is partially because the United States has relatively high pre-term birth and low birth weight rates, leading to subsequent health complications. Another factor is high health care prices, which drive up health expenditures (Thakrar et al., 2018_[227]; Lorenzoni, Belloni and Sassi, 2014_[228]). A substantial fraction of these expenditures can also be driven by low-value and unnecessary medical care that give no clear benefit to children's well-being, such as cough medicines for young children or pap tests for pregnant women (Chua et al., 2020_[229]). Therefore, it is important to remove spending on low-value services when creating indicators that measure health care spending and/or use for cross-national comparison. A potential list of such services can be found in Chua et al. (2020_[229]).

There may be institutional or geographical barriers to health care services, both of which may have severe implications for children's well-being and health. Institutional barriers can prevent children from having substantive health care insurance, in particular for those from lower socio-economic status households. Geographic barriers can limit the physical accessibility to health care and medical facilities. Issues with health care coverage often results in unmet health care needs and increased emergency department use among children (DeVoe, Tillotson and Wallace, 2009_[230]; Gushue et al., 2019_[231]). Child maltreatment is also less likely to be reported among uninsured children, because they have less contact with health care providers (Puls et al., 2020_[232]). Children who do not live close to medical care facilities are also less likely to attend these services (Currie and Reagan, 2003_[233]; Goodman et al., 2011_[234]). The assessment of inequalities in children's access to health care then requires sound information on geographical disparities in the availability of health services for children, as well as on differences in service use by families' socioeconomic status.

4.6. Overview of data availability

A wide range of information on children's physical health outcomes exist at the national level. The underlying data usually originate from household surveys or, in rarer cases, administrative registers. However, if the aim is to compare the state of children's physical health across countries, it is often hard to find data sources that are sufficiently similar in terms of concepts and methodology. For example, it is easier to develop indicators that measure infant mortality across countries, than it is to measure children subject to violent discipline or domestic sexual violence.

There are some comprehensive epidemiological data sources that allows for cross-national comparisons of children's physical health. The *Global Burden of Disease* study (GBD) from the Institute for Health Metrics and Evaluation (IHME) offers morbidity and mortality estimates for all OECD countries. The GBD

is built on a wide range of sources, including national household surveys, official statistics and academic publications. The modelled data include death rates and disability adjusted life years (DALYs) as well as prevalence and incidence rates for over 350 diseases and injuries as well as 80 risk outcomes. Importantly, the estimates are reported for very fine age groupings, which allows for measurement across different stages of childhood. A range WHO datasets also provide useful cross-national data. These include the WHO databases that track the *Sustainable Development Goals* (SDGs), as well as the *NCD Risk Factor Collaboration* (NCD-RisC), which models overweight and obesity prevalence across countries.

However, as also discussed in the appendix, global health metrics, especially the GBD data, are often not sufficiently transparent in their methods and risk oversimplifications of complex realities (Shiffman and Shawar, 2020^[235]; Mahajan, 2019^[236]). Occasionally, these data conflict with national statistical accounts, which raises various questions on the reliability and uncertainty involved in the creation of the estimates (Boerma, Victora and Abouzahr, 2018^[237]; Rigby, Deshpande and Blair, 2019^[238]; 2019^[239]). Stronger confidence in the GBD data would require greater transparency obligations, which would enable users of the data to better understand the origins and the underlying levels of uncertainty. An alternative route would be stronger commitments from national statistical institutes to collect and public harmonised data and indicators, given internationally coordinated definitions and standard, which may reduce the reliance on global health metrics.

Table 4.3. Overview of available data sources

		Country coverage	Age coverage	Main Data source	Data type	Regular update	Dis-aggregation
Physical health outcomes	Birth Outcomes	Good	Good	OECD, WHO	Estimates	Yes	No
	Physical development	Good	Good	GBD, NCD-RisC	Estimates	Yes	No
	Physical health status	Good	Good	GBD	Estimates	Yes	No
Pre-natal determinants (e.g. pre-natal health care, parental pre-natal health behaviours)		Poor	Good	National	Administrative	Yes	No
Health behaviours and other health activities	Nutrition and eating behaviours	Medium	Medium and good	HBSC, EU-SILC	Survey	Yes	Yes
	Risky and protective behaviours	Medium	Medium	HBSC	Survey	Yes	Yes
Environment & public policies	Exposure to pollution or contaminants	Poor	Medium	GBD, EU-SILC	Estimates, Survey	Yes	Partly
	Family and home environment	Medium	Good	EU-SILC	Survey	Yes	Yes
	Health care services	Good	Poor	GBD, OECD, WHO	Estimates, National	Yes	No

Note: A set of more detailed tables can be found in the Annex. "Disaggregation" means that the publicly available data allows for disaggregation by at least basic socio-economic and demographic groups, such as by sex, age, family status, and family income.

Many existing sources of data on children's physical health lack information on inequalities. However, there are a few cross-national surveys that allow for data disaggregation by various demographic and socio-economic factors. One example is the *Health Behaviour in School-aged Children* study (HBSC), which offers comprehensive cross-national data for adolescents aged 11-, 13- and 15 years in most OECD countries (except Australia, Canada, Chile, Colombia, Japan, Korea, Mexico, New Zealand and the United States). HBSC collects data on a variety of areas relating to child health and health behaviours, ranging from dietary and eating behaviours to self-perceived health status, and can be disaggregated by various demographic and socio-economic markers. For European countries, the *European Union Statistics on Income and Living Conditions* (EU-SILC) can give insights on the living conditions and health behaviours

of children, such as exposure to noise and consumptions of fruits and vegetables, as well as basic information on child health status, all of which can be disaggregated along various dimensions. Future rounds of the *European Health Interview Survey* may also contain questions on children’s physical health (Box 4.4). Unfortunately, beyond these sources, there are currently no other comprehensive cross-national dataset on children’s physical health that offer disaggregation by household socioeconomic characteristics.

The remainder of this section summarises the available information in each of the previously identified dimensions on children’s physical health, with a rough mapping presented in Table 4.3. More detailed information on each dimension and a more comprehensive mapping of the available data sources can be found in the Annex.

Box 4.4. Test module on the health of children in the European Health Interview Survey 2019

The *European Health Interview Survey* (EHIS) is a cross-national representative household survey that collects data on adult health status, health care use, and health determinants, as well as relevant socio-economic and demographic factors. The EHIS covers all EU member states plus Iceland and Norway, and runs every five years. The fieldwork for the most recent wave, Wave 3, took place in 2019.

As part of the latest wave, the EHIS ran a new test module on “Health of Children” in two EU member states (Bulgaria and Hungary). Two versions of the module were tested: one focusing on child disability (with questions that largely conform to the Washington Group/UNICEF Module on Child Functioning), and the other on child health behaviours and prevention. Both contained a set of basic questions on child health status. Responses to the test module were collected from parents or guardians.

Eurostat and the EU member states are currently in the process of deciding whether to include the “Health of Children” module (or part of it) in future waves of the EHIS.

Source: (Eurostat, 2021^[240]); (UNICEF, 2016^[241]); OECD Secretariat correspondence with Eurostat.

Data on physical health outcomes and pre-natal determinants

Comparable cross-national data on birth outcomes are widely available, with full OECD wide coverage and frequent data update cycles. For example, infant and under-five mortality rates are reported by OECD Health Statistics and by the UN Inter-agency Group for Child Mortality Estimation, respectively. The GBD reports estimates of the incidence of pre-term births across the OECD, while the WHO reports both observational and estimated data in the Global Preterm Birth Estimates. Information on low birthweight is available through the UNICEF-WHO Low Birthweight Estimates and through OECD Health Statistics. For some countries, information on birth outcomes is also available in administrative birth records (more details in the Annex).

The data availability for key pre-natal determinants is considerably sparser. While antenatal care coverage in middle and low income countries is monitored by the WHO as part of its tracking of SDG 3.7. (“*By 2030, ensure universal access to sexual and reproductive health-care services [...]*”), no comparable information is available for most OECD members. Global data on maternal smoking during pregnancy can be found in Lange et al. (2018^[242]), though, while valuable, this is only a one-off systematic review of estimates in the literature. It may be possible to source information on either antenatal care and/or maternal smoking from administrative datasets in some OECD countries. For example, the number of antenatal care visits for Danish mothers as well as information on whether mothers smoked during pregnancy is available in the Medical Birth Register. However, most countries do not have sufficient administrative data infrastructures to similarly measure birth outcomes.

Indicators of infant and early childhood anthropometric development are available as part of the monitoring of SDG 2.2. (“By 2030 end all forms of malnutrition [...]”), which targets the prevalence of stunting, wasting and overweight among children under the age of 5. OECD-wide estimates might be sourced from the health-related SDGs estimates in the GBD, which cover stunting, wasting, and over-/underweight, in line with the WHO growth standards. An alternative source for data on infant and child height and weight status and/or development at different stages may be found in preventive health examinations records, though only a handful of countries collect this information.

Information on anthropometric status in middle-childhood and adolescence can be obtained from NCD-RisC, which reports estimated over-/underweight and obesity prevalence among children and adolescents aged 5-9 and 10-19 years old, including for all OECD countries, based on a variety of national population-based surveys. The prevalence rates are based on BMI levels along which over- and underweight is typically classified in the literature and the health care system. Alternatively, data from the HBSC survey also provides self-reported information on child height, weight and BMI. However, for a number of countries there are significant non-response rates, which may reduce reliability.

OECD-wide data on child morbidities are available through the GBD, which estimates prevalence and incidence rates for 350 diseases and injuries by detailed age groups, including children and adolescents (e.g. below 1, 1 to 4, 5 to 9, 10 to 14 and 15 to 19 years). The data is typically updated every two years and is well suited to continuous monitoring of child morbidities. Importantly, the GBD also covers estimates for oral health conditions, such as caries and periodontitis, as well as hearing and vision impairments, and can thus also be used to measure the oral and sensory health status of children and adolescents in OECD countries.

For adolescents, data on self-assessed health is available in the HBSC survey. Here, 11-, 13- and 15 year old children report how often they have experienced headaches, stomach aches and backaches over the previous six months, as well as their over-arching self-rated health status. The latter is answered on a simple “excellent, good, fair and poor”-scale, which may be subject to semantics bias, possibility reducing its reliability as a proper cross-country measure (Schnohr et al., 2016^[243]). Similar questions are also asked to 15 year old children in the *Programme for International Student Assessment* (PISA), yet for many countries there are no responses in the most recent 2018 round. Unfortunately, none of these sources provide a self-assessed health status for children below the age of 11.

Data on child health behaviours and other health activities

Indicators that monitor the WHO recommendations on breast-feeding are readily available only for low- and middle-income countries, though this data gap can be overcome by synthesizing information from various national surveys in high-income countries (Victora et al., 2016^[118]). However, most of these countries are not able to report information that is in line with WHO recommendations. As a result, it may be necessary to rely more general information (such as whether the child was ever breastfed; see, for example, OECD (2009^[244])). A further complication is that many of these surveys are subject to significant non-response rates, a lack of recent information and long recall periods that may reduce accuracy. One alternative may be to make use of administrative data on preventive health examinations, though the availability of such sources across OECD countries is rather sparse (more on this in the Annex).

In terms of comparable cross-national data on nutrition, either deficiency rates or the overall availability of nutrients, the sources are out-dated or lacking, especially for OECD countries. Both EU-SILC and HBSC provide alternative and more up-to-date information on general childhood nutrition. The latter collects information for adolescents on fruits and vegetable consumption, as well as the consumption of sweets, sugared drink, and breakfast on school days. Similar data on fruit and vegetable consumption, which is also available for younger children, can be found in EU-SILC. Here, the information covers children in households where at least one child aged 1-15 does not have either fresh fruits or vegetables at least once per day, as well as those that did not have one meal with meat, chicken or fish (or vegetarian equivalent).

While both datasets do not provide direct information on micro- or macronutrient deficiency per se, they do allow for a basic assessment of nutritional deprivation along major food groups. Nevertheless, they are not well suited to assessing whether children reach the WHO recommendations of 400g of fruits and vegetables per day.

Global population-level information on physical activity are available for adolescents, either from pooled survey estimates in the scientific literature (e.g. in Guthold et al. (2020^[245])) or through regular cross/national studies. For instance, the HBSC survey provides information on adolescents' physical activity in the form of the share of reporting at least 60 minutes of moderate-to-vigorous activity per day, as well as the share of respondents that engaged 4 or more times in vigorous physical activity per week. The former is in line with the physical activity-related recommendation of the WHO, though does not identify how much time is spent on activity strengthening muscles and bones. Similarly, PISA data contains information on how often 15-year old children engaged in moderate or vigorous physical activity over the last 7 days outside of school. Unfortunately, the latest PISA round lacks information on this item for many countries and thus it may not be possible to use this source for further measurement, though future rounds will include some physical activity items for all countries.

Indicators on physical activity for younger children are not as readily available. Some countries, including the United Kingdom, collect information on physical activity for children aged 5 and over on a regular basis. Population-level indicators on physical activity for children under 5 years are often only available from child cohort surveys using parental reports, organised in-home observations or accelerometers (e.g. in Worobey (2014^[246])). These are expensive methodologies that are unlikely to be extended beyond small sample or child cohort surveys, which involve nation-representative samples but are not conducted on a regular basis.

Even though the HBSC survey has information on self-reported sleep difficulties for adolescents, globally comparable data on children's sleep patterns are rare. Nevertheless, some information is available in nationally representative surveys, such as the Longitudinal Study of Australian Children (LSAC). The data includes survey items on bed- and wake-time, though all participants have practically reached adulthood by now. A complication of similar surveys that collect data on bed- and wake-time is that these concepts do not necessarily indicate actual sleep-duration, especially among adolescents, who appear to frequently use smartphones and social media past bed-time and/or in the middle of the night.

Data on sexual activity is available in the HBSC survey for 15 year olds. Questions cover whether adolescents have engaged in sexual activity and whether or not they used a condom or contraceptive pill at last intercourse. In terms of preventive health behaviour, the HBSC survey also collects information on tooth brushing, in particular the share of adolescents that brush their teeth more than once per day, which makes it possible to measure attainment of WHO recommendations. Unfortunately, no globally comparable data source exists on tooth-brushing behaviour for younger children, though researchers have occasionally administered surveys on children in a wide range of countries (e.g. Llodra et al. (2014^[247])).

Indicators on childhood vaccination are routinely reported as vaccination rates that reflect the share of children receiving a specific vaccination or a combination of those (e.g. combined DTP-vaccine against diphtheria, tetanus, and pertussis) at the recommended vaccination age. Information on global vaccination rates is available through the WHO/UNICEF estimates of national immunisation coverage. OECD Health Statistics also reports similar information for OECD countries. These indicators may be further extended to cover additional vaccination rates, such as for rubella-, rotavirus-, pneumococcus- and polio vaccines.

Data on environments and public policies

Information on risks related to particulate matter pollution are available from the GBD comparative risk assessment (CRA), which estimates exposure based on a combination of land use and satellite data, chemical transport models, and ground measurements of pollutants. While less important in the OECD

context, data on risks relating to residential or household pollution are also estimated, using a wide range of surveys on the use of solid fuels for cooking. Both sources are reported as pollution-related deaths and DALYs, and can be broken down by detailed age groups. However, no details on specific exposure levels are available. Indicators on exposure to critical levels of different pollutants (above a critical threshold for a certain period) are available for EU countries through the European Environment Agency (EEA). Unfortunately, however, this data cannot be broken down by age, and only considers exposure in urban agglomerations. One route to building better indicators of children's exposure to particulate matter pollution may be to use data collected as a by-product of pollution measurement by public and private initiatives operating air quality sensors across cities and along major roads, though this may be costly and complicated.

The GBD CRA also estimates death risks and DALYs relating to unsafe water sources and lead exposure. For food safety, the WHO reports annual indicators based on monitoring by the International Health Regulation (IHR) to detect and respond to foodborne disease and food contamination. While this data is not broken down by specific foods, such as early infancy dietary products, it nevertheless may give a good overview of national food safety levels.

Information on children's exposure to noise and tobacco smoke can be obtained for EU countries from the EU-SILC survey, which collects the share of children under the age of 15 exposed to some or severe noise from neighbours or the street or tobacco smoke in the household. Data on exposure to heavy traffic are sometimes obtainable from road network and traffic volume data, which is often available to local authorities, typically based on road surveys and sensor data. Finland, for example, publishes real-time information on traffic volume for its entire road network on a fine-grained basis in the Digiroad and Digitraffic data.

Information on child maltreatment in the family and home environment is often collected through survey data or reports to child protection services (e.g. through primary care contacts or the school). For example, in order to track global attainment of SDG 16.2. (*“End abuse, exploitation, trafficking and all forms of violence and torture against children”*), the UN's Global SDG Indicator Database reports the proportion of children aged 1-14 years who experienced physical punishment and/or psychological aggression by caregivers. The data is mainly obtained from Multiple Indicator Cluster Surveys (MICS) or other household surveys, though survey sources may severely under-report actual instances of child maltreatment and violence against children (MacMillan, Jamieson and Walsh, 2003^[248]).

The availability of health policy is inconsistent and depends on the specific policy aspects and country. Relatively little data are routinely available to monitor the development of preventative health policies. Moreover, those data that are available, such as on antenatal health checks and vaccination rates, often covers only the early years of childhood. Data on health checks and visits to doctors or dentists by older children are not routinely reported on a large cross-national scale.

In Europe, the 2017 EU-SILC collected information on the proportion of children with unmet needs for medical and dental examination or treatment. About 1.3% of higher-income families with children, and 3% of income-poor families with children, reported unmet needs for medical examinations or treatment for at least one child in the household (Eurostat, 2019^[249]). Similar question on unmet needs for child medical care will be included in EU-SILC 2021. A few countries, including Australia, Italy, New Zealand and the United Kingdom, produce statistics on potentially preventable hospitalizations of children based on administrative data from hospitals (Zucco et al., 2019^[250]; Procter et al., 2020^[225]; DoPMC, 2020^[224]; Nuffield Trust, 2020^[251]); the production of comparative data at the international level on this issue would require a greater harmonization of the situations covered by these statistics.

Data on health care spending for children are not widely available. In European countries, the HEDIC project (Health Expenditures by Diseases and Conditions) has demonstrated the general feasibility of collecting data on expenditure by age, but data collection is incorporated in routine collection of data on health expenditure in the European Statistical System (HEDIC, 2016^[252]). The *Global Health Expenditure*

Database (GHED) of the WHO for low and middle countries but with poor documentation about comparability. Cross-country information on health care utilization is typically only available for the general population, e.g. in the OECD Health Statistics. However, for a few countries it may be possible to use administrative health care records to assess the status of health care service utilization for children. The advantage of this method over self- (or parent-reported) household survey information is a usually stronger reliability of the data due to avoidance of self-report bias.

Data on coverage for child and maternal health care is often obtained from household surveys. Globally comparable data is, for example, compiled by the Countdown to 2030 initiative, though coverage extends only to low- and middle-income countries. Equivalent information for countries in the OECD may be obtained from national household surveys or approximated by the health care coverage for the general populations (as in OECD (2019^[253])). In a few cases, data on the geographical accessibility of children's health care services may be obtained from administrative data sources using information on children's residential location and the location of health care service facilities. For the monitoring of the SDGs, a set of indicators on inequalities in maternal and child health coverage have been developed from Demographic and Health Surveys (DHS) carried out in low and middle income countries. Increasing relevance of to higher income countries remains a challenge (WHO/World Bank, 2017^[254]).

Some cross-country measurement of health care quality is available from the OECD Health Care Quality and Outcomes (HCQO) programme. The most recent framework collects a total of 61 indicators on health care service quality. However, these indicators are typically age-standardised and not available for children below the age of 15. An alternative approach to measuring both healthcare access and the quality of the care provided may be the use of estimated summary indices, such as the GBD's Healthcare Access and Quality (HAQ) Index. Using incidence and mortality rates, it approximates personal health care access and quality by estimating excess death rates which should not occur under effective health care systems. One drawback is that the estimates refer to health systems as a whole, without a particular focus on child health outcomes.

4.7. The way forward

The discussion above has shown that the development of health surveys and comprehensive global disease estimation projects has greatly expanded the range of cross-national data on children's health. These data cover physical health status, the prevalence of physical diseases and adolescent's risky and protective behaviours fairly well. However, there is a lack of transparency in the data generating processes and underlying uncertainty behind the estimates. In addition, there are several limitations that prevent proper tracking of inequalities in children's health and of its determinants from pregnancy onward. These limitations range from a lack of information to account for the differences in physical health outcomes among children of different socio-economic backgrounds and (hidden) risk factors, to the degree of which health care and policy decrease children's actual physical health risks through preventative measures.

Policies to promote children's physical health and well-being requires indicators that make it possible to properly identify the risks to children's health, including whether those risks are related to the environment in which children grow up or to individual circumstances. It also requires being able to identify health inequalities as soon as they emerge, even among the very young. However, the set of data presently available for child health in early and middle childhood is much more limited than for older children. For example, much of the currently available data, especially on children's risky and protective behaviours, are only available for adolescent. Though risk-taking is generally higher among adolescents, information on risky and protective practices for younger children is valuable and should be a focus of future data collections. Although sometimes collected in national surveys, there is a lack of comprehensive cross-country data on children's behaviours as well as on children's views regarding health issues.

More data on the resources available to nurture child health are also needed. It would involve having data on maternal and children's health care services coverage, and health checks for screening for preventive or curative services.

Improve the tracking of vulnerable children and child health inequalities

Inequalities in physical health develop as early as pregnancy and can have strong and long-lasting consequences on many aspects of adult outcomes, including education, employment, earnings, and the health of the next generation (Currie, 2017^[255]; Spencer et al., 2019^[256]). Therefore, it is important that indicators can be used to track health inequalities from pregnancy and the first years of life throughout childhood and adolescence. However, much of the data and indicators currently available on the health status and use of medical services provide information on the average situation – possibly for different age groups and genders – but very few provide information on disparities by income or other socio-demographic characteristics.

For policy-relevance, it would be useful if indicators on socio-economic health disparities capture different aspects of health status, health determinants and health care use at individual, family and neighbourhood levels. The prevalence of some infectious diseases, for example, is related to household living conditions, environmental health, hygiene and nutrition behaviours, and there can be a link here with the socio-economic status of the family (Spencer et al., 2019^[256]). Similarly, there can be geographic disparities in health status and determinants, sometimes linked to the spatial and/or community-level concentration of disadvantage. The situation of some indigenous communities – such as in Canada, where access to clean drinking water, as well as cramped living conditions and inadequate nutrition, are ongoing issues for a number of First Nations communities (Geland and Harrison, 2013^[257]; Government of Canada, 2021^[258]) – provides one such example. Information on the social gradient of diseases prevalence would help to determine whether universal policies – such as vaccinations – are successful in reaching all children, and whether governments need to expand their efforts to better reach certain groups of children.

The GBD project is the most comprehensive data source in children's physical health outcomes, and uses ex-post harmonisation of a wide range of national household surveys in order to track the incidence and prevalence of many diseases and risk factors. However, household surveys typically cover detailed information on each respondent's income and living conditions. While likely requiring extensive synthesisation efforts, it may be nonetheless possible to enrich the estimates with further disaggregation along socio-demographic dimensions in the future, including by household type, migrant background and possibly indigenous identity.

Another important limitation of data on children's physical health outcomes is that relatively little information is available on children with physical or intellectual disabilities and other vulnerabilities, such as those living in out-of-home care or who are homeless. These children often have additional health needs that, if unmet, can compromise different areas of development. For example, there is a lack of cross-national data on children with disabilities due to the fact that national surveys are not regularly conducted and/or are typically based on definitions of disabilities that vary across countries (OECD, 2020^[259]; Hunt, 2019^[260]). Even though international instruments like the UN Convention on the Rights of Persons with Disabilities propose definitions, the practical translation of this recommendation into disability surveys varies between countries. In particular, the inclusion of disabilities in social activities is subject to varying interpretations depending on the social norms that are diverse across countries. To this end, the Conference of European Statisticians has set up a Task Force mandated to review data gaps, sources, standards and definition and collection mechanisms used in UNECE countries on children with disabilities and to develop a set of recommendations for a harmonized improvement of the availability of data.

Expand the monitoring of child health across childhood, including the 1000 first days of life

The developmental period from conception to the end of the child's second year has become known as the first 1 000 days and has helped frame the type of supports very young children and their families need in order to give children the best possible start to life. The special focus on the first 1 000 days comes from the growing body of scientific evidence showing the importance of the early life experiences for long-term healthy development and well-being. The First 1 000 Days of life are regarded as the period in people's lives when public policy can have the most positive impact as brain plasticity is at its highest (Moore, 2018^[261]; Riding et al., 2021^[262]).

Birth outcomes have a significant impact on children's healthy development in the early years of life and on later life outcomes. However, only a small list of prenatal conditions are currently measured and where indicators and data sources do exist, for example, such as those collected at post-birth hospital discharge or during preventive health examinations, they are typically not comprehensive and standardised enough for cross-country comparison. Measuring prenatal conditions and maternal behaviours during pregnancy is important as it can provide insight into whether information and preparation programmes during pregnancy are efficient in reaching expectant mothers to ensure that every baby starts life with the highest potential for healthy development.

It is crucially important that future data collections establish standardised frameworks for evaluating pregnancy and increase their focus on prenatal conditions, such as mother's physical and mental health, physical activity and risky behaviour during pregnancy. The HEDIC project in Europe and the International Consortium for Health Outcomes Measurement (ICHOM), for example, propose a minimum standard set of internationally comparable measures to be collected during the pregnancy that incorporate some of these factors (Nijagal et al., 2018^[263]; HEDIC, 2016^[252]). A better mapping of prenatal risks for child health will be possible if enough countries adopted either of these proposed measurement agendas.

Having in place regular health screening programmes for children, especially during the first years after birth, is also crucial to reach children in vulnerable situations, increase the likelihood of early detection of developmental problems and diseases, and improve full completion of vaccine schedules. Depending on the country, medical check-ups in the first few years of life can be performed by regular home visits, or provided in other settings such as in day nurseries, childcare or healthcare centres (Riding et al., 2021^[262]). However, not all children necessarily enjoy equal access to health check-ups. It is therefore important to have information on the existence and coverage of regular postnatal routine examinations/screening programmes, confirmation of whether these programmes provide general health, vision, hearing and dental care screening, and of procedures in place to ensure that the child receives the required follow-up.

A better assessment of child maltreatment

The capacity to monitor health risks is central to policies that aim to improve child health and reduce health inequalities across children. However, population-based estimates of child maltreatment, including exposure to intimate partner violence, child neglect and abuse, are often incomplete, in part due to the complexity of measurement (Annex 4.A). The development of indicators is key to giving visibility to cases of child maltreatment and to encourage countries to put in place policies to address it. But most data collection methods are very costly, often require lengthy in-person interviews that render a sufficiently large data collection complicated, and come with tricky ethical issues. However, a range of short form questionnaires on children's experience with household physical, verbal and sexual abuse exists or are under development and validation, which could be embedded in cross-country surveys in the future (WHO, 2016^[264]).

A better tracking of environmental risks

The thorough tracking of children's exposure to environmental risks, such as unsafe air and contaminated water and food, is key to ensuring that children can grow up healthily (Currie, 2013^[265]; Currie, 2017^[255]; WHO, 2017^[266]). To this end, it is desirable to have indicators to monitor the prevalence and concentration of environmental risks in some regions, including those resulting from climate change.

Currently, available data focuses on death rates relating to environmental pollution and contamination, but less frequently accounts for the global exposure of children to levels of risks that can jeopardise current and future health. A few features are essential for achieving good quality tracking. First, tracking must be done at the appropriate local level, which requires a high level of granularity in the data. Second, tracking must account for children's exposure to environmental risks not only in the home, but also in school, during commutes, and partaking in other activities (see e.g. McConnell et al. (2010^[267])).

In order to set and monitor policy priorities relating to environmental quality, it is important to have detailed data that consider the full spectrum of children's environments. Fortunately, recent advances have put individual-level measurement of environmental exposures on the scientific agenda. As a result, it might be possible to measure exposure levels more comprehensively and in more detail in future (Caplin et al., 2019^[268]). Other major challenges for monitoring include collecting better data on infants' and toddlers' exposure to chemicals through contaminants in foods targeted at children (e.g. infant formula, baby food, cereals, etc.), as well in consumer products targeted for children (e.g. toys, child mattresses, etc.). A better understanding of the use patterns and behaviours of children and adolescents when using products such as paints, glues, hand sanitizers, and make up is also needed.

Develop data on child health check-ups and health care service policies

Detecting health problems as early as possible is essential for ensuring that children have access to appropriate health care and support. Medical check-ups during pregnancy and in the post-natal period are a key element of prevention systems and useful for directing families to appropriate care services. From a policy perspective, monitoring the number of children covered by medical check-ups (including especially vision and hearing screening) in the early years of life but also at later stages of childhood is critical for strengthening preventive health policies.

Access to relevant treatment and health care services by pregnant women and children is a key resource for improving children's health (Guio, Frazer and Marlier, 2021^[269]). However, data on service availability, cost and child coverage are limited. These data are nevertheless important for the development of policies to promote access and to alleviate possible barriers to treatment and services. For infectious diseases, WHO and UNICEF have developed an indicator measuring the proportion of children receiving appropriate treatment, but this indicator is available for only a few low- and middle-income. This approach could be extended to other types of diseases and health issues by asking parents of children with a diagnosed health issue about their access to an adequate health service and the possible obstacles to service use.

Current data collections on health care spending are typically focussed on overall expenditure, mostly stretching across all age groups, although, in some cases, data are available on health care spending on children under the age 5. However, there are crucial differences between preventive and curative-rehabilitative measures when looking to link health expenditure to child health and well-being outcomes. A sufficient level of preventative health care is essential for keeping health risk under control and for providing services that detect emerging health issues early on. Preventative measures are also often particularly cost-effective, as they help detect and address health conditions that may become more severe and more costly later on (Merkur, Sassi and McDaid, 2013^[270]).

Currently, OECD countries spend only about 3% of overall healthcare expenditure on preventive measures, such as immunisation, early detection and healthy condition monitoring, though there is a wide variation between countries. The level of preventative expenditure is also highly sensitive to the economic

environment and has often been reduced as a response to recessions (Gmeinder, Morgan and Mueller, 2017^[271]). In principle, it would be valuable to measure spending on, and children's access to, specific preventive measures, but this is complicated by differences in preventive measure recommendations across countries (e.g. immunisation guidelines differ across OECD countries). In order to monitor whether children receive sufficient preventative measures, it is important to measure not just how countries spend on preventative health care, but also how this expenditure is distributed across children of different ages. Preventative measures for infants typically include immunisation programs and frequently re-occurring health examinations that aim to detect emerging health risks and conditions. In later childhood and adolescence, expenditure may be directed more towards education programs that inform children of the risk and benefits of different health behaviours, such as substance use, sex, sport and nutrition.

Collect information on children's views and knowledge on health issues

Understanding what children know about health issues is important for assessing where, when and how to target health education. However, at present, there is no data on children's knowledge of health issues, the supports they may receive, the risk they face now or in the future, and the positive or negative consequences that certain behaviours may have on their current and future health and well-being. Collecting this kind of data would be a first step towards better engaging children and young people on health issues, and could help ensure that guidance and information on health issues is presented in a "child-friendly" way. Consulting with children to understand how they best absorb information could also be valuable.

Collecting information on parents' knowledge of children's health issues may also be important in view of helping them construct healthy environments, especially for parents with younger children and infants. Areas that could be covered include, among other domains, prenatal care, children's developmental milestones, nutrition and eating practices, sleep patterns, and physical activity practices.

Track awareness and the implementation of child health-related recommendations

National and international recommendations on nutrition, physical activity and sleep set minimum standards that are intended to promote healthy child development and prevent health problems that may be linked to poor practices. However, to date, not all existing recommendations have corresponding data that can be used to monitor whether guidelines are being met. The importance of these gaps depends on the specific recommendation in question. For example, some datasets can already be used to give general information on a certain dimension. The EU SILC data on fruit and vegetable consumption, for instance, is not fully aligned with the WHO recommendations of consuming at least 400g (or alternatively five pieces) of fruits and vegetables per day, but nevertheless provides useful and relevant information on child nutrition. Regarding physical activity, some data exist for adolescents, but not for younger children. Finally, there are data on the existence of sleep disorders, but no data, regardless of age, on child sleep patterns indicating whether the recommendations are being met. The desirability of developing new data on child sleep that is consistent with existing child health recommendations is something that should be further explored.

To be effective, health recommendations must be known to those to whom they are directed at. Collecting data on children and parent's awareness of recommendations may help highlight areas where better information and guidance on risky and protective health behaviours is needed.

Connecting the dots: physical health and other well-being outcomes

In order to provide children with a healthy start to life and foster healthy development throughout childhood and adolescence, it is crucial to know not just about children's physical health outcomes, but also how their health interacts with other aspects of current and future well-being. The evidence reviewed in this and

other chapters shows that good physical health depends on material living conditions (Chapter 3) and lays the foundation for children's learning (Chapter 6) and emotional and social development (Chapter 5). Measuring how differences in well-being outcomes are linked to differences in health status can help promote a more holistic understanding of the issues and aid the identification of areas where public action should focus its efforts. This requires data that allows for information on health status to be cross-tabulated with other aspects of children's development and well-being. This is not always possible with existing sources, which often focus only on specific aspects of child well-being.

Developing a good mapping of children's physical health situation and the challenges, risks and health-related resources available to children is key for fostering children's abilities to reach their full potential. At the same time, there are still key gaps in child physical health data that need to be filled. Some of these gaps may be tackled by extending currently existing methodologies to measure additional aspects, while others may require the introduction of new surveys or additional items in existing questionnaires, and better linkages across different data sources.

References

- Abarca-Gómez, L. et al. (2017), "Worldwide trends in body-mass index, underweight, overweight, and obesity from 1975 to 2016: a pooled analysis of 2416 population-based measurement studies in 128· 9 million children, adolescents, and adults.", *The Lancet*, Vol. 390/10113, pp. 2627-2642, [https://doi.org/10.1016/S0140-6736\(17\)32129-3](https://doi.org/10.1016/S0140-6736(17)32129-3). [287]
- Aboud, F. and A. Yousafzai (2015), "Global Health and Development in Early Childhood", *Annual Review of Psychology*, Vol. 66/1, pp. 433-457, <http://dx.doi.org/10.1146/annurev-psych-010814-015128>. [121]
- Adolph, K. and S. Robinson (2015), "Motor Development", in Lerner, R., L. Liben and U. Mueller (eds.), *Handbook of Child Psychology and Developmental Science - Vol 2, Cognitive processes*, John Wiley & Sons, <https://www.wiley.com/en-us/Handbook+of+Child+Psychology+and+Developmental+Science%2C+Volume+2%2C+Cognitive+Processes%2C+7th+Edition-p-9781118136782>. [75]
- Adolphus, K., C. Lawton and L. Dye (2013), "The effects of breakfast on behavior and academic performance in children and adolescents", *Frontiers in Human Neuroscience*, Vol. 7/425, <https://doi.org/10.3389/fnhum.2013.00425>. [138]
- Adrian, N. et al. (2020), *Climate Change & Child Poverty in OECD Countries*, <http://www.lafollette.wisc.edu/research-public-service/workshops-in-public-affairs-> (accessed on 20 November 2020). [182]
- Agius, R., C. Savona-Ventura and J. Vassallo (2013), "Transgenerational metabolic determinants of fetal birth weight", *Experimental and Clinical Endocrinology and Diabetes*, Vol. 121/7, pp. 431-435, <http://dx.doi.org/10.1055/s-0033-1345121>. [43]
- Agrawal, A. et al. (2010), "The effects of maternal smoking during pregnancy on offspring outcomes", *Preventive Medicine*, Vol. 50/1-2, pp. 13-18, <http://dx.doi.org/10.1016/j.ypmed.2009.12.009>. [61]
- Ajetunmobi, O. et al. (2014), "Informing the 'early years' agenda in Scotland: understanding infant feeding patterns using linked datasets", *Journal of Epidemiology & Community Health*, Vol. 68/1, pp. 83-92, <https://doi.org/10.1136/jech-2013-202718>. [289]

- Almond, D., J. Currie and V. Duque (2018), "Childhood Circumstances and Adult Outcomes: Act II", *Journal of Economic Literature*, Vol. 56/4, pp. 1360-1446, <http://dx.doi.org/10.1257/jel.20171164>. [4]
- Anderson, E. et al. (2018), "Protecting the community through child vaccination", *Clinical Infectious Diseases*, Vol. 67/3, pp. 464-471, <https://doi.org/10.1093/cid/ciy142>. [140]
- Andre, F. et al. (2008), "Vaccination greatly reduces disease, disability, death and inequity worldwide", *Bulletin of the World Health Organization*, Vol. 86, pp. 140-146, <http://dx.doi.org/10.2471/BLT.07.040089>. [139]
- APHA (2010), *Child Health Policy for the United States*, American Public Health Association. Policy Statement., <https://www.apha.org/policies-and-advocacy/public-health-policy-statements/policy-database/2014/07/30/17/25/american-public-health-association-child-health-policy-for-the-united-states> (accessed on 25 January 2021). [21]
- Armijos, R. et al. (2015), "Residential exposure to urban traffic is associated with increased carotid intima-media thickness in children", *Journal of Environmental and Public Health*, Vol. 2015, <http://dx.doi.org/10.1155/2015/713540>. [198]
- Association, A. et al. (2006), "Dietary Recommendations for Children and Adolescents: A Guide for Practitioners", <http://dx.doi.org/10.1542/peds.2005-2565>. [124]
- Attina, T. et al. (2016), "Exposure to endocrine-disrupting chemicals in the USA: A population-based disease burden and cost analysis", *The Lancet Diabetes and Endocrinology*, Vol. 4/12, pp. 996-1003, [http://dx.doi.org/10.1016/S2213-8587\(16\)30275-3](http://dx.doi.org/10.1016/S2213-8587(16)30275-3). [207]
- Baert, K. et al. (2011), "Measuring the safety of the food chain in Belgium: Development of a barometer", *Food Research International*, Vol. 44/4, pp. 940-950, <https://doi.org/10.1016/j.foodres.2011.02.005>. [301]
- Bagchi, D. (ed.) (2019), *Sleep and obesity in children and adolescents.*, Academic Press, <https://doi.org/10.1016/B978-0-12-812840-4.00013-X>. [164]
- Basu, R. and B. Ostro (2008), "A Multicounty Analysis Identifying the Populations Vulnerable to Mortality Associated with High Ambient Temperature in California", *American Journal of Epidemiology*, Vol. 168/6, <http://dx.doi.org/10.1093/aje/kwn170>. [183]
- Bechtel, K. (2010), "Sexual abuse and sexually transmitted infections in children and adolescents", *Current Opinion in Pediatrics*, Vol. 22/1, pp. 94-99, <http://dx.doi.org/10.1097/MOP.0b013e32833502ad>. [215]
- Bevans, K. and C. Forrest (2010), "The reliability and validity of children's and adolescents' self-reported health", in Ungar, W. (ed.), *Economic Evaluation in Child Health*, Oxford University Press, <http://dx.doi.org/10.1093/acprof:oso/9780199547494.003.02> (accessed on 4 June 2021). [114]
- Bharadwaj, P. et al. (2017), "Gray Matters: Fetal Pollution Exposure and Human Capital Formation", *Journal of the Association of Environmental and Resource Economists*, Vol. 4/2, <http://dx.doi.org/10.1086/691591>. [184]
- Bhaskar, V., K. McGraw and K. Divaris (2014), "The importance of preventive dental visits from a young age: Systematic review and current perspectives", *Clinical, Cosmetic and Investigational Dentistry*, Vol. 6, pp. 21-27, <https://dx.doi.org/10.2147%2FCCIDE.S41499>. [107]

- Bidzan-Bluma, I. and M. Lipowska (2018), "Physical Activity and Cognitive Functioning of Children: A Systematic Review", *International Journal of Environmental Research and Public Health*, Vol. 15/4, <http://dx.doi.org/10.3390/IJERPH15040800>. [154]
- Björkstén, B. et al. (2008), "Worldwide time trends for symptoms of rhinitis and conjunctivitis: Phase III of the International Study of Asthma and Allergies in Childhood", *Pediatric Allergy and Immunology*, Vol. 19/2, pp. 110-124, <http://dx.doi.org/10.1111/j.1399-3038.2007.00601.x>. [87]
- Bliddal, M. et al. (2018), "The Danish medical birth register", *European Journal of Epidemiology*, Vol. 33/1, pp. 27-36, <https://doi.org/10.1007/s10654-018-0356-1>. [277]
- Boerma, T., C. Victora and C. Abouzahr (2018), "Monitoring country progress and achievements by making global predictions: is the tail wagging the dog?", *The Lancet*, Vol. 392/10147, pp. 607-609, [http://dx.doi.org/10.1016/S0140-6736\(18\)30586-5](http://dx.doi.org/10.1016/S0140-6736(18)30586-5). [237]
- Bonzini, M. et al. (2011), "Shift work and pregnancy outcomes: a systematic review with meta-analysis of currently available epidemiological studies", *BJOG: An International Journal of Obstetrics & Gynaecology*, Vol. 118/12, pp. 1429-1437, <http://dx.doi.org/10.1111/j.1471-0528.2011.03066.x>. [70]
- Borger, J., R. Huber and A. Ghosh (2019), "Capturing sleep-wake cycles by using day-to-day smartphone touchscreen interactions", *NPJ Digital Medicine*, Vol. 2/1, pp. 1-8, <https://doi.org/10.1038/s41746-019-0147-4>. [299]
- Both, M. et al. (2010), "The association of daily physical activity and birth outcome: A population-based cohort study", *European Journal of Epidemiology*, Vol. 25/6, pp. 421-429, <http://dx.doi.org/10.1007/s10654-010-9458-0>. [54]
- Braams, B. et al. (2015), "Longitudinal changes in adolescent risk-taking: A comprehensive study of neural responses to rewards, pubertal development, and risk-taking behavior", *Journal of Neuroscience*, Vol. 35/18, pp. 7226-7238, <https://doi.org/10.1523/JNEUROSCI.4764-14.2015>. [145]
- Brown, D., X. Fang and C. Florence (2011), *Medical costs attributable to child maltreatment: A systematic review of short- and long-term effects*, Elsevier Inc., <http://dx.doi.org/10.1016/j.amepre.2011.08.013>. [218]
- Brown, M. et al. (2012), "Residential proximity to a major roadway is associated with features of asthma control in children", *PLoS One*, Vol. 7/5, <https://doi.org/10.1371/journal.pone.0037044>. [199]
- Burakevych, N. et al. (2017), "Bayley-III motor scale and neurological examination at 2 years do not predict motor skills at 4.5 years", *Developmental Medicine and Child Neurology*, Vol. 59/2, pp. 216-223, <http://dx.doi.org/10.1111/dmcn.13232>. [81]
- Bushnik, T. et al. (2020), "Association of urinary polycyclic aromatic hydrocarbons and obesity in children aged 3-18: Canadian Health Measures Survey 2009-2015", *Journal of Developmental Origins of Health and Disease*, Vol. 11/6, pp. 623-631, <http://dx.doi.org/10.1017/S2040174419000825>. [179]
- Byrne, C. and D. Phillips (2000), *Fetal origins of adult disease: Epidemiology and mechanisms*, BMJ Publishing Group, <http://dx.doi.org/10.1136/jcp.53.11.822>. [40]

- Caini, S. et al. (2014), "Sexually transmitted infections and prostate cancer risk: A systematic review and meta-analysis", *Cancer Epidemiology*, Vol. 38/4, pp. 329-338, <https://doi.org/10.1016/j.canep.2014.06.002>. [167]
- Calkins, K. and S. Devaskar (2011), "Fetal origins of adult disease", *Current Problems in Pediatric and Adolescent Health Care*, Vol. 41/6, pp. 158-176, <http://dx.doi.org/10.1016/j.cppeds.2011.01.001>. [42]
- Caplin, A. et al. (2019), "Advancing environmental exposure assessment science to benefit society", *Nature Communications*, Vol. 10/1, pp. 1-11, <https://doi.org/10.1038/s41467-019-09155-4>. [268]
- Carson, V. et al. (2016), *Systematic review of physical activity and cognitive development in early childhood*, Elsevier Ltd, <http://dx.doi.org/10.1016/j.jsams.2015.07.011>. [155]
- CDC (2021), *Data and Statistics for SIDS and SUID*, Centers for Disease Control and Prevention, <https://www.cdc.gov/sids/data.htm> (accessed on 11 May 2021). [161]
- CDC (2018), *Safe Sleep for Babies*, Centers for Disease Control and Prevention, <https://www.cdc.gov/vitalsigns/safesleep/index.html> (accessed on 11 May 2021). [159]
- Chang, H. et al. (2014), "Prenatal maternal depression is associated with low birth weight through shorter gestational age in term infants in Korea", *Early Human Development*, Vol. 90/1, pp. 15-20, <http://dx.doi.org/10.1016/j.earlhumdev.2013.11.006>. [51]
- Chaput, J. et al. (2016), "Systematic review of the relationships between sleep duration", *Applied Physiology, Nutrition, and Metabolism*, Vol. 41/6, pp. S266-S282, <http://dx.doi.org/10.1139/apnm-2015-0627>. [163]
- Chawanpaiboon, S. et al. (2019), "Global, regional, and national estimates of levels of preterm birth in 2014: a systematic review and modelling analysis.", *The Lancet Global Health*, Vol. 7/1, pp. e37-e46, [http://doi.org/10.1016/S2214-109X\(18\)30451-0](http://doi.org/10.1016/S2214-109X(18)30451-0). [275]
- Cheong, J. et al. (2017), "Association between moderate and late preterm birth and neurodevelopment and social-emotional development at age 2 years", *JAMA Pediatrics*, Vol. 171/4, <http://dx.doi.org/10.1001/jamapediatrics.2016.4805>. [33]
- Cherry, A., V. Baltag and M. Dillon (eds.) (2017), *Prevention of sexually transmitted infections among adolescents.*, Springer, Cham, https://doi.org/10.1007/978-3-319-40743-2_10. [169]
- Chotard, S. et al. (2010), "Fluctuations in wasting in vulnerable child populations in the Greater Horn of Africa.", *Food and Nutrition Bulletin*, Vol. 31/3, pp. S219-S233, <https://doi.org/10.1177/15648265100313s302>. [280]
- Chua, K. et al. (2020), "Differences in the receipt of low-value services between publicly and privately insured children.", *Pediatrics*, Vol. 145/2, <https://doi.org/10.1542/peds.2019-2325>. [229]
- Clark, H. et al. (2020), "The Lancet Commissions A future for the world's children? A WHO-UNICEF-Lancet Commission Executive summary", *The Lancet*, Vol. 395, pp. 605-658, [http://dx.doi.org/10.1016/S0140-6736\(19\)32540-1](http://dx.doi.org/10.1016/S0140-6736(19)32540-1). [13]
- Çolak, H. et al. (2013), "Early childhood caries update: A review of causes, diagnoses, and treatments.", *Journal of Natural Science, Biology, and Medicine*, Vol. 4/1, pp. 29-38, <https://dx.doi.org/10.4103%2F0976-9668.107257>. [104]

- Conley, D. and N. Bennett (2000), "Is biology destiny? Birth weight and life chances", *American Sociological Review*, Vol. 65/3, pp. 458-467, <http://dx.doi.org/10.2307/2657467>. [23]
- Conti, G. et al. (2018), "Beyond Birthweight: The Origins of Human Capital", *IZA – Institute of Labor Economics, Discussion Paper Series*, No. Working Paper W18/30, Institute for Fiscal Studies, <https://www.iza.org/publications/dp/13296/beyond-birthweight-the-origins-of-human-capital> (accessed on 5 February 2020). [39]
- Conti, G. and J. Heckman (2013), "The developmental approach to child and adult health", *Pediatrics*, Vol. 131/SUPPL.2, pp. S133-S141, <http://dx.doi.org/10.1542/peds.2013-0252d>. [2]
- Croteau, A., S. Marcoux and C. Brisson (2007), "Work Activity in Pregnancy, Preventive Measures, and the Risk of Preterm Delivery", *American Journal of Epidemiology*, Vol. 166/8, pp. 951-965, <http://dx.doi.org/10.1093/aje/kwm171>. [69]
- Curcio, G., M. Ferrara and L. De Gennaro (2006), "Sleep loss, learning capacity and academic performance.", *Sleep Medicine Reviews.*, Vol. 10/5, pp. 323-337, <https://doi.org/10.1016/j.smrv.2005.11.001>. [165]
- Curran, D. et al. (2016), "Vaccine Timeliness: A Cost Analysis of the Potential Implications of Delayed Pertussis Vaccination in the US", *The Pediatric Infectious Disease Journal*, Vol. 35/5, pp. 542-547, <http://dx.doi.org/10.1097/INF.0000000000001071>. [141]
- Currie, J. (2020), "Child health as human capital", *Health Economics*, Vol. 29/4, pp. 452-463, <http://dx.doi.org/10.1002/hec.3995>. [3]
- Currie, J. (2017), "The long-term consequences of children's health and circumstance", *Focus*, Vol. 33/1, pp. 11-16, <https://www.irp.wisc.edu/resource/the-long-term-consequences-of-childrens-health-and-circumstance/> (accessed on 18 May 2020). [255]
- Currie, J. (2013), "Pollution and Infant Health", *Child Development Perspectives*, Vol. 7/4, pp. 237-242, <http://dx.doi.org/10.1111/cdep.12047>. [265]
- Currie, J. (2009), "Healthy, Wealthy, and Wise: Socioeconomic Status, Poor Health in Childhood, and Human Capital Development", *Journal of Economic Literature*, Vol. 47/1, pp. 87-122, <http://dx.doi.org/10.1257/jel.47.1.87>. [7]
- Currie, J. (2005), "Health disparities and gaps in school readiness", *The Future of Children*, Vol. 15/1, pp. 117-138, <http://dx.doi.org/10.1353/foc.2005.0002>. [6]
- Currie, J. and P. Reagan (2003), "Distance to hospital and children's use of preventive care: is being closer better, and for whom?", *Economic Inquiry*, Vol. 41/3, pp. 378-391, <https://doi.org/10.1093/ei/cbg015>. [233]
- Currie, J. and N. Reichman (2015), "Policies to Promote Child Health", *The Future of Children. Princeton - Brookings.*, Vol. 25/1, <http://www.futureofchildren.org> (accessed on 25 January 2021). [18]
- da Silva, S. et al. (2017), *Leisure-Time Physical Activity in Pregnancy and Maternal-Child Health: A Systematic Review and Meta-Analysis of Randomized Controlled Trials and Cohort Studies*, Springer International Publishing, <http://dx.doi.org/10.1007/s40279-016-0565-2>. [56]
- Danish Health Data Authority (2018), *Dokumentation af registre: Børnedatabasen.*, <https://www.esundhed.dk/Dokumentation/DocumentationExtended?id=20>. [282]

- Daraganova, G. and N. Joss (eds.) (2019), *Are children and adolescents getting enough sleep?*, [295]
 Australian Institute of Family Studies,
<https://growingupinaustralia.gov.au/sites/default/files/publication-documents/ljac-asr-2018.pdf>.
- Das, J. et al. (2017), "Nutrition in adolescents: physiology, metabolism, and nutritional needs.", [122]
Annals of the New York Academy of Sciences, Vol. 1393/1, pp. 21-33,
<https://doi.org/10.1111/nyas.13330>.
- Davenport, M. et al. (2018), *Impact of prenatal exercise on neonatal and childhood outcomes: A systematic review and meta-analysis*, BMJ Publishing Group,
<http://dx.doi.org/10.1136/bjsports-2018-099836>.
- De Araújo, B. et al. (2012), "Analysis of neonatal morbidity and mortality in late-preterm newborn infants", *Jornal de Pediatria*, Vol. 88/3, pp. 259-266, <http://dx.doi.org/10.2223/JPED.2196>.
- De Jongh, B. et al. (2014), "Effects of pre-pregnancy obesity, race/ethnicity and prematurity", [46]
Maternal and Child Health Journal, Vol. 18/3, pp. 511-517, <http://dx.doi.org/10.1007/s10995-013-1296-8>.
- de Vries, L. and M. Jongmans (2010), "Long-term outcome after neonatal hypoxic-ischaemic encephalopathy.", [88]
Archives of Disease in Childhood-Fetal and Neonatal Edition, Vol. 95/3,
 pp. 220-224, <http://dx.doi.org/10.1136/adc.2008.148205>.
- DeBoer, M., R. Scharf and R. Demmer (2013), "Sugar-sweetened beverages and weight gain in 2-to 5-year-old children.", [132]
Pediatrics, Vol. 132/3, pp. 413-420,
<https://doi.org/10.1542/peds.2013-0570>.
- Degli Esposti, M. et al. (2018), "iCoverT: A rich data source on the incidence of child maltreatment over time in England and Wales.", [303]
PLoS One, Vol. 13/8,
<https://doi.org/10.1371/journal.pone.0201223>.
- Dendukuri, N. et al. (2005), "Comparing the Validity of Different Sources of Information on Emergency Department Visits: A Latent Class Analysis", [305]
Medical Care, Vol. 43/3, pp. 266-275, <http://dx.doi.org/www.jstor.org/stable/3768225>.
- DeVoe, J., C. Tillotson and L. Wallace (2009), "Children's receipt of health care services and family health insurance patterns.", [230]
The Annals of Family Medicine, Vol. 7/5, pp. 406-413,
<https://dx.doi.org/10.1370%2Fafm.1040>.
- Dharmage, S., J. Perret and A. Custovic (2019), *Epidemiology of asthma in children and adults*, [95]
 Frontiers Media S.A., <http://dx.doi.org/10.3389/fped.2019.00246>.
- Dominici, F. et al. (2006), "Fine particulate air pollution and hospital admission for cardiovascular and respiratory diseases", [15]
Jama, Vol. 295/10, pp. 1127-1134,
<http://dx.doi.org/10.1001/jama.295.10.1127>.
- DoPMC (2020), *Potentially avoidable hospitalisations | Child and Youth Wellbeing*, [224]
<https://childyouthwellbeing.govt.nz/measuring-success/indicators/potentially-avoidable-hospitalisations> (accessed on 25 January 2021).
- Drucker, A. et al. (2017), "The burden of atopic dermatitis: summary of a report for the National Eczema Association.", [91]
Journal of Investigative Dermatology, Vol. 37/1, pp. 26-30,
<https://doi.org/10.1016/j.jid.2016.07.012>.

- Dubois, L. and M. Girard (2006), "Determinants of birthweight inequalities: Population-based study", *Pediatrics International*, Vol. 48/5, pp. 470-478, <http://dx.doi.org/10.1111/j.1442-200X.2006.02256.x>. [59]
- Due, P. et al. (2011), "Pathways and mechanisms in adolescence contribute to adult health inequalities.", *Scandinavian Journal of Public Health*, Vol. 39/6, pp. 62-78, <https://doi.org/10.1177/1403494810395989>. [117]
- Dunkel Schetter, C. and M. Lobel (2012), "Pregnancy and birth outcomes: A multilevel analysis of prenatal maternal stress and birth weight. - PsycNET", in Baum, A., T. Revenson and J. Singer (eds.), *Handbook of health psychology*, Psychology Press, <https://psycnet.apa.org/record/2011-28192-019> (accessed on 4 February 2020). [49]
- Dunn, K., L. Hestbaek and J. Cassidy (2013), "Low back pain across the life course.", *Best Practice & Research Clinical Rheumatology*, Vol. 27/5, pp. 591-600, <https://doi.org/10.1016/j.berh.2013.09.007>. [97]
- Euro-Peristat Project (2015), *European Perinatal Health Report. Core indicators of the health and care of pregnant women and babies in Europe in 2015*, <http://www.europeristat.com> (accessed on 19 January 2021). [34]
- Eurostat (2021), *European Health Interview Survey*, <https://ec.europa.eu/eurostat/web/microdata/european-health-interview-survey> (accessed on 19 May 2021). [240]
- Eurostat (2019), *Children's unmet medical and dental needs*, <https://ec.europa.eu/eurostat/fr/web/products-eurostat-news/-/DDN-20190215-1> (accessed on 25 January 2021). [249]
- Evans, J., P. Morjaria and C. Powell (2018), "Vision screening for correctable visual acuity deficits in school-age children and adolescents.", *Cochrane Database of Systematic Reviews*, Vol. 2/2, <http://dx.doi.org/10.1002/14651858.CD005023.pub>. [113]
- Field, T. et al. (2006), "Prenatal paternal depression", *Infant Behavior and Development*, Vol. 29/4, pp. 579-583, <http://dx.doi.org/10.1016/j.infbeh.2006.07.010>. [53]
- Fletcher, J., J. Green and M. Neidell (2010), "Long term effects of childhood asthma on adult health", *Journal of Health Economics*, Vol. 29/3, pp. 377-387, <http://dx.doi.org/10.1016/j.jhealeco.2010.03.007>. [94]
- Fullman, N. et al. (2018), "Measuring performance on the Healthcare Access and Quality Index for 195 countries and territories and selected subnational locations: a systematic analysis from the Global Burden of Disease Study 2016", *The Lancet*, Vol. 391/10136, pp. 2236-2271, [https://doi.org/10.1016/S0140-6736\(18\)30994-2](https://doi.org/10.1016/S0140-6736(18)30994-2). [307]
- Geland, G. and G. Harrison (2013), *Health disparities: promoting Indigenous Peoples' health through traditional food systems and self-determination*, FAO, <http://www.fao.org/3/i3144e/i3144e.pdf> (accessed on 11 May 2021). [257]
- Gibbs, K., J. Collaco and S. McGrath-Morrow (2016), "Impact of tobacco smoke and nicotine exposure on lung development", *Chest*, Vol. 49/2, pp. 552-561, <https://dx.doi.org/10.1378%2Fchest.15-1858>. [35]

- Gilbert, R. et al. (2009), *Burden and consequences of child maltreatment in high-income countries*, Elsevier, [http://dx.doi.org/10.1016/S0140-6736\(08\)61706-7](http://dx.doi.org/10.1016/S0140-6736(08)61706-7). [217]
- Gilraine, M. (2020), "Air Filters, Pollution and Student Achievement", *EdWorkingPaper*, Vol. 20/188, <https://doi.org/10.26300/7mcr-8a10>. [181]
- Gmeinder, M., D. Morgan and M. Mueller (2017), "How much do OECD countries spend on prevention?", *OECD Health Working Papers*, Vol. 101, <https://doi.org/10.1787/f19e803c-en>. [271]
- Goetzinger, K. et al. (2012), "The relationship between maternal body mass index and tobacco use on small-for-gestational-age infants", *American Journal of Perinatology*, Vol. 29/3, pp. 153-158, <http://dx.doi.org/10.1055/s-0031-1284224>. [64]
- Gonzalez, S., V. Alvarez and E. Nelson (2019), *Do Gross and Fine Motor Skills Differentially Contribute to Language Outcomes? A Systematic Review*, Frontiers Media S.A., <http://dx.doi.org/10.3389/fpsyg.2019.02670>. [78]
- Goodman, D. et al. (2011), "The distance to community medical care and the likelihood of hospitalization: is closer always better?", *American Journal of Public Health*, Vol. 87/7, pp. 1144-1150, <https://doi.org/10.2105/AJPH.87.7.1144>. [234]
- Government of Canada (2021), *Ending long-term drinking water advisories*, <https://www.sac-isc.gc.ca/eng/1506514143353/1533317130660> (accessed on 11 May 2021). [258]
- Greco, V., H. Lambert and M. Park (2016), "Capturing the Child's Perspective: A Review of Self-Report Measures used with Children", *Occupational Therapy in Mental Health*, Vol. 32/3, pp. 228-244, <http://dx.doi.org/10.1080/0164212X.2016.1164104>. [115]
- Greiner, T. (2014), "Exclusive breastfeeding: measurement and indicators.", *International Breastfeeding Journal*, Vol. 9/18, <https://doi.org/10.1186/1746-4358-9-18>. [288]
- Griffin, S. et al. (2016), "Vital signs: dental sealant use and untreated tooth decay among US school-aged children.", *Morbidity and Mortality Weekly Report*, Vol. 65/41, pp. 1141-1145, <http://dx.doi.org/10.15585/mmwr.mm6541e1>. [102]
- Grigg, C. and S. Tracy (2013), "New Zealand's unique maternity system.", *Women and Birth*, Vol. 26/1, pp. e59-e64, <https://doi.org/10.1016/j.wombi.2012.09.006>. [278]
- Grimwood, K. and A. Chang (2015), "Long-term effects of pneumonia in young children.", *Pneumonia*, Vol. 6/1, pp. 101-114, <https://doi.org/10.15172/pneu.2015.6/671>. [90]
- Grote, N. et al. (2010), "A meta-analysis of depression during pregnancy and the risk of preterm birth, low birth weight, and intrauterine growth restriction", *Archives of General Psychiatry*, Vol. 67/10, pp. 1012-1024, <http://dx.doi.org/10.1001/archgenpsychiatry.2010.111>. [50]
- Guio, A., H. Frazer and E. Marlier (2021), *Study on the economic implementing framework of a possible EU Child Guarantee Scheme including its financial foundation*, European Commission, Brussels, <https://iser.elsevierpure.com/en/projects/study-on-the-economic-implementing-framework-of-a-possible-eu-chil>. [269]
- Güngör, N. (2015), "Overweight and obesity in children and adolescents.", *Journal of Clinical Research in Pediatric Endocrinology*, Vol. 6/3, pp. 129-143, <http://dx.doi.org/10.4274/jcrpe.1471>. [84]

- Gushue, C. et al. (2019), "Gaps in health insurance coverage and emergency department use among children with asthma.", *Journal of Asthma*, Vol. 56/10, pp. 1070-1078, <https://doi.org/10.1080/02770903.2018.1523929>. [231]
- Guthold, R. et al. (2020), "Global trends in insufficient physical activity among adolescents: a pooled analysis of 298 population-based surveys with 1· 6 million participants.", *The Lancet Child & Adolescent Health*, Vol. 4/1, pp. 23-35, [https://doi.org/10.1016/S2352-4642\(19\)30323-2](https://doi.org/10.1016/S2352-4642(19)30323-2). [245]
- Haskell, W., S. Blair and J. Hill (2009), "Physical activity: health outcomes and importance for public health policy.", *Preventive Medicine*, Vol. 49/4, pp. 280-282, <https://doi.org/10.1016/j.ypmed.2009.05.002>. [14]
- Haug, L. et al. (2018), "In-utero and childhood chemical exposome in six European mother-child cohorts", *Environment International*, Vol. 121, pp. 751-763, <https://doi.org/10.1016/j.envint.2018.09.056>. [203]
- HEDIC (2016), *Health Expenditures by diseases and conditions 2016 edition*, <http://dx.doi.org/10.2785/434142>. [252]
- Hillis, S. et al. (2016), *Global prevalence of past-year violence against children: A systematic review and minimum estimates*, American Academy of Pediatrics, <http://dx.doi.org/10.1542/peds.2015-4079>. [210]
- Hills, A., A. Okely and L. Baur (2010), *Addressing childhood obesity through increased physical activity*, Nature Publishing Group, <http://dx.doi.org/10.1038/nrendo.2010.133>. [152]
- Hirshkowitz, M. et al. (2015), "National Sleep Foundation's sleep time duration recommendations: methodology and results summary", *Sleep Health*, Vol. 1/1, pp. 40-43, <https://doi.org/10.1016/j.sleh.2014.12.010>. [157]
- Houot, J. et al. (2015), "Residential Proximity to Heavy-Traffic Roads, Benzene Exposure, and Childhood Leukemia - The GEOCAP Study, 2002–2007", *American Journal of Epidemiology*, Vol. 182/8, pp. 685-693, <https://doi.org/10.1093/aje/kwv111>. [197]
- Hughes, S. et al. (2020), "The effect of time since measles vaccination and age at first dose on measles vaccine effectiveness—A systematic review.", *Vaccine*, Vol. 38/3, pp. 460-469, <https://doi.org/10.1016/j.vaccine.2019.10.090>. [142]
- Hunt, P. (2019), *Target Group Discussion Paper on Children with Disabilities - Feasibility Study for a Child Guarantee*, European Commission, Brussels, <https://ec.europa.eu/social/main.jsp?catId=1428&langId=fr&moreDocuments=yes>. [260]
- Hurren, E., A. Stewart and S. Dennison (2017), "New methods to address old challenges: The use of administrative data for longitudinal replication studies of child maltreatment.", *International Journal of Environmental Research and Public Health*, Vol. 14/9, p. 1066, <https://doi.org/10.3390/ijerph14091066>. [302]
- IDS (2019), *Infant Feeding Statistics Scotland - Financial Year 2018/19*, <https://www.isdscotland.org/Health-Topics/Child-Health/Publications/2019-10-29/2019-10-29-Infant-Feeding-Report.pdf>. [290]
- IHME (2018), *Global Health Data Exchange - GDB Results Tool*, <http://ghdx.healthdata.org/gbd-results-tool>. [98]

- ISD (2019), *Body Mass Index of Primary 1 Children in Scotland Technical Report School Year 2018/19*, <https://www.isdscotland.org/Health-Topics/Child-Health/Publications/2019-12-10/2019-12-10-P1-BMI-Statistics-Technical-Report.pdf>. [283]
- ISD (2010), *Child Health Surveillance System - Pre-School: Audit of children with no CHSP-PS record of a health visitor first visit and/or 6-8 week review*, <https://www.isdscotland.org/Health-Topics/Child-Health/Child-Health-Programme/CHSP-PS-audit-results-final1.pdf>. [286]
- Isen, A., M. Rossin-Slater and W. Walker (2017), "Every breath you take—every dollar you'll make: The long-term consequences of the clean air act of 1970", *Journal of Political Economy*, Vol. 125/3, pp. 848-902, <http://dx.doi.org/10.1086/691465>. [185]
- Jackson, M. (2015), "Cumulative Inequality in Child Health and Academic Achievement", *Journal of Health and Social Behavior*, Vol. 56/2, pp. 262-80, <http://dx.doi.org/10.1177/0022146515581857>. [9]
- Jackson, M. (2010), "A Life Course Perspective on Child Health, Cognition and Occupational Skill Qualifications in Adulthood: Evidence from a British Cohort", *Social Forces*, Vol. 89/1, pp. 89-116, <http://dx.doi.org/10.1353/sof.2010.0101>. [8]
- Johnson, S. et al. (2015), "Neurodevelopmental outcomes following late and moderate prematurity: A population-based cohort study", *Archives of Disease in Childhood: Fetal and Neonatal Edition*, Vol. 100/4, pp. F301-F308, <http://dx.doi.org/10.1136/archdischild-2014-307684>. [32]
- Jud, A. (2018), *Current research on child maltreatment epidemiology*, BioMed Central Ltd., <http://dx.doi.org/10.1186/s13034-018-0228-1>. [213]
- Keenan, T., S. Evans and K. Crowley (2016), *An Introduction to Child Development*, Sage, <https://us.sagepub.com/en-us/nam/an-introduction-to-child-development/book241258> (accessed on 17 December 2019). [76]
- Kelishadi, R. et al. (2016), "Are active and passive smoking associated with cardiometabolic risk factors in adolescents? The CASPIAN-III Study", *Paediatrics and international child health*, Vol. 31/3, pp. 181-188, <https://doi.org/10.1179/2046905515Y.0000000039>. [36]
- Kelly, R. et al. (2015), "Development of hypertension in overweight adolescents: a review.", *Adolescent Health, Medicine and Therapeutics*, Vol. 6, pp. 171-187, <http://dx.doi.org/10.2147/AHMT.S55837>. [83]
- Kinney, H. and B. Thach (2009), "Medical progress: The sudden infant death syndrome", *The New England journal of medicine*, Vol. 361/8, pp. 795-805, <http://dx.doi.org/10.1056/NEJMr0803836>. [158]
- Klebanoff, M., P. Shiono and J. Carey (1990), "The effect of physical activity during pregnancy on preterm delivery and birth weight", *American Journal of Obstetrics and Gynecology*, Vol. 163/5 PART 1, pp. 1450-1456, [http://dx.doi.org/10.1016/0002-9378\(90\)90604-6](http://dx.doi.org/10.1016/0002-9378(90)90604-6). [67]
- Knopik, V. et al. (2016), "Maternal Smoking During Pregnancy and Offspring Birth Weight: A Genetically-Informed Approach Comparing Multiple Raters", *Behavior Genetics*, Vol. 46/3, pp. 353-364, <http://dx.doi.org/10.1007/s10519-015-9750-6>. [62]
- Kral, A. and G. O'Donoghue (2010), "Profound deafness in childhood.", *New England Journal of Medicine*, Vol. 363/15, pp. 1438-1450, <http://dx.doi.org/10.1056/NEJMr0911225>. [110]

- Kral, T. et al. (2011), "Effects of eating breakfast compared with skipping breakfast on ratings of appetite and intake at subsequent meals in 8-to 10-y-old children", *The American journal of clinical nutrition*, Vol. 93/2, pp. 284-291, <https://doi.org/10.3945/ajcn.110.000505>. [136]
- Kreisel, K. et al. (2021), "Sexually Transmitted Infections Among US Women and Men: Prevalence and Incidence Estimates, 2018", *Sexually transmitted diseases*, Vol. 48/4, pp. 208-214, <http://dx.doi.org/10.1097/OLQ.0000000000001355>. [166]
- Kumar, S., J. Tadakamadla and N. Johnson (2016), "Effect of toothbrushing frequency on incidence and increment of dental caries: a systematic review and meta-analysis.", *Journal of Dental Research*, Vol. 95/11, pp. 1230-1236, <https://doi.org/10.1177%2F0022034516655315>. [106]
- Landrigan, P. et al. (2018), "The Lancet Commission on pollution and health", *The Lancet*, Vol. 391/10119, pp. 462-512, [https://doi.org/10.1016/S0140-6736\(17\)32345-0](https://doi.org/10.1016/S0140-6736(17)32345-0). [175]
- Landrigan, P. et al. (2019), "Pollution and children's health.", *Science of the Total Environment*, Vol. 650, pp. 2389-2394, <https://doi.org/10.1016/j.scitotenv.2018.09.375>. [174]
- Landrigan, P. and L. Goldman (2011), "Children's vulnerability to toxic chemicals: a challenge and opportunity to strengthen health and environmental policy.", *Health Affairs*, Vol. 30/5, pp. 842-850, <https://doi.org/10.1377/hlthaff.2011.0151>. [201]
- Lange, S. et al. (2018), "National, regional, and global prevalence of smoking during pregnancy in the general population: a systematic review and meta-analysis.", *The Lancet Global Health*, Vol. 6/7, pp. e769-e776, [https://doi.org/10.1016/S2214-109X\(18\)30223-7](https://doi.org/10.1016/S2214-109X(18)30223-7). [242]
- Le Clercq, C. et al. (2018), "Association between portable music player use and hearing loss among children of school age in the Netherlands", *JAMA Otolaryngology - Head and Neck Surgery*, Vol. 144/8, pp. 668-675, <http://dx.doi.org/10.1001/jamaoto.2018.0646>. [195]
- Lederberg, A., B. Schick and P. Spencer (2013), "Language and literacy development of deaf and hard-of-hearing children: Successes and challenges.", *Developmental*, Vol. 49/1, pp. 15-30, <https://psycnet.apa.org/doi/10.1037/a0029558>. [109]
- Lee, B. et al. (2011), "Psychosocial work stress during pregnancy and birthweight", *Paediatric and Perinatal Epidemiology*, Vol. 25/3, pp. 246-254, <http://dx.doi.org/10.1111/j.1365-3016.2010.01177.x>. [48]
- Lemola, S. et al. (2015), "Adolescents' electronic media use at night, sleep disturbance, and depressive symptoms in the smartphone age.", *Journal of Youth and Adolescence*, Vol. 44/2, pp. 405-418, <https://doi.org/10.1007/s10964-014-0176-x>. [296]
- Leonard, H. and E. Hill (2014), "Review: The impact of motor development on typical and atypical social cognition and language: a systematic review", *Child and Adolescent Mental Health*, Vol. 19/3, pp. n/a-n/a, <http://dx.doi.org/10.1111/camh.12055>. [77]
- Li, L. et al. (2016), "Maternal smoking in pregnancy association with childhood adiposity and blood pressure", *Pediatric obesity*, Vol. 11/3, pp. 202-209, <https://dx.doi.org/10.1111%2Fijpo.12046>. [37]
- Liu, C. et al. (2016), "Prenatal parental depression and preterm birth: a national cohort study", *BJOG: An International Journal of Obstetrics & Gynaecology*, Vol. 123/12, pp. 1973-1982, <http://dx.doi.org/10.1111/1471-0528.13891>. [52]

- Liu, C. et al. (2014), "The associations between traffic-related air pollution and noise with blood pressure in children: Results from the GINIplus and LISAPLUS studies", *International Journal of Hygiene and Environmental Health*, Vol. 217/4-5, pp. 499-505, <https://doi.org/10.1016/j.ijheh.2013.09.008>. [192]
- Liu, M. et al. (2020), "Do body mass index and waist-to-height ratio over the preceding decade predict retinal microvasculature in 11–12 year olds and midlife adults?", *International Journal of Obesity*, pp. 1-11, <http://dx.doi.org/10.1038/s41366-020-0584-9>. [74]
- Llodra, J. et al. (2014), "LLL 2: an international global level questionnaire on toothbrushing and use of fluoride toothpaste.", *International Dental Journal*, Vol. 64, pp. 20-26, <http://dx.doi.org/10.1111/idj.12128>. [247]
- Lorenzoni, L., A. Belloni and F. Sassi (2014), *Health-care expenditure and health policy in the USA versus other high-spending OECD countries*, Lancet Publishing Group, [http://dx.doi.org/10.1016/S0140-6736\(14\)60571-7](http://dx.doi.org/10.1016/S0140-6736(14)60571-7). [228]
- Lozano, R. et al. (2018), "Measuring progress from 1990 to 2017 and projecting attainment to 2030 of the health-related Sustainable Development Goals for 195 countries and territories: a systematic analysis for the Global Burden of Disease Study 2017", *The Lancet*, Vol. 392/10159, pp. 2091-2138, [https://doi.org/10.1016/S0140-6736\(18\)32281-5](https://doi.org/10.1016/S0140-6736(18)32281-5). [281]
- Lubczyńska, M. et al. (2020), "Air pollution exposure during pregnancy and childhood and brain morphology in preadolescents", *Environmental Research*, p. 110446, <http://dx.doi.org/10.1016/j.envres.2020.110446>. [180]
- MacMillan, H., E. Jamieson and C. Walsh (2003), "Reported contact with child protection services among those reporting child physical and sexual abuse: Results from a community survey", *Child Abuse & Neglect*, Vol. 27/12, pp. 1397-1408, <https://doi.org/10.1016/j.chiabu.2003.06.003>. [248]
- Magnus, P. et al. (2008), "Parental determinants of birth weight", *Clinical Genetics*, Vol. 26/5, pp. 397-405, <http://dx.doi.org/10.1111/j.1399-0004.1984.tb01079.x>. [60]
- Mahajan, M. (2019), "The IHME in the Shifting Landscape of Global Health Metrics", *Global Policy*, Vol. 10/S1, pp. 110-120, <http://dx.doi.org/10.1111/1758-5899.12605>. [236]
- Maibach, E. and L. Feldman (2010), *The Climate Change Generation? Survey Analysis of the Perceptions and Beliefs of Young Americans*, https://www.researchgate.net/publication/315690375_The_Climate_Change_Generation_Survey_Analysis_of_the_Perceptions_and_Beliefs_of_Young_Americans (accessed on 12 May 2021). [190]
- Malik, V. et al. (2013), "Sugar-sweetened beverages and weight gain in children and adults: a systematic review and meta-analysis.", *The American journal of clinical nutrition*, Vol. 98/4, pp. 1084-1102, <https://doi.org/10.3945/ajcn.113.058362>. [131]
- Mallo, M. and B. Wolfe (2020), *The Influence of Early Life Health Conditions on Life Course Health*, National Bureau of Economic Research, Cambridge, MA, <http://dx.doi.org/10.3386/w27174>. [5]
- Mangin, K., L. Horwood and L. Woodward (2017), "Cognitive Development Trajectories of Very Preterm and Typically Developing Children", *Child Development*, Vol. 88/1, pp. 282-298, <http://dx.doi.org/10.1111/cdev.12585>. [30]

- Martin-Calvo, N., L. Moreno-Galarraga and M. Martinez-Gonzalez (2016), "Association between Body Mass Index, Waist-to-Height Ratio and Adiposity in Children: A Systematic Review and Meta-Analysis", *Nutrients*, Vol. 8/8, p. 512, <http://dx.doi.org/10.3390/nu8080512>. [73]
- Mathers, M., M. Keyes and M. Wright (2010), "A review of the evidence on the effectiveness of children's vision screening.", *Child: care, health and development*, Vol. 36/6, pp. 756-780, <http://dx.doi.org/10.1111/j.1365-2214.2010.01109.x>. [112]
- Mathew, S. et al. (2019), "Mixed viral-bacterial infections and their effects on gut microbiota and clinical illnesses in children", *Scientific Reports*, Vol. 9/1, pp. 1-12, <https://doi.org/10.1038/s41598-018-37162-w>. [202]
- Maynard, M. et al. (2003), "Fruit, vegetables, and antioxidants in childhood and risk of adult cancer: the Boyd Orr cohort.", *Journal of Epidemiology & Community Health*, Vol. 57/3, pp. 218-225, <http://dx.doi.org/10.1136/jech.57.3.218>. [128]
- McConnell, R. et al. (2010), "Childhood incident asthma and traffic-related air pollution at home and school", *Environmental Health Perspectives*, Vol. 118/7, pp. 1021-1026, <https://doi.org/10.1289/ehp.0901232>. [267]
- Merkur, S., F. Sassi and D. McDaid (2013), *Promoting health, preventing disease: is there an economic case?*, https://www.euro.who.int/_data/assets/pdf_file/0004/235966/e96956.pdf?ua=1. [270]
- Michelsen, S. et al. (2007), *Evaluering af de forebyggende børneundersøgelser i almen praksis.*, https://www.sdu.dk/da/sif/rapporter/2007/evaluering_af_de_forebyggende_boerneundersoegelser_i_almen_praksis. [285]
- Ministry of Health (2011), *National Maternity Collection Data Mart Data Dictionar*, <https://www.health.govt.nz/system/files/documents/publications/mat-dict-v1-0.pdf>. [276]
- Mistry, K. et al. (2012), *A New Framework for Childhood Health Promotion: The Role of Policies and Programs in Building Capacity and Foundations of Early Childhood Health*, American Public Health Association, <http://dx.doi.org/10.2105/AJPH.2012.300687>. [22]
- Monzani, A. et al. (2019), "A Systematic Review of the Association of Skipping Breakfast with Weight and Cardiometabolic Risk Factors in Children and Adolescents. What Should We Better Investigate in the Future?", *Nutrients*, Vol. 11/2, p. 387, <https://dx.doi.org/10.3390%2Fnu11020387>. [135]
- Moore, L. et al. (2005), "Intake of fruits, vegetables, and dairy products in early childhood and subsequent blood pressure change.", *Epidemiology*, Vol. 16/1, pp. 4-11, <http://dx.doi.org/10.1097/01.ede.0000147106.32027.3e>. [130]
- Moore, T. (2018), *Constructing a new narrative of our first 1000 days: Synthesising the evidence and framing the messages*, Centre for Community Child Health, <https://www.rch.org.au> (accessed on 15 July 2020). [261]
- Moreira, R., L. Magalhães and C. Alves (2014), *Effect of preterm birth on motor development, behavior, and school performance of school-age children: A systematic review*, Elsevier Editora Ltda, <http://dx.doi.org/10.1016/j.jpeds.2013.05.010>. [31]
- Moreno, M. (2016), "Atopic diseases in children", *JAMA Pediatrics*, Vol. 170/1, pp. 96-96, <http://dx.doi.org/10.1001/jamapediatrics.2015.3886>. [100]

- Mozurkewich, E. et al. (2000), "Working conditions and adverse pregnancy outcome: A meta-analysis", *Obstet Gynecol*, Vol. 95, pp. 623-635, [http://dx.doi.org/10.1016/s0029-7844\(99\)00598-0](http://dx.doi.org/10.1016/s0029-7844(99)00598-0). [68]
- Mulpuri, K., B. Slobogean and S. Tredwell (2011), *The epidemiology of nonaccidental trauma in children*, Springer New York LLC, <http://dx.doi.org/10.1007/s11999-010-1565-4>. [214]
- Myers, S. et al. (2017), *Climate Change and Global Food Systems: Potential Impacts on Food Security and Undernutrition*, Annual Reviews Inc., <http://dx.doi.org/10.1146/annurev-publhealth-031816-044356>. [188]
- Nemeroff, C. (2016), *Paradise Lost: The Neurobiological and Clinical Consequences of Child Abuse and Neglect*, Cell Press, <http://dx.doi.org/10.1016/j.neuron.2016.01.019>. [212]
- Nemet, D. et al. (2005), "Short- and long-term beneficial effects of a combined dietary-behavioral- physical activity intervention for the treatment of childhood obesity", *Pediatrics*, Vol. 115/4, pp. e443-e449, <http://dx.doi.org/10.1542/peds.2004-2172>. [153]
- Ness, A. et al. (2005), "Diet in childhood and adult cardiovascular and all cause mortality: the Boyd Orr cohort.", *Heart*, Vol. 91/7, pp. 894-898, <https://doi.org/10.1136/hrt.2004.043489>. [129]
- NHS (2018), *Reduce the risk of sudden infant death syndrome (SIDS)*, National Health Service, <https://www.nhs.uk/conditions/baby/caring-for-a-newborn/reduce-the-risk-of-sudden-infant-death-syndrome/> (accessed on 11 May 2021). [160]
- Nijagal, M. et al. (2018), "Standardized outcome measures for pregnancy and childbirth, an ICHOM proposal.", *BMC Health Services Research*, Vol. 18/1, pp. 1-12, <https://dx.doi.org/10.1186/s12913-018-3732-3>. [263]
- Noll, J., C. Shenk and K. Putnam (2009), "Childhood sexual abuse and adolescent pregnancy: A meta-analytic update", *Journal of Pediatric Psychology*, Vol. 34/4, pp. 366-378, <http://dx.doi.org/10.1093/jpepsy/jsn098>. [216]
- Nuffield Trust (2020), *Potentially preventable emergency admissions | The Nuffield Trust*, <https://www.nuffieldtrust.org.uk/resource/potentially-preventable-emergency-hospital-admissions> (accessed on 25 January 2021). [251]
- Nyaradi, A. et al. (2014), "Prospective associations between dietary patterns and cognitive performance during adolescence.", *Journal of Child Psychology and Psychiatry*, Vol. 55/9, pp. 1017-1024, <https://doi.org/10.1111/jcpp.12209>. [127]
- OECD (2020), *CO1.9: Child Disability*, OECD Family Database, <http://www.oecd.org/els/family/CO1%209%20Child%20disability%20FINAL.pdf>. [259]
- OECD (2019), *Changing the Odds for Vulnerable Children: Building Opportunities and Resilience*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/a2e8796c-en>. [221]
- OECD (2019), *CO1.3: Low birth weight*, https://www.oecd.org/els/family/CO_1_3_Low_birth_weight.pdf. [26]
- OECD (2019), *Health at a Glance 2019: OECD Indicators*, OECD Publishing, <https://doi.org/10.1787/4dd50c09-en>. [253]
- OECD (2019), *Infant Mortality Rates*, <https://doi.org/10.1787/83dea506-en>. [24]

- OECD (2019), *Mortality and welfare cost from exposure to environmental risks*, [178]
http://stats.oecd.org/Index.aspx?DataSetCode=EXP_MORSC.
- OECD (2016), *Expenditure by disease, age and gender*, [226]
<https://www.oecd.org/els/health-systems/Expenditure-by-disease-age-and-gender-FOCUS-April2016.pdf>.
- OECD (2009), *CO1.5: Breastfeeding rates*, [244]
<http://www.oecd.org/social/family/43136964.pdf>.
- OECD (2009), *Dental Health Among Children*, OECD, [101]
https://doi.org/10.1787/health_glance-2009-12-en.
- OECD (2009), *Doing Better for Children*, OECD Publishing, Paris, [19]
<http://www.oecd.org/els/family/43552898.pdf> (accessed on 8 January 2018).
- OECD/European Union (2020), *Health at a Glance: Europe 2020: State of Health in the EU Cycle*, OECD Publishing, Paris, [16]
<https://dx.doi.org/10.1787/82129230-en>.
- OECD/WHO (2018), *Health at a Glance: Asia/Pacific 2018: Measuring Progress towards Universal Health Coverage*, OECD Publishing, Paris, [38]
https://dx.doi.org/10.1787/health_glance_ap-2018-en.
- Oken, E. (2009), *Maternal and Child Obesity: The Causal Link*, Elsevier, [44]
<http://dx.doi.org/10.1016/j.ogc.2009.03.007>.
- Pagani, L. (2014), “Environmental tobacco smoke exposure and brain development: the case of attention deficit/hyperactivity disorder.”, *Neuroscience & Biobehavioral Reviews*, Vol. 44, pp. 195-205, [223]
<https://doi.org/10.1016/j.neubiorev.2013.03.008>.
- Palloni, A. et al. (2009), “Early childhood health, reproduction of economic inequalities and the persistence of health and mortality differentials”, *Social Science and Medicine*, Vol. 68/9, pp. 1574-1582, [1]
<http://dx.doi.org/10.1016/j.socscimed.2009.02.009>.
- Panico, L., M. Tô and O. Thevenon (2015), “What is the link between mothers’ level of education and low birthweight?”, *Population and Societies*, Vol. 523/1, [65]
<https://www.ined.fr/en/publications/editions/population-and-societies/low-birthweight-link-mothers-level-education/>.
- Paris, V., M. Devaux and L. Wei (2010), “Health Systems Institutional Characteristics: A Survey of 29 OECD Countries”, *OECD Health Working Papers*, No. 50, OECD Publishing, Paris, [20]
<https://dx.doi.org/10.1787/5kmxfq9qbnr-en>.
- Patton, G. et al. (2016), “Our future: a Lancet commission on adolescent health and wellbeing The Lancet Commissions Executive summary”, *The Lancet*, Vol. 387, pp. 2423-2478, [10]
[http://dx.doi.org/10.1016/S0140-6736\(16\)00579-1](http://dx.doi.org/10.1016/S0140-6736(16)00579-1).
- Pearce, N. et al. (2007), “Worldwide trends in the prevalence of asthma symptoms: Phase III of the International Study of Asthma and Allergies in Childhood (ISAAC)”, *Thorax*, Vol. 62/9, pp. 757-765, [86]
<http://dx.doi.org/10.1136/thx.2006.070169>.
- Pearson, R., H. Wachtel and K. Ebi (2000), “Distance-weighted traffic density in proximity to a home is a risk factor for leukemia and other childhood cancers”, *Journal of the Air & Waste Management Association*, Vol. 50/2, pp. 175-180, [196]
<https://doi.org/10.1080/10473289.2000.10463998>.

- Pereira, P. et al. (2017), “Maternal Active Smoking During Pregnancy and Low Birth Weight in the Americas: A Systematic Review and Meta-analysis”, *Nicotine & Tobacco Research*, Vol. 19/5, pp. 497-505, <http://dx.doi.org/10.1093/ntr/ntw228>. [63]
- Peres, M. et al. (2019), “Oral diseases: a global public health challenge.”, *The Lancet*, Vol. 394/10194, pp. 249-260, [https://doi.org/10.1016/S0140-6736\(19\)31146-8](https://doi.org/10.1016/S0140-6736(19)31146-8). [103]
- Pesonen, A. et al. (2016), “Maternal Prenatal Positive Affect, Depressive and Anxiety Symptoms and Birth Outcomes: The PREDO Study”, *PLOS ONE*, Vol. 11/2, p. e0150058, <http://dx.doi.org/10.1371/journal.pone.0150058>. [47]
- Platt, M. (2014), *Outcomes in preterm infants*, Elsevier, <http://dx.doi.org/10.1016/j.puhe.2014.03.010>. [29]
- Poulton, R. et al. (2002), “Association between children’s experience of socioeconomic disadvantage and adult health: A life-course study”, *Lancet*, Vol. 360/9346, pp. 1640-1645, [http://dx.doi.org/10.1016/S0140-6736\(02\)11602-3](http://dx.doi.org/10.1016/S0140-6736(02)11602-3). [11]
- Price, M. et al. (2016), “The natural history of Chlamydia trachomatis infection in women: a multi-parameter evidence synthesis”, *Health Technology Assessment*, Vol. 20/22, <http://dx.crossref.org/10.3310/hta20220>. [168]
- Procter, A. et al. (2020), “Potentially preventable hospitalisations in children: A comparison of definitions”, *Archives of Disease in Childhood*, Vol. 105/4, pp. 375-381, <http://dx.doi.org/10.1136/archdischild-2019-316945>. [225]
- Proudfoot, N. et al. (2019), “Physical activity and trajectories of cardiovascular health indicators during early childhood”, *Pediatrics*, Vol. 144/1, <http://dx.doi.org/10.1542/peds.2018-2242>. [150]
- Puls, H. et al. (2020), “Insurance Coverage for Children Impacts Reporting of Child Maltreatment by Healthcare Professionals”, *The Journal of Pediatrics*, Vol. 2016, pp. 181-188, <https://doi.org/10.1016/j.jpeds.2019.09.073>. [232]
- Ramakrishnan, U. (2004), “Nutrition and low birth weight: from research to practice”, *The American Journal of Clinical Nutrition*, Vol. 79/1, pp. 17-21, <http://dx.doi.org/10.1093/ajcn/79.1.17>. [58]
- Ramsay, S. et al. (2018), “Skipping breakfast is associated with lower diet quality in young US children.”, *European Journal of Clinical Nutrition*, Vol. 72/4, pp. 548-556, <https://doi.org/10.1038/s41430-018-0084-3>. [137]
- Razzaghi, H., M. Oster and J. Reefhuis (2015), “Long-term outcomes in children with congenital heart disease: National Health Interview Survey.”, *The Journal of Pediatrics*, Vol. 166/1, pp. 119-124, <https://doi.org/10.1016/j.jpeds.2014.09.006>. [89]
- Rees, N. and R. Fuller (2020), *The Toxic Truth: Children’s Exposure to Lead Pollution*, UNICEF - Pure Earth, <https://www.unicef.org/sites/default/files/2020-07/The-toxic-truth-children%E2%80%99s-exposure-to-lead-pollution-2020.pdf> (accessed on 11 May 2021). [204]
- Reijneveld, S. (2000), “The cross-cultural validity of self-reported use of health care: a comparison of survey and registration data.”, *Journal of Clinical Epidemiology*, Vol. 54/3, pp. 267-272, [https://doi.org/10.1016/S0895-4356\(99\)00138-9](https://doi.org/10.1016/S0895-4356(99)00138-9). [304]

- Riding, S. et al. (2021), "Looking beyond COVID-19: Strengthening family support services across the OECD", *OECD Social, Employment and Migration Working Papers*, No. 260, OECD Publishing, Paris, <https://dx.doi.org/10.1787/86738ab2-en>. [262]
- Rigby, M., S. Deshpande and M. Blair (2019), "Another blow to credibility in published data sources.", *The Lancet*, Vol. 394/10192, pp. 29-27, [https://doi.org/10.1016/S0140-6736\(19\)31251-6](https://doi.org/10.1016/S0140-6736(19)31251-6). [239]
- Rigby, M., S. Deshpande and M. Blair (2019), "Credibility in published data sources.", *The Lancet*, Vol. 393/10168, pp. 225-226, [https://doi.org/10.1016/S0140-6736\(18\)32844-7](https://doi.org/10.1016/S0140-6736(18)32844-7). [238]
- Rod, N. et al. (2018), "Overnight smartphone use: A new public health challenge? A novel study design based on high-resolution smartphone data.", *PLoS one*, Vol. 13/10, <https://dx.doi.org/10.1371%2Fjournal.pone.0204811>. [298]
- Romer, D. (2010), "Adolescent risk taking, impulsivity, and brain development: Implications for prevention.", *Developmental Psychobiology: The Journal of the International Society for Developmental Psychobiology*, Vol. 52/3, pp. 263-276, <https://dx.doi.org/10.1002%2Fdev.20442>. [144]
- Ruane, K. (2018), *Birth outcomes of women who use substance during pregnancy*, Montgomery County - Maryland, https://www.montgomerycountymd.gov/COUNCIL/Resources/Files/Summer_Fellows/2018/FinalReport-Ruane.pdf. [66]
- Sahl Andersen, J., N. de Fine Olivarius and A. Krasnik (2011), "The Danish National Health Service Register", *Scandinavian Journal of Public Health*, Vol. 39/7, pp. 34-37, <https://doi.org/10.1177%2F1403494810394718>. [306]
- Salas, M. et al. (2015), "Diet influenced tooth erosion prevalence in children and adolescents: Results of a meta-analysis and meta-regression.", *Journal of Dentistry*, Vol. 43/8, pp. 865-875, <https://doi.org/10.1016/j.jdent.2015.05.012>. [133]
- Sankar, M. et al. (2015), "Optimal breastfeeding practices and infant and child mortality: a systematic review and meta-analysis", *Acta Paediatrica*, Vol. 104, pp. 3-13, <https://doi.org/10.1111/apa.13147>. [119]
- Santé Publique France (2020), *Saturnisme infantile*, <https://www.santepubliquefrance.fr/maladies-et-traumatismes/maladies-de-la-mere-et-de-l-enfant/saturnisme-de-l-enfant> (accessed on 4 February 2021). [209]
- Santos, E. et al. (2013), "Predictive value of the Bayley Scales of Infant Development on development of very preterm/very low birth weight children: a meta-analysis", *Early Human Development*, Vol. 89/7, pp. 487-496, <http://dx.doi.org/10.1016/j.earlhumdev.2013.03.008> (accessed on 28 April 2020). [79]
- Scharf, R. and M. DeBoer (2016), "Growth and development in children born very low birthweight", *Archives of Disease in Childhood-Fetal and Neonatal Edition*, Vol. 101/5, pp. F433-F438, <https://dx.doi.org/10.1136%2Farchdischild-2015-309427>. [25]
- Scheffler, C. et al. (2020), "Stunting is not a synonym of malnutrition.", *European Journal of Clinical Nutrition*, Vol. 74/3, pp. 377-386, <https://doi.org/10.1038/s41430-019-0439-4>. [71]

- Schmidhuber, J. et al. (2018), "The Global Nutrient Database: availability of macronutrients and micronutrients in 195 countries from 1980 to 2013.", *The Lancet Planetary Health*, Vol. 2/8, pp. e353-e368, [https://doi.org/10.1016/S2542-5196\(18\)30170-0](https://doi.org/10.1016/S2542-5196(18)30170-0). [293]
- Schnohr, C. et al. (2016), "emantics bias in cross-national comparative analyses: is it good or bad to have "fair" health?", *Health and quality of life outcomes*, Vol. 14/1, pp. 1-4, <https://dx.doi.org/10.1186%2Fs12955-016-0469-8>. [243]
- Sen, B. et al. (2016), "Preventive Dental Care and Long-Term Dental Outcomes among ALL Kids Enrollees.", *Health Services Research*, Vol. 51/6, pp. 2242-2257, <https://doi.org/10.1111/1475-6773.12469>. [108]
- Sheiham, A. (2006), "Dental caries affects body weight, growth and quality of life in pre-school children.", *British Dental Journal*, Vol. 201/10, pp. 625–626, <https://doi.org/10.1038/sj.bdj.4814259>. [105]
- Shiffman, J. and Y. Shawar (2020), *Strengthening accountability of the global health metrics enterprise*, Lancet Publishing Group, [http://dx.doi.org/10.1016/S0140-6736\(20\)30416-5](http://dx.doi.org/10.1016/S0140-6736(20)30416-5). [235]
- Shochat, T., M. Cohen-Zion and O. Tzischinsky (2014), "Functional consequences of inadequate sleep in adolescents: a systematic review.", *Sleep Medicine Reviews*, Vol. 18/1, pp. 75-87, <https://doi.org/10.1016/j.smrv.2013.03.005>. [162]
- Shulman, E. et al. (2016), "The dual systems model: Review, reappraisal, and reaffirmation", *Developmental Cognitive Neuroscience*, Vol. 17, pp. 103-117, <https://doi.org/10.1016/j.dcn.2015.12.010>. [146]
- Silverwood, R. et al. (2019), "Are environmental risk factors for current wheeze in the International Study of Asthma and Allergies in Childhood (ISAAC) phase three due to reverse causation?", *Clinical and Experimental Allergy*, <http://dx.doi.org/10.1111/cea.13325>. [85]
- Simmonds, M. et al. (2016), "Predicting Adult Obesity From Childhood Obesity: A Systematic Review and Meta-Analysis", *Obesity Reviews*, Vol. 17/2, pp. 95-107, <https://doi.org/10.1111/obr.12334>. [82]
- Skogen, J. and S. Øverland (2012), "The fetal origins of adult disease: a narrative review of the epidemiological literature", *JRSM Short Reports*, Vol. 3/8, pp. 1-7, <http://dx.doi.org/10.1258/shorts.2012.012048>. [41]
- Skrzypek, M. et al. (2017), "Impact of road traffic noise on sleep disturbances and attention disorders amongst school children living in Upper Silesian Industrial Zone, Poland", *International Journal of Occupational Medicine and Environmental Health*, Vol. 30/3, pp. 511–520, <https://doi.org/10.13075/ijomeh.1896.00823>. [193]
- Skrzypek, M. et al. (2013), "Effect of residential proximity to traffic on respiratory disorders in school children in upper Silesian Industrial Zone, Poland", *International Journal of Occupational Medicine and Environmental Health*, Vol. 26/1, pp. 83-91, <https://doi.org/10.2478/S13382-013-0078-2>. [200]
- Slater, C. and A. Robinson (2014), *Sexual health in adolescents*, Elsevier, <http://dx.doi.org/10.1016/j.clindermatol.2013.08.002>. [170]
- Sleet, D. (2018), *The global challenge of child injury prevention*, MDPI AG, <http://dx.doi.org/10.3390/ijerph15091921>. [92]

- Smith, K. et al. (2010), "Skipping breakfast: longitudinal associations with cardiometabolic risk factors in the Childhood Determinants of Adult Health Study", *The American Journal of Clinical Nutrition*, Vol. 92/6, pp. 1316–1325, <https://doi.org/10.3945/ajcn.2010.30101>. [134]
- Spencer, N. et al. (2019), "Addressing inequities in child health and development: Towards social justice", *BMJ Paediatrics Open*, Vol. 3/1, <http://dx.doi.org/10.1136/bmjpo-2019-000503>. [256]
- Spittle, A. et al. (2013), "Does the Bayley-III Motor Scale at 2 years predict motor outcome at 4 years in very preterm children?", *Developmental Medicine & Child Neurology*, Vol. 55/5, pp. 448-452, <http://dx.doi.org/10.1111/dmcn.12049>. [80]
- Sport England (2019), *Active Lives Children and Young People Survey*, Sport England, https://www.sportengland.org/know-your-audience/data/active-lives?section=access_the_reports (accessed on 22 May 2020). [294]
- Stanaway, J. et al. (2018), "Global, regional, and national comparative risk assessment of 84 behavioural, environmental and occupational, and metabolic risks or clusters of risks for 195 countries and territories, 1990–2017: a systematic analysis for the Global Burden of Disease Study", *The Lancet*, Vol. 392/10159, pp. 1923-1994, [https://doi.org/10.1016/S0140-6736\(18\)32225-6](https://doi.org/10.1016/S0140-6736(18)32225-6). [300]
- Stansfeld, S. and C. Clark (2015), "Health Effects of Noise Exposure in Children", *Current Environmental Health Reports*, Vol. 2, pp. 171-178, <https://doi.org/10.1007/s40572-015-0044-1>. [191]
- Stats NZ (2017), *IDI Data Dictionary: B4 School Check data*, <http://archive.stats.govt.nz/~media/Statistics/browse-categories/snapshots-of-nz/integrated-data-infrastructure/IDI%20data%20dictionaries/idi-dd-b4-school-check-feb17.pdf>. [284]
- Stevens, G. et al. (2013), "Global, regional, and national trends in haemoglobin concentration and prevalence of total and severe anaemia in children and pregnant and non-pregnant women for 1995–2011: a systematic analysis of population-representative data.", *The Lancet Global Health*, Vol. 1/1, pp. e16-e25, [https://dx.doi.org/10.1016%2FS2214-109X\(13\)70001-9](https://dx.doi.org/10.1016%2FS2214-109X(13)70001-9). [291]
- Swierniak, W. et al. (2020), "Personal music players use and other noise hazards among children 11 to 12 years old", *International Journal of Environmental Research and Public Health*, Vol. 17/18, pp. 1-11, <http://dx.doi.org/10.3390/ijerph17186934>. [194]
- Taub, D., B. Miller and H. Allen (2008), "Effects of elevated CO2 on the protein concentration of food crops: A meta-analysis", *Global Change Biology*, Vol. 14/3, pp. 565-575, <http://dx.doi.org/10.1111/j.1365-2486.2007.01511.x>. [189]
- Thakrar, A. et al. (2018), "Child mortality in the US and 19 OECD comparator nations: a 50-year time-trend analysis.", *Health Affairs*, Vol. 37/1, pp. 140-149, <https://doi.org/10.1377/hlthaff.2017.0767>. [227]
- Thielen, F. et al. (2016), "Long-term economic consequences of child maltreatment: a population-based study", *European Child and Adolescent Psychiatry*, Vol. 25/12, pp. 1297-1305, <http://dx.doi.org/10.1007/s00787-016-0850-5>. [220]
- Thomsen, S. (2015), "Epidemiology and natural history of atopic diseases.", *European Clinical Respiratory Journal*, Vol. 2/1, <https://dx.doi.org/10.3402%2Fecrj.v2.24642>. [99]

- Timmons, B. et al. (2012), "Systematic review of physical activity and health in the early years (aged 0-4 years)", *Applied Physiology, Nutrition and Metabolism*, Vol. 37/4, pp. 773-792, <http://dx.doi.org/10.1139/H2012-070>. [149]
- Trasande, L. et al. (2015), "Estimating burden and disease costs of exposure to endocrine-disrupting chemicals in the European Union", *Journal of Clinical Endocrinology and Metabolism*, Vol. 100/4, pp. 1245-1255, <http://dx.doi.org/10.1210/jc.2014-4324>. [208]
- Troxel, W., G. Hunter and D. Scharf (2015), "Say "GDNT": frequency of adolescent texting at night.", *Sleep Health*, Vol. 1/4, pp. 300-303, <https://doi.org/10.1016/j.sleh.2015.09.006>. [297]
- Ulrich, D. and J. Hauck (2016), "Programming Physical Activity in Young Infants At-Risk for Early Onset of Obesity", *Kinesiology Review*, Vol. 2/4, pp. 221-232, <http://dx.doi.org/10.1123/krj.2.4.221>. [151]
- UN IGME (2019), *Under-Five Mortality Rate: Total*, <https://childmortality.org/>. [273]
- UNICEF (2016), *Washington Group/UNICEF Module on Child Functioning*, <https://data.unicef.org/resources/module-child-functioning/> (accessed on 19 May 2021). [241]
- UNICEF/WHO/World Bank (2020), *UNICEF/WHO/The World Bank Group joint child malnutrition estimates: levels and trends in child malnutrition: Key findings of the 2020 edition.*, <https://data.unicef.org/wp-content/uploads/2020/03/Joint-Malnutrition-Estimates-2020-brochure.pdf>. [279]
- US Department of Health & Human Resources (2015), *2015-2020 Dietary Guidelines | health.gov*, <https://health.gov/our-work/food-nutrition/previous-dietary-guidelines/2015> (accessed on 19 January 2021). [123]
- USDA and USHHS (2018), *What We Eat in America, NHANES 2015-2016, individuals 2 years and over (excluding breast-fed children): Table 1 - Nutrient Intakes from Food and Beverages*, https://www.ars.usda.gov/ARSUserFiles/80400530/pdf/1516/tables_1-56_2015-2016.pdf. [292]
- Varni, J., C. Limbers and T. Burwinkle (2007), "How young can children reliably and validly self-report their health-related quality of life?: An analysis of 8,591 children across age subgroups with the PedsQL™ 4.0 Generic Core Scales", *Health and Quality of Life Outcomes*, Vol. 5/1, <https://doi.org/10.1186/1477-7525-5-1>. [116]
- Victora, C. et al. (2008), *Maternal and child undernutrition: consequences for adult health and human capital*, Lancet Publishing Group, [http://dx.doi.org/10.1016/S0140-6736\(07\)61692-4](http://dx.doi.org/10.1016/S0140-6736(07)61692-4). [72]
- Victora, C. et al. (2016), "Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect.", *The Lancet*, Vol. 387/10017, pp. 475-490, [https://doi.org/10.1016/S0140-6736\(15\)01024-7](https://doi.org/10.1016/S0140-6736(15)01024-7). [118]
- Vogel, J. et al. (2018), *The global epidemiology of preterm birth*, Bailliere Tindall Ltd, <http://dx.doi.org/10.1016/j.bpobgyn.2018.04.003>. [27]
- Voorheis, J. (2017), "Longitudinal Environmental Inequality and Environmental Gentrification: Who Gains From Cleaner Air?", *CARRA Working Papers 2017-04*, Center for Economic Studies, U.S. Census Bureau, <https://ideas.repec.org/p/cen/cpaper/2017-04.html> (accessed on 12 May 2021). [186]

- Vos, T. et al. (2016), *Global and national burden of diseases and injuries among children and adolescents between 1990 and 2013 findings from the global burden of disease 2013 study*, American Medical Association, <http://dx.doi.org/10.1001/jamapediatrics.2015.4276>. [193]
- Wallace, T. et al. (2019), "Fruits, vegetables, and health: A comprehensive narrative, umbrella review of the science and recommendations for enhanced public policy to improve intake.", *Critical Reviews in Food Science and Nutrition*, Vol. 60/13, pp. 2174-2211, <https://doi.org/10.1080/10408398.2019.1632258>. [126]
- Watts, N. et al. (2018), *The 2018 report of the Lancet Countdown on health and climate change: shaping the health of nations for centuries to come*, Lancet Publishing Group, [http://dx.doi.org/10.1016/S0140-6736\(18\)32594-7](http://dx.doi.org/10.1016/S0140-6736(18)32594-7). [187]
- WHO (2020), *Infant and young child feeding*, <https://www.who.int/news-room/fact-sheets/detail/infant-and-young-child-feeding> (accessed on 19 January 2021). [120]
- WHO (2020), *Physical activity*, <https://www.who.int/news-room/fact-sheets/detail/physical-activity> (accessed on 19 January 2021). [147]
- WHO (2020), *Spotlight on adolescent health and well-being. Findings from the 2017/2018 Health Behaviour in School-aged Children (HBSC) survey in Europe and Canada. International report. Volume 2. Key data*, <http://www.euro.who.int/en/publications/abstracts/spotlight-on-adolescent-health-and-well-being.-findings-from-the-20172018-health-behaviour-in-school-aged-children-hbsc-survey-in-europe-and-canada.-international-report.-volume-2.-key-data>. [272]
- WHO (2019), *Don't pollute my future! The impact of the environment on children's health*, World Health Organization, <http://www.who.int/ceh/publications/don-t-pollute-my-future/en/> (accessed on 11 May 2021). [173]
- WHO (2019), *Guidelines on physical activity, sedentary behaviour and sleep for children under 5 years of age*, <https://www.who.int/publications/i/item/guidelines-on-physical-activity-sedentary-behaviour-and-sleep-for-children-under-5-years-of-age>. [156]
- WHO (2019), *Lead poisoning and health*, <https://www.who.int/news-room/fact-sheets/detail/lead-poisoning-and-health> (accessed on 11 May 2021). [205]
- WHO (2019), *UNICEF-WHO low birthweight estimates: levels and trends 2000-2015*, <https://www.unicef.org/reports/UNICEF-WHO-low-birthweight-estimates-2019>. [274]
- WHO (2019), *Violence against children*, <https://www.who.int/news-room/fact-sheets/detail/violence-against-children> (accessed on 6 May 2020). [211]
- WHO (2019), *WHO recommendations for routine immunization - summary tables.*, https://www.who.int/immunization/policy/immunization_tables/en/. [143]
- WHO (2018), *Air pollution and child health: prescribing clean air*, <https://www.who.int/publications/i/item/air-pollution-and-child-health>. [177]
- WHO (2018), *Inheriting a sustainable world: Atlas on children's health and the environment*, <http://www.who.int/ceh/publications/inheriting-a-sustainable-world/en/> (accessed on 11 May 2021). [171]

- WHO (2018), *Preventing disease through healthy environments: a global assessment of the burden of disease from environmental risks*, World Health Organisation, <https://www.who.int/publications/i/item/9789241565196> (accessed on 11 May 2021). [172]
- WHO (2017), *Determinants of health*, <https://www.who.int/news-room/q-a-detail/determinants-of-health> (accessed on 15 January 2021). [17]
- WHO (2017), *Don't pollute my future! The impact of the environment on children's health*, World Health Organisation. [266]
- WHO (2016), *Measuring and monitoring national prevalence of child maltreatment: A practical handbook*, https://ora.ox.ac.uk/objects/uuid:d119ecfc-cd5e-45bc-8cde-13fabdfa982a/download_file?file_format=pdf&safe_filename=Measuring-monitoring-national-prevalence-child-maltreatment-practical-handbook.pdf&type_of_work=Report. [264]
- WHO (2016), *Public health impact of chemicals: knowns and unknowns*, World Health Organisation, <https://www.who.int/publications/i/item/WHO-FWC-PHE-EPE-16.01-eng> (accessed on 11 May 2021). [176]
- WHO (2014), "Children's diet. Global Strategy on Diet, Physical Activity and Health.", WHO. [125]
- WHO (2014), *Global status report on violence prevention 2014*, World Health Organisation, https://www.who.int/violence_injury_prevention/violence/status_report/2014/en/ (accessed on 13 May 2020). [222]
- WHO (2014), *What's at stake Low Birth Weight Policy Brief*, World Health Organisation, https://www.who.int/nutrition/topics/globaltargets_lowbirthweight_policybrief.pdf (accessed on 2 July 2019). [57]
- WHO (2012), *Endocrine disruptors and child health*, World Health Organisation, http://www.who.int/ceh/publications/endocrine_disruptors_child/en/ (accessed on 11 May 2021). [206]
- WHO/World Bank (2017), *Tracking Universal Health Coverage: 2017 Global Monitoring Report*, https://www.who.int/healthinfo/universal_health_coverage/report/2017/en/ (accessed on 19 January 2021). [254]
- Wittenborn, J. et al. (2013), "The economic burden of vision loss and eye disorders among the United States population younger than 40 years.", *Ophthalmology*, Vol. 120/9, pp. 1728-1735, <https://dx.doi.org/10.1016%2Fj.ophtha.2013.01.068>. [111]
- Wöber-Bingöl, Ç. (2013), "Epidemiology of migraine and headache in children and adolescents.", *Current Pain and Headache Reports*, Vol. 17/341, <https://doi.org/10.1007/s11916-013-0341-Z>. [96]
- Worobey, J. (2014), "Physical activity in infancy: Developmental aspects, measurement, and importance", *American Journal of Clinical Nutrition*, Vol. 99/3, p. 729S, <http://dx.doi.org/10.3945/ajcn.113.072397>. [246]
- Yang, Y. et al. (2017), "Early-Life Socioeconomic Status and Adult Physiological Functioning: A Life Course Examination of Biosocial Mechanisms", *Biodemography and Social Biology*, Vol. 63/2, pp. 87-103, <http://dx.doi.org/10.1080/19485565.2017.1279536>. [12]

- Yu, Z. et al. (2013), "Pre-Pregnancy Body Mass Index in Relation to Infant Birth Weight and Offspring Overweight/Obesity: A Systematic Review and Meta-Analysis", *PLoS ONE*, Vol. 8/4, p. e61627, <http://dx.doi.org/10.1371/journal.pone.0061627>. [45]
- Zeng, N. et al. (2017), "Effects of Physical Activity on Motor Skills and Cognitive Development in Early Childhood: A Systematic Review", <http://dx.doi.org/10.1155/2017/2760716>. [148]
- Zielinski, D. (2009), "Child maltreatment and adult socioeconomic well-being", *Child Abuse and Neglect*, Vol. 33/10, pp. 666-678, <http://dx.doi.org/10.1016/j.chiabu.2009.09.001>. [219]
- Zucco, R. et al. (2019), "Preventable pediatric hospitalizations and access to primary health care in Italy", *PLoS ONE*, Vol. 14/10, <http://dx.doi.org/10.1371/journal.pone.0221852>. [250]

Annex 4.A. Details on data availability

The goal of this annex is to provide information on whether child health indicators are already available and which sources could potentially be used to fill current data gaps.

Much of the existing information on children's health is available in national demographic and household surveys. Non-response, recall- and sampling biases as well as small sample sizes can make it difficult to draw inferences to the population. It can also be difficult to synthesize information across countries due to differences in survey design. For some countries data gaps can in part be filled by administrative data sources, but these are rare and necessitate sufficient administrative information data infrastructures.

Promising alternatives are cross-country surveys and other global approaches to measure and estimate health outcomes, such as the Health Behaviour in School-aged Children study (HBSC) or the European Union Statistics on Income and Living Conditions (EU-SILC) (see Annex Box 4.A.1). Some useful items can also be obtained from OECD's Programme for International Student Assessment (PISA), which collects school performance data for adolescents in the OECD, but also includes items on health and behaviour outside of the school context. To date, the health- and well-being items were administered on a voluntary basis to a subset of countries participating in the PISA. As a result, only nine countries have results relating to self-reported health status or body image. Forthcoming PISA rounds will include a new health and well-being module in the core questionnaire, which may become useful to measure health related outcomes among adolescents for a broader set of countries in the future.

It is also possible to make use of work done to synthesise information within and across countries to provide estimates of the prevalence and incidence of diseases and conditions, such as the Global Burden of Disease Study (GBD, see Annex Box 4.A.1). Other sources, such as WHO or UN datasets, track the Sustainable Development Goals (SDGs) or model overweight and obesity across countries, for example in the NCD Risk Factor Collaboration (NCD-RisC).

As with all data collection, there are limitations and caveats with cross country surveys and synthesised datasets. Surveys, such as the HBSC or EU-SILC do not cover all OECD countries and have differential rates of non-responses for some countries on specific items. Estimated data, such as the GBD are often subject to uncertainty and unclear reliability as well as occasional conflicts with other official observational data sources (Boerma, Victora and Abouzahr, 2018^[237]; Rigby, Deshpande and Blair, 2019^[238]; 2019^[239]). A lack of clear information on the underlying methods that create these estimates raises questions on the transparency of the data and some of the estimates may risk oversimplifications of complex realities (Shiffman and Shawar, 2020^[235]; Mahajan, 2019^[236]). These issues may, in the future, require other coordinated efforts of national statistical institutes to replace the reliance on global health metrics or a more transparent data generating process of the IHME itself in order to fully understand the estimates and their resulting uncertainty. Despite the potential caveats, both cross-national surveys and estimated data are of great value in order to measure and compare child health and well-being across the OECD, especially where other data is not available. Careful use of these data can close a substantial amount of current data gaps with readily-available information at a low-cost.

Annex Box 4.A.1. Cross-country data sources (examples)

Global Burden of Disease Study (GBD)

The Global Burden of Disease Study is an international observational epidemiological study of the Institute for Health Metrics and Evaluation (IHME) at the University of Washington. It estimates the burden of diseases, injuries, and risk factors across the world and provides data for all OECD countries available in the GBD results tool (IHME, 2018^[98]). The wide range of estimates is available as cause-specific deaths and disability-adjusted life years across detailed age groups, including children and adolescents (e.g. below 1, 1 to 4, 5 to 9, 10 to 14 and 15 to 19 years), and many also include prevalence and incidence estimates. Estimates typically published every two years, with the latest update containing data for 2017. Due to its wide coverage and detailed age breakdown, the GBD data is particularly useful in order to measure cross-country differences in child health outcomes.

Health Behaviour in School-aged Children (HBSC)

The Health Behaviour in School-aged Children survey collects data on 11-, 13- and 15-year-old boys' and girls' health and well-being, social environments and health behaviours for most European countries and Canada (29 out of the 37 OECD member states). In collaboration with the WHO Regional Office for Europe, data is collected every 4 years with latest data available for 2018 (see results in WHO (2020^[272])). The survey can illuminate cross-country differences over critical periods of adolescent development with increased personal authority. Importantly, it is possible to break down information by gender and family affluence (highest/lowest quintile).

European Union Statistics on Income and Living Conditions (EU-SILC)

The European Union Statistics on Income and Living Conditions is a survey that collects cross-sectional and longitudinal multidimensional microdata on income, poverty, social exclusion and living conditions for most European Economic Area (EEA) countries, the United Kingdom and accession candidates. Data is collected by Eurostat, primarily on the household level and the resulting microdata can be used to build indicators on child health outcomes at different ages, disaggregated into socioeconomic groups. The most recent data is currently available for 2018.

Physical health outcomes

As discussed, in the main chapter, there is generally a good availability of data on children's physical health outcomes. The following section will detail the availability of indicators on these dimensions and account for potential caveats. An overview of the specific data sources can be found in Annex Table 4.A.1.

Birth outcomes and key prenatal determinants

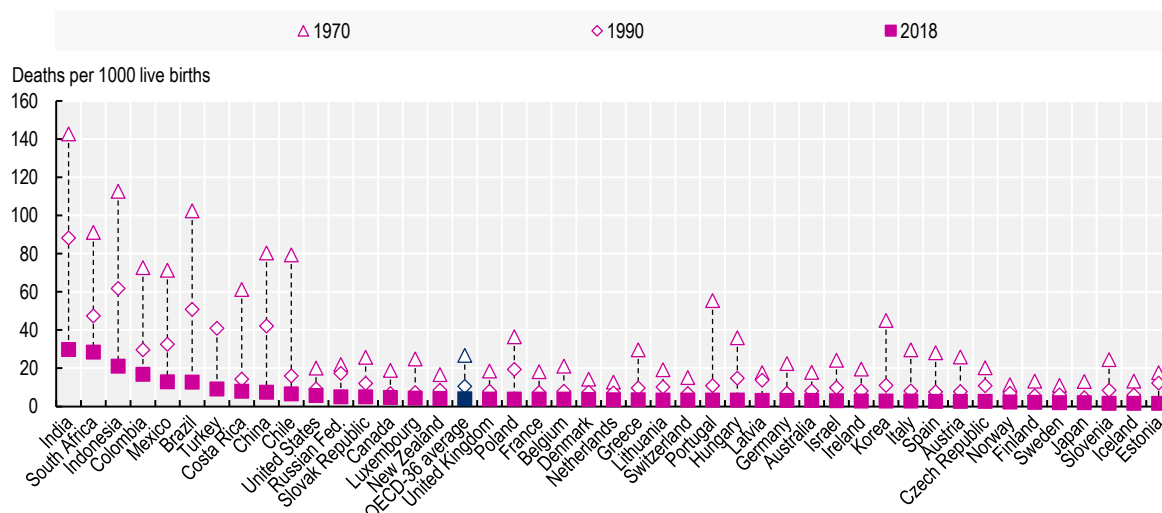
Indicators on infant mortality are available from the OECD Health Statistics. Here infant mortality is based on either neonatal mortality, that is death under 28 days after birth, or infant mortality before age 1. For a few countries there, a slight differences in the recording that dampen the cross-country comparability to a small degree, but these differences are documented. For example, typically all live births are considered in the mortality statistics, but some countries register slightly different births conditional on specific characteristics. Poland, for example, registers only children born with at least 500 grams. Annex Figure 4.A.1 plots these data on infant mortality rates, which have become very low in most OECD countries. Like many of the following sources on children's physical health outcomes, disaggregation for

these data sources is not possible, which prevents the identification of intra-national health inequalities on these specific dimensions.

Alternative data on under age five mortality, but also neonatal and infant mortality, is available through the United Nations Inter-agency Group for Child Mortality Estimation (UN IGME), which is based on comprehensive cross-country estimates that accounts for differences in data collections across countries as well as systematic measurement biases (UN IGME, 2019^[273]).

Annex Figure 4.A.1. Infant mortality rates

Deaths per 1 000 live births, 1970, 1990 and 2018 or latest year available



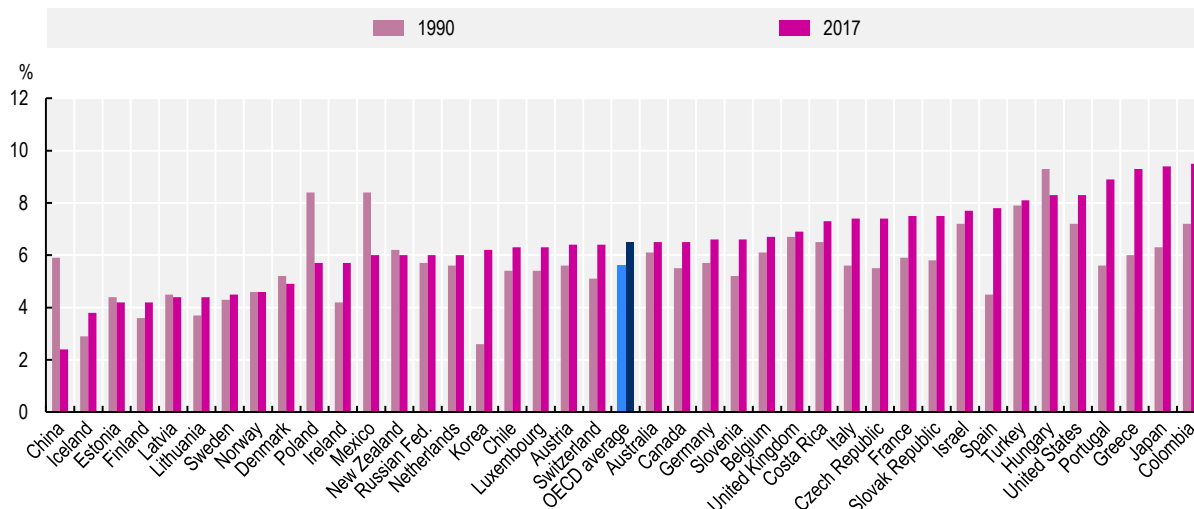
Note: Deaths of children aged less than one year per 1 000 live births (no minimum threshold of gestation period or birthweight). For 1970, data for Mexico refer to 1971, for the Russian Federation to 1980, and for South Africa to 1974. For 1990, data for Korea refer to the mean of 1989 and 1991, and for Turkey to 1996. For 2018, data for Colombia and New Zealand refer to 2016, and for Costa Rica and the United States to 2017. The OECD-36 average excludes Turkey due to missing data.

Source: *OECD Health Statistics*, <http://www.oecd.org/els/health-systems/health-data.htm>, via the *OECD Family Database*, oe.cd/fdb.

Data on low birthweight are well suited for the evidence-informed framework, but would benefit from disaggregation to illuminate health inequalities at the beginning of life. Data on the number of low birthweight births is available from the OECD Health Statistics, as plotted in Annex Figure 4.A.2. The statistics are typically based on national health survey data. While cross-country comparison is possible, differences along demographic and socioeconomic lines are not visible. Alternative sources of data on low birthweight incidence can be found in the UNICEF-WHO Low birthweight estimates (WHO, 2019^[274]). These estimates are in part based on administrative sources, such as vital statistic registers, as well as Multiple Indicator Cluster Surveys (MICS). Similar to the UN IGME mortality estimates, these estimates correct for underlying data insufficiencies.

Annex Figure 4.A.2. Low birth weight

Number of live births weighing less than 2 500 grams as a proportion (%) of total live births, 1990 and 2017



Note: Data for China, Colombia and Costa Rica refer to 2012, for Germany to 2013, for the Russian Federation to 2015, and for Australia, Belgium, Chile, France, Japan, Netherlands and Sweden to 2016. Exact definitions of low birth weight and of live births may differ slightly across countries.

Source: OECD Health Statistics, <http://www.oecd.org/els/health-systems/health-data.htm>, via the OECD Family Database, oe.cd/fdb.

Cross-country comparable data on birth outcomes are typically widely available. For example, the Global Burden of Disease study (GBD, see Annex Box 4.A.1) reports estimates of the incidence of pre-term births across the OECD. On the other hand, the WHO reports both observational and estimated data in the Global Preterm Birth Estimates which are based on Chawanpaiboon et al. (2019^[275]). However, latest data is only available for 2014 and it is not clear whether these estimations will see updates in the future.

In some countries, information on birth outcomes is also available in administrative datasets. For New Zealand birth outcomes, including gestation length (to identify preterm births) and birthweight, are collected in the National Maternity Collection (MAT) by the Ministry of Health (2011^[276]). Similar data is also available in administrative register elsewhere, in particular the Nordics. For example, birth outcomes for all Danish children are available in the Medical Birth Register (MBR) (Bliddal et al., 2018^[277]). However, the spread of these registers is, as of now, not yet very wide, but will likely an important part of future data collections.

Prenatal maternal care consists of assessments and treatments that differ along multiple dimensions, including variations in the time care starts, prescribed and actual care, the type and training of the provider, the location of care, and the availability of specialised services. Some forms of pre-natal intervention may also apply to fathers, including relationship advice, birth and parenting classes, and public health information. Due to this wide definition on antenatal care as well as differences in national policy and health care contexts, comparable data on actual visits received by pregnant women and visit content remains very limited, however.

Annex Table 4.A.1. Data on physical health outcomes and key pre-natal determinants

Birth Outcomes	Country coverage	Age coverage	Data source	Data type	Regular update	Dis-aggregation
Birth Outcomes						
Infant mortality	OECD	< 28 days, < 1 year	OECD - Health Statistics	Collection of national sources	Yes	No
	OECD	< 5 years	UN IGME	Estimates	Yes	No
Low birthweight	OECD	-	UNICEF-WHO Low birthweight estimates	Estimates	Yes	No
	OECD	-	OECD - Health Statistics	Collection of national surveys	Yes	No
Preterm birth	OECD	-	IHME - Global Burden of Disease	Estimates	Yes	No
	OECD	-	WHO - Global Preterm Birth Estimates	Estimates and observed data	Not sure	No
General (all above outcomes)	Single countries, e.g. Denmark	-	Medical Birth Register (MBR)	Administrative	Yes	Yes
Physical development						
Anthropometrics (stunting, wasting, overweight, underweight)	OECD	< 5 years	IHME - Global Burden of Disease	Estimates	Yes	No
	Single countries, e.g. Denmark	5 weeks, 5 months, 1, 2, 3, 4 and 5 years	Children's Database (BDB)	Administrative (preventive child examinations)	Yes	Yes
BMI (overweight, obesity, underweight)	OECD	5-9 and 10-19 years	NCD Risk Factor Collaboration	Estimates	Not sure	No
Physical health status						
Illnesses and injuries	OECD	Birth, 0-6, 7-27 and 28-364 days, 1-4, 5-9, 10-14 and 15-19 years	IHME - Global Burden of Disease	Estimates	Yes	No
Oral health and sensory impairments (caries, periodontitis, refractive disorders, vision loss, hearing loss)	OECD	Birth, 0-6, 7-27 and 28-364 days, 1-4, 5-9, 10-14 and 15-19 years	IHME - Global Burden of Disease	Estimates	Yes	No
Self-reported health status	EU + Canada	11-, 13-, and 15 year	HBSC	Survey	Yes	Yes
	OECD (sparse)	15 year olds	PISA	Survey	Yes	Yes
Prenatal determinants						
Antenatal care	Single countries, e.g. New Zealand	-	National Maternity Collection (MAT)	Administrative	Yes	Yes
Maternal smoking	Single countries, e.g. Denmark	-	Medical Birth Register (MBR)	Administrative	Yes	Yes
	OECD	-	Lange et al. (2018)	Systematic literature review	No	No

Note: "Disaggregation" means that the publicly available data allows for disaggregation by at least basic socio-economic and demographic groups, such as by sex, age, family status, and family income.

WHO currently recommends a minimum of four antenatal visits, and antenatal care coverage is being monitored to ensure that access to prenatal care is integrated into national reproductive health-care services strategies and programmes by 2030 (Sustainable Development Goal 3.7). The indicator developed by the WHO measures the share of pregnant women who received the four recommended visits, or lack thereof, who had at least one visit during pregnancy. This information is available for many middle and low income countries but no comparable information is available for most OECD countries. The World Bank offers an indicator on whether pregnant women receive any prenatal care, but this is not available for most OECD countries.

This information is available from administrative datasets for some OECD countries. For New Zealand, the total number of antenatal publicly funded maternity and new-born services, which are available to all mothers, is collected in the National Maternity Collection (MAT). The number of antenatal care visits for Danish mothers is available in the Medical Birth Register (MBR), along with other information on the new-born's anthropometrics and mothers risk behaviours during pregnancy, such as smoking. However, the use of administrative data to monitor the recommended antenatal visits often depends on the underlying funding structure of the health care system as these records are typically only available for publicly funded services. If a country has a substantial private health-care market, data solely from public services may not provide an accurate estimate. In New Zealand, even if a women chooses a private obstetrician (which makes up about 6% of all pregnancies), services are still publicly funded and thus covered in the MAT (Grigg and Tracy, 2013^[278]).

Data on maternal prenatal smoking can be obtained from national sources, such as the Danish MBR or the Smoking Status at Time of Delivery (SATOD) data collection in the United Kingdom. Additionally, there have been academic reviews that collected national prevalence rates in scientific surveys in order to estimate the fraction of children born by mothers who smoked during pregnancy, such as Lange et al. (2018^[242]).

Physical development

Indicators of infant and early childhood anthropometric development, such as stunting (low height relative to age), wasting (low weight relative to height) as well as under- (low weight relative to age) and overweight (high weight relative to height) can theoretically be constructed along different stages of the early life, but are most commonly reported as the prevalence among children below the age of 5. These indicators are manifested in the Sustainable Development Goals (SDGs) with targets for the prevalence of stunting, wasting and overweight (Sustainable Development Goal 2.2). Information on these indicators is available in the Joint Child Malnutrition Estimates that are compiled using a range of nationally representative household surveys (UNICEF/WHO/World Bank, 2020^[279]). While most indicators sufficiently capture malnutrition, wasting prevalence can be volatile over a given year. As the survey data feeding into the Joint Child Malnutrition Estimates is usually collected at certain point in time and does not allow to collect wasting incidence, the indicator is not fully reliable (Chotard et al., 2010^[280]). Related to other indicators on early child development, much of this information is also only available for low- and middle-income countries, without wide coverage of the OECD member states. Alternatively, comparable information might be sourced from the health-related SDGs indicators of the GBD that estimates worldwide attainment of the SDGs using over 90 000 different sources (Lozano et al., 2018^[281]).

An alternative source for data on infant and child height and weight development may be found in preventive health examinations records. In Denmark for example, obligatory preventive health examinations provide information on height, weight and head circumference at different stages after birth. Information on height and weight in different ages of school children can be compiled in the Children's Database (BDB) which is recommended for national monitoring of children's health development by the Danish Health Data Authority (2018^[282]) and can be linked to other background data for each child, allowing for a breakdown of the indicator by socioeconomic status. Comparable information is for example available

in the Child Health Systems Programme Pre-School data for Scotland (ISD, 2019^[283]) or in the B4 School Check data for New Zealand (Stats NZ, 2017^[284]), though the latter is collected from a single examination before school start. Even though participation rates for preventive health examinations are routinely close to or above 90%, it cannot be ruled out that the group of non-participants, for which no administrative data anthropometric development exists, may be a selected subsample with a higher representation of children already at risk of being vulnerable (Michelsen et al., 2007^[285]; ISD, 2010^[286]; Stats NZ, 2017^[284]).

Information on physical development in middle childhood and adolescence can be obtained from the NCD Risk Factor Collaboration (NCD-RisC) which reports estimated over-/underweight and obesity prevalence among children and adolescents aged 5-9 and 10-19 years old, broken down by gender. This data is collected through a variety of national population-based surveys covering data on height and weight as well as waist and hip circumference. Similar to the GBD data, this source provides information for countries worldwide, including OECD members. The current data is based on estimates from Abarca-Gómez et al. (2017^[287]) for 2016. Alternatively, data from the Health Behaviour in School-aged Children (HBSC, see Annex Box 4.A.1) survey may be used. This data covers information on over-/underweight and the body image for children and adolescents aged 11, 13 and 15 in Canada and Europe. However, for a number of countries there is a significant fraction of non-response along most of these questions and data is not available for non-European OECD members, except Canada. Alternatively, the Programme for International Student Assessment (PISA) data contains information on the BMI of 15-year old adolescents, yet in the most recent 2018 round this information is available for less than 13 percent of students. This is because the relevant well-being questionnaire, which contained height and weight items, was not administered to adolescents in all countries.

Child health status

Using estimates of the GBD study (see Annex Box 4.A.1), the main chapter identifies the most important childhood morbidities, by ranking them according to death rates, which give a direct indication in terms of lives lost due to specific conditions, as well as disability-adjusted life years (DALYs), as a measure of healthy years of life lost due to illness, disability or early death. Both measures are important concepts to examine national indicators of child health. DALYs in particular include information on long-term implications of child morbidities – for example, while Asthma is itself rarely a lethal condition, it significantly impairs the quality of life for many children. Using the same data from the GBD study used to identify common child morbidities, it is then possible to build indicators for each OECD member across different age groups as the source contains not just death rates and DALYs, but also prevalence and incidence estimates by country, sex and age. Additionally, the GBD data also includes estimates for the incidence and prevalence of a number of oral diseases and sensory impairments across age groups in OECD countries, including caries and periodontitis, refractive disorders, and vision and hearing loss, which can be used to assess the oral and sensory health status of children.

Data on self-assessed health for adolescents is available in the HBSC survey. Here 11-, 13- and 15 year old children report how often they had experienced headaches, stomach aches and backaches over the last six months. The survey also includes a self-rated health status that may be used to compare countries in the EU and Canada. Similar questions are also asked to 15 year old children in the PISA questionnaire, yet for many countries there are no responses in the most recent 2018 round due to the reason already raised above.

Child health behaviours and other health activities

As evident in the main chapter, data on nutrition, behaviours and processes can mainly be sourced from cross-country surveys, such as the HBSC and EU-SILC. Much of this does not cover younger children and countries other than in Europe and Canada, though it provides a good set of readily available indicators

that can be disaggregated according to family affluence. A collection of the different potential data sources can be found in Annex Table 4.A.2.

Nutrition and eating habits

The WHO recommends that new-born children are exclusively breastfed within the first hour after birth and throughout the first 6 months of life, while receiving a mix of breastfeeding and complementary foods for the following 18 months. To measure the share of children being breast-fed, the WHO defined a set of indicators: early initiation of breastfeeding (within first hour of birth), exclusive breastfeeding under 6 months, continued breastfeeding at 1 year, and continued breastfeeding at 2 years. While some of these indicators are designed in a way to reduce recall bias, they may suffer from often misinterpreted exaggeration of the shares (Greiner, 2014^[288]).

Most of the information regarding breast-feeding is only readily available for low- and middle-income countries, primarily collected through the Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS). In order to overcome this data gap, Victora et al. (2016^[118]) additionally compile data from various national surveys in high-income countries. However, most of these countries are not able to report information that is in line with the WHO indicators and thus it might be necessary to use more general information (such as indicators on children ever breastfed), which are available in the OECD Family Database. Unfortunately, the data only covers breastfeeding rates in 2005 and as such appears outdated. The use of such data is complicated by the fact that these surveys are often subject to some degree of non-response bias, a lack of recent information and long recall periods that may diminish the accuracy of indicators. However, for some countries it may be possible to use information that is recorded in administrative dataset. In Scotland for example, information on the incidence of breastfeeding for new-born children is available in the Child Health Systems Programme Pre-School data which is collected with high coverage at hospital discharge and during preventive health examinations (Ajetunmobi et al., 2014^[289]; IDS, 2019^[290]). Similar data is available in the previously mentioned Danish Children's, Database (BDB), which also collects administrative information on breastfeeding and exposure to smoking at home during preventive examinations.

The WHO operates a detailed set of biochemical indicators for assessing the prevalence of various vitamin and mineral deficiencies in the Micronutrients Database of the Vitamin and Mineral Nutrition Information System (VMNIS). When combined with health-, nutrition- and household surveys, this data for instance allows to use recorded haemoglobin concentrations to estimate the prevalence of anaemia caused by iron-deficiency in pre-school aged children (see e.g. Stevens et al. (2013^[291])). Unfortunately, the data which is collected from a wide array of published research and reports is often not up to date, in particular for OECD countries. Children's dietary intake of specific micro- and macronutrients may further be available from some national food surveys, such as in the United States (USDA and USHHS, 2018^[292]).

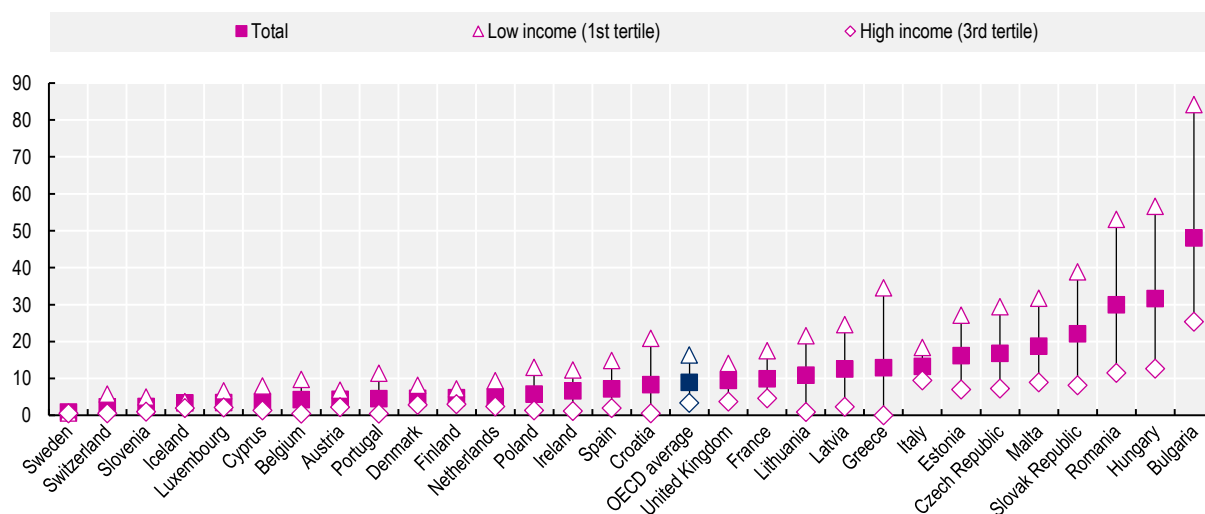
The overall availability of micro- and macronutrients on country level can be obtained from the Global Nutrient Database by the Institute for Health Metrics and Evaluation (IHME) and the Food and Agriculture Organization of the United Nations (UN FAO), which compiles information from the scientific literature, estimates of food availability, sales data as well as nutrition- and household surveys in order to estimate global dietary risks (Schmidhuber et al., 2018^[293]). Again, the latest available data is from 2013 and it is not certain whether there will be any subsequent updates to the database in the near future.

An alternative for more up-to-date information on general childhood nutrition may be found in either EU-SILC or HBSC data (see Annex Box 4.A.1). The latter survey provides respective information on children who consume neither fruits or vegetables, as well as data on sweet-, carbonated drink- and school-day breakfast consumption for children aged 11, 13 and 15 in European countries and Canada. Information on nutritional behaviour along these lines, especially fruit and vegetable as well as breakfast consumption, is valuable due to its well-documented relation to healthy child development even though it does not provide more detailed information on specific nutrients and deficiencies. The information on sweet and carbonate

drink consumption can be used to measure the share of adolescents with high levels of risky dietary patterns. As mentioned above, the HBSC data can be disaggregated by the children's gender and the household affluence. In contrast to many other data sources on child health, the latter can unveil important socioeconomic differences in healthy childhood nutrition, often found to be pronounced throughout childhood.

Annex Figure 4.A.3. Children deprived of basic nutrition

Percent of children (1-15) that live in households where at least one child aged 1-15 does not have either fruits and vegetables at least once a day or one meal with meat, chicken or fish (or vegetarian equivalent) at least once a day, by household income tertiles, 2014



Note: Children are limited to those aged 1-15. "Fruits and vegetables" includes both fresh fruits and vegetables and frozen fruits and vegetables. Canned fruits and vegetables are not included.

Source: OECD Child Well-Being Data Portal based on EU-SILC 2014, <https://www.oecd.org/els/family/child-well-being/data/>.

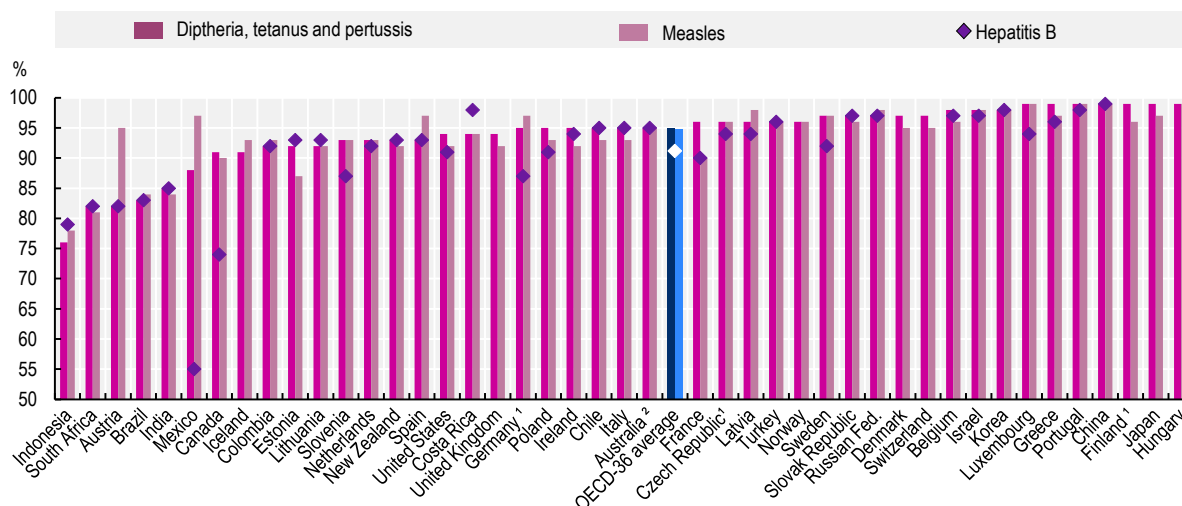
Data on the consumption of fruit and vegetables, also available for younger children, can be found in the EU-SILC micro-data. Here, the information covers children aged 1 to 15 that live in households where at least one child aged 1-15 does not have either fresh fruits and vegetables at least once a day as well as those that did not have one meal with meat, chicken or fish (or vegetarian equivalent), see e.g. a combined indicator in Annex Figure 4.A.3 using EU-SILC data. While both datasets do not provide practical information on micro- or macronutrient deficiency per se, they allow to assess basic nutritional deprivation along major food groups which have shown to be important for child development.

Risky and protective behaviours

Indicators on childhood vaccination are routinely reported as vaccination rates that reflect the share of children receiving a specific vaccination or a combination of those (e.g. combined DTP-vaccine against diphtheria, tetanus, and pertussis) at the recommended vaccination age. Information on global vaccination rates is available through the WHO/UNICEF estimates of national immunization coverage. Using the same estimates, Annex Figure 4.A.4 reports vaccination rates for diphtheria, tetanus and pertussis (DTP), measles and hepatitis B at 1 year of age across OECD countries. The figure shows that vaccination rates are high, even though many still fall short of WHO recommended immunization levels (OECD, 2019^[253]). These indicators may be further extended to cover additional vaccination rates that are available through the WHO/UNICEF estimates, such as for rubella-, rotavirus-, pneumococcus- and polio vaccines.

Annex Figure 4.A.4. Vaccination rates

Percent of children aged 1 vaccinated for diphtheria, tetanus, and pertussis (DTP), measles, and hepatitis B, 2018 or nearest year



Note: 1. DTP data estimated. 2. Measles data estimated.

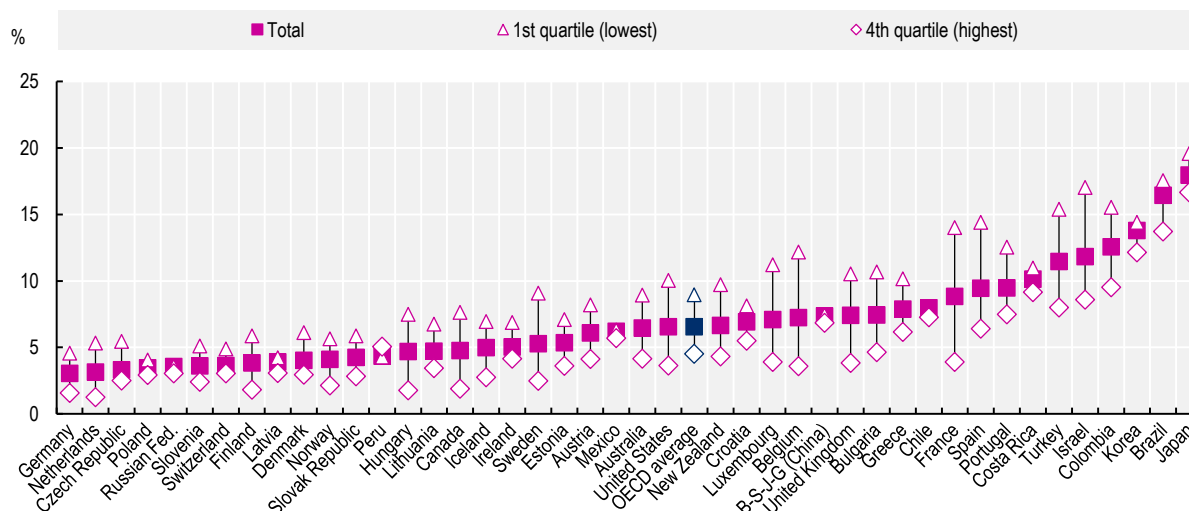
Source: OECD Health Statistics, <http://www.oecd.org/els/health-systems/health-data.htm>.

Cross-country information on physical activity for adolescents can be found in the scientific literature that pools survey estimates (e.g. in Guthold et al. (2020^[245])) or through regular cross-national surveys that study adolescents behaviour in and outside of school. For instance, the HBSC survey provides information for physical activity of 11-, 13- and 15 year old boys and girls. The information includes data on the share of respondents reporting at least 60 minutes of moderate-to-vigorous activity per day as well as the share of respondents that engaged 4 or more times in vigorous physical activity per week. Similarly, Programme for International Student Assessment (PISA) data contains information on how often 15-year old children engaged in neither moderate nor vigorous physical activity over the last 7 days outside of school, which can be disaggregated by an index of socioeconomic status (see Annex Figure 4.A.5). Unfortunately, the latest PISA round lacks information on this item for many countries and thus it may not be possible to use this source for further measurement. However, items on physical activity will be included in the 2021 round and may thus become useful.

In contrast to adolescent's information on physical activity, measures for younger children are not as readily available as international indicators. Nevertheless, some countries, such as the United Kingdom, run surveys that quantify physical activity for children aged 5 and over on a regular basis (Sport England, 2019^[294]). However, population-level indicators on physical activity for children under 5 years of age seem to be unavailable at this point. The only information available comes from child cohort surveys using various of methods to collect data on children who are not old enough to answer a survey as well as to rate child activity: parental reports are used in some surveys, while others organise in-home observations or use accelerometers (Worobey, 2014^[246]). These are expensive methodologies that are unlikely to be extended beyond small sample surveys or child cohort surveys which involve nation-representative samples but are not conducted on a regular basis.

Annex Figure 4.A.5. Adolescents doing no exercise

Percent of 15-year-old students who reported that they do not practice any vigorous or moderate physical activity outside of school, by index of economic, social and cultural status (ESCS), 2015



Note: The PISA index of economic, social and cultural status (ESCS) is a composite measure used to estimate a student's socio-economic background. The index is derived from several variables related to students' family background: parents' education, parents' occupations, a number of home possessions that can be taken as proxies for material wealth, and the number of books and other educational resources available in the home. The index itself is a composite score derived from these indicators via Principal Component Analysis (PCA). Here, however, students are divided into quartiles according to their position in the distribution of ESCS scores in their country or economy. B-S-J-G (China) refers to the four PISA-participating China provinces: Beijing, Shanghai, Jiangsu and Guangdong.

Source: OECD Child Well-Being Data Portal based on OECD PISA 2015. <https://www.oecd.org/els/family/child-well-being/data/>.

Even though the HBSC survey has information on self-reported sleep difficulties for adolescents aged either 11, 13 or 15, globally comparable data on children's sleep patterns are rare. Nevertheless, some information is available in nationally representative surveys, such as the Longitudinal Study of Australian Children (LSAC). The data is based on two cohorts, children aged 0-1 years as well as those aged 4-5 in 2003 and the data is collected among primary carers and the children themselves (those aged 10 and older) every two years and includes survey items on bed- and wake-time (Evans-Whipp and Gasser, 2019^[295]). Since most of the studies sample reached adulthood by now, it can unfortunately not be used anymore to track children's sleep patterns in Australia. A further complication of similar surveys that collect data on bed- and wake-time is that these concepts do not necessarily indicate actual sleep-duration, especially among adolescents who appear to frequently use smartphones and social media past bed-time and/or in the middle of the night (Lemola et al., 2015^[296]; Troxel, Hunter and Scharf, 2015^[297]). The increasing availability of detailed smartphone usage data, such as touchscreen activity, may have future potential to measure sleep patterns among adolescents, even though current data collection requires particularly controlled settings (Rod et al., 2018^[298]; Borger, Huber and Ghosh, 2019^[299]).

Data on risky sexual activity is available in the HBSC survey on adolescents in Europe and Canada. The survey includes questions on sexual activity, though they are only available for 15 year olds, either as having had sexual intercourse or having used a condom or contraceptive pill at last intercourse (or used neither). As in other cases where HBSC data may be used, some countries may not have sufficient sample sizes to allow detailed breakdowns and countries outside the EU and Canada are not included.

Annex Table 4.A.2. Child health behaviours and other health activities

	Country coverage	Age coverage	Data source	Data type	Regular update	Dis-aggregation
Nutrition and eating behaviours						
Breastfeeding	Single countries, e.g. Denmark	5 weeks, 5 months, 1, 2, 3, 4 and 5 years	Children's Database (BDB)	Administrative (preventive child examinations)	Yes	Yes
Micro- and macronutrients (consumptions, deficiency, availability)	Single countries, e.g. United States	2-5, 6-11, 12-19 years old	National Health and Nutrition Examination Survey (NHANES)	Survey	Yes	No
	OECD	Not sure	WHO - Vitamin and Mineral Nutrition Information System (VMNIS)	Systematic literature review	Uncertain	No
	OECD	No breakdown	IHME & UN FAO - Global Nutrient Database	Estimates	Uncertain	No
Consumption (fruit, vegetable, breakfast, sweets, carbonated drinks)	EU + Canada	11-, 13-, and 15 year olds	HBSC	Survey	Yes	Yes
	EU	All ages	EU-SILC	Survey	Yes	Yes
Risky and protective behaviours						
Vaccination	OECD	1 year old	OECD - Health Statistics	Collection of national sources	Yes	No
Physical activity	EU + Canada	11-, 13-, and 15 year olds	HBSC	Survey	Yes	Yes
	OECD (sparse)	15 year olds	OECD - PISA	Survey	Yes	Yes
	Single countries, e.g. United Kingdom	5-16 year olds	Active Lives Children and Young People Survey	Survey	Yes	No
Sleep patterns	EU + Canada	11-, 13-, and 15 year olds	HBSC	Survey	Yes	Yes
	Single countries, e.g. Australia	6-17 years	Longitudinal Study of Australian Children (LSAC).	Survey	No	No
Tooth brushing	EU + Canada	11-, 13-, and 15 year olds	HBSC	Survey	Yes	Yes
	8 OECD countries	Varying ages for each country	Llodra et al. (2014)	Survey	No	Yes
Unprotected sexual activity	EU + Canada	15 year olds	HBSC	Survey	Yes	Yes

Note: "Disaggregation" means that the publicly available data allows for disaggregation by at least basic socio-economic and demographic groups, such as by sex, age, family status, and family income.

Environments and public policies

Data on children's environment and the policy context is considerably sparse, and as such, require future development. As evident in the main chapter, new measurement items in cross-country surveys or improved individual-level data collections could however improve the measure in the future. In terms of what is nevertheless available at the moments, Annex Table 4.A.3 present an overview of potential data sources.

Exposure to pollutions or contaminants

Information on exposure to particulate matter pollution is available in from the GBD comparative risk assessment (CRA) which estimates pollution-related risks by combining land use and satellite data with chemical transport models and ground measurements of pollutants. While less important in the OECD context, data on residential or household pollution is also readily available and estimated using a wide range of surveys on the usage of solid fuels for cooking (Stanaway et al., 2018^[300]). Both data are reported as deaths and DALYs associated with particulate matter pollution and can be broken down into detailed age groups, yet no details on the specific exposure level are available.

Aggregate indicators relating to the share of population exposed to critical levels of different pollutants (above a critical threshold for a certain period) are for example available for European countries through the European Environment Agency (EEA). However, this data cannot be broken down by age and only considers urban agglomeration. It is thus not immediately suitable to measure the level of particulate matter pollution children are exposed to. An alternative avenue to build indicators on children exposed to particulate matter pollution may be data as a by-product of pollution measurement by public and private initiatives operating air quality sensors across cities and along major roads. Although common sources are mostly available for few urban spaces, some commercial providers have modelled detailed national pollution levels of, among others, particulate matter on postcode level (e.g. in the UK). The information is typically gathered from a chemical transport models employing range of sources, combining sensor-, weather-, traffic- and external air quality data. In order to estimate the share of children exposed to critical levels of pollution, the availability of geographical information, i.e. address data for each children or the number of children living in each postcode area, is necessary.

In terms of data sources, the GBD CRA also estimates death risks and DALYs related to unsafe water sources and lead exposure, broken down into detailed age groups. In terms of food safety, the WHO reports annual indicators based on International Health Regulation (IHR) monitoring to detect and respond to foodborne disease and food contamination. While this is not disaggregated into specific foods, such as early infancy dietary products, it nevertheless may give a good presentation of national food safety levels. Another approach is the barometer containing 30 safety indicators for the food chain in Belgium, as in Baert et al. (2011^[301]), yet applying this methodology to other countries and deciding on the specific indicators might be hard.

Information on children exposure to noise can be obtained for EU countries from the EU-SILC survey (see Annex Box 4.A.1), which collects the share of children under the age of 15 exposed to some or severe noise from neighbours or the street. Both noise and particulate matter pollution are often originating in road traffic. Thus, it may be beneficial to build indicators on the share of children exposed to heavy traffic. This can for example be done using road network and traffic volume data which is often available at local authorities, typically based on road surveys and sensor data. Finland, for example, offers real-time information on traffic volume for its entire road network on a fine grained basis in the Digiroad and Digiroad data. This can, in theory, be combined with detailed address data for children.

Household environment

Data on passive exposure to tobacco smoke is for example available in the EU-SILC data (see Annex Box 4.A.1). The source measures daily exposure to tobacco smoke indoors by sex, age and educational attainment level in EU member states, the United Kingdom and accession candidates. However, individual exposure levels are only available for children 15 year old or older. Thus exposure for younger children would need to be identified from data on the number and age of younger children in each household.

Annex Table 4.A.3. Data on environments and public policies

	Country coverage	Age coverage	Data source	Data type	Regular update	Dis-aggregation
Exposure to pollutants or contaminants						
Fine particulate matter pollution (death risks, DALYs)	OECD	Birth, 0-6, 7-27 and 28-364 days, 1-4, 5-9, 10-14 and 15-19 years	IHME - Comparative Risk Assessment (CRA)	Estimates	Yes	No
Fine particulate matter pollution (exposure)	EU	All ages	European Environment Agency (EEA)	Measurements and estimates	Yes	No
	Single countries, e.g. UK	All ages	Commercial providers	Measurements and estimates	Yes	No
Water and lead pollution (death risks, DALYs)	OECD	Birth, 0-6, 7-27 and 28-364 days, 1-4, 5-9, 10-14 and 15-19 years	IHME - Comparative Risk Assessment (CRA)	Estimates	Yes	No
Food safety	OECD	All ages	WHO - IHR Monitoring	Country Survey	Yes	No
Household noise exposure	EU	All ages	EU-SILC	Survey	Yes	Yes
Traffic volume	Single countries, e.g. Finland	All ages	Digiroad and Digitraffic	Measurements	Yes	No
Family and home environment						
Passive smoke exposure	EU	All ages	EU-SILC	Survey	Yes	Yes
	Single countries, e.g. Denmark	5 weeks, 5 months, 1, 2, 3, 4 and 5 years	Children's Database (BDB)	Administrative (preventive child examinations)	Yes	Yes
Child maltreatment	OECD	1-14 years old	UN - Global SDG Indicator Database	Surveys	Yes	No
	Single countries, e.g. United Kingdom	0-18 years old	Incidence of child maltreatment over Time (iCoverT)	Administrative data	No	No
Health-care policies						
Potentially avoidable hospitalisation	Single countries	0-17 years		Administrative data	Yes	..
Health expenditure	European OECD	< 5 years, all ages	HEDIC	Observational data	Yes	No
	Subset of OECD	0-4, 5-9, 10-14 and 15-19 years	OECD Health Expenditure and Financing Database	Observational data	No	No
Geographical access	Single countries, e.g. Denmark	All ages	Person and business registers	Administrative data	Yes	Yes
Health care quality	OECD	All ages	IHME - HAQ	Estimates	Yes	No

Note: "Disaggregation" means that the publicly available data allows for disaggregation by at least basic socio-economic and demographic groups, such as by sex, age, family status, and family income.

Data collection on child maltreatment, is complicated and needs to be subject to strong ethical guidelines in order to minimize further risk to children. Information on child maltreatment in the family and home environment is often obtained from survey data or reports to child protection services (e.g. through primary care contacts or the school). For example, in order to track global attainment of SDG 16.2.1, the Global SDG Indicator Database of the United Nations reports the proportion of children aged 1-14 years who

experienced physical punishment and/or psychological aggression by caregivers. The data is mainly obtained from Multiple Indicator Cluster Surveys (MICS) or other household surveys and defines physical punishment as actions intended to cause physical pain or discomfort without injuries as well as psychological aggression as shouting, yelling or screaming at a child.

Survey sources may severely under-report actual instances of child maltreatment and violence against children (MacMillan, Jamieson and Walsh, 2003^[248]). With comparable problems, national child protection registers, such as those operated to administer and register cases of children referred to and assessed by social services, can be used. The use of administrative data reduces the need for children to disclose traumatic events of maltreatment and may thus severely lower the burden of recalling traumatic events (Hurren, Stewart and Dennison, 2017^[302]). However, administrative data can always only cover the “tip of the iceberg” of children exposed to maltreatment. In terms of measurement, Degli, Esposti et al. (2018^[303]) build a rich data compilation (iCoverT) covering the incidence of reported child maltreatment over time with administrative datasets and registering cases referred to and assessed by social services for England and Wales. The referrals only cover a fraction of the actual number of child maltreatment incidences and while survey data also severely underreports these cases, there is no sufficient added value to be expected immediately even though these sources may reduce the burden on the children themselves.

Health care spending, quality and access

Data on health care spending, in particular among the population of children below the age of 5, is readily available in the *Global Health Expenditure Database* (GHED) of the WHO and for further age groups in the OECD Health Expenditure and financing database. This database collects accounts on health care expenditures using national reports as well as other sources, such as the OECD Health Expenditure and Financing Dataset. Cross-country information on health care utilization is typically only available for the general population, e.g. in the OECD Health Statistics. However, for some countries it may be possible to use administrative health care records to assess the status of health care service utilization for children. The advantage of this method over self- (or parent-reported) household survey information is a usually stronger reliability of the data due to avoidance of self-report bias (Reijneveld, 2000^[304]; Dendukuri et al., 2005^[305]). Administrative data on doctor consultations exists for example in the Danish National Health Service Register (SSR) which collects data on all services provided within the public health care and can be broken down by age (Sahl Andersen, de Fine Olivarius and Krasnik, 2011^[306]).

Data on coverage for child and maternal health care is often obtained from household surveys and globally comparable data is, for example, compiled by the Countdown to 2030 initiative, though it includes only low- and middle-income countries. Equivalent information for countries in the OECD may be individually obtained from national household surveys or approximated by the health care coverage for the general populations (as in OECD (2019^[253])). In some cases, data on geographical accessibility of children’s health-care services may be obtainable from administrative data sources in some countries. For many countries, administrative records contain the children’s precise (de-identified) address or an area/geographical unit, such as zip-/postal-/municipality- codes or census tracts, regularly collected from administrative registers in order to build census sampling frames or as a base for social statistics. Combining this information with central business registers (CBR), which contain the locations of businesses and public enterprises, it is then sometimes possible to build indicators on the access to medical care by determining approximate distances between the child’s home and specific medical facilities. However, while basic population data exists for many countries, including addresses, it is not always useable without problems and requires sufficient knowledge of recording processes.

Some cross-country measurement of health care quality is available in the OECD Health Care Quality and Outcomes (HCQO) programme. The most recent framework collects a total of 61 indicators on primary care, prescribing, acute care, mental health care, cancer care, patient safety, and patient experiences. The data are typically age-standardized and not available for children below the age of 15, but it may be

possible to build some of these indicators for children alone. However, the HCQO programme might be too comprehensive to be used in an evidence-informed framework due to its large volume of data and indicators.

An alternative way to measure healthcare access as well as quality of the care provided may be the use of estimated summary indices, such as the Healthcare Access and Quality (HAQ) Index of the GBD study (Fullman et al., 2018^[307]). This index approximates personal health-care access and quality by estimating excess death rates which should not occur under effective health care systems. In particular, using mortality, incidence and risk estimates from the GBD study, it uses risk-standardised death rates for most causes that are amendable to health-care as well as mortality-to-incidence ratios for cancers. As a result, these estimated indices make it possible to compare the effectiveness of national health care systems across countries. While the index is available for all OECD countries, it is estimated for overall systems, without particular focus on child health outcomes. Using similar methods and the open source GBD estimates it should nevertheless be possible to tailor similar indices for the quality of health care at young ages, potentially broken down into different childhood stages.

5. Do children feel safe and secure, respected, included and happy?

This chapter analyses the key determinants of children's social and emotional well-being and highlights the data required to develop better policies for meeting children's social and emotional needs. It considers key social and emotional outcomes, such as emotional security, sense of safety, social and cultural identity, mental health, and life satisfaction. It examines how children's activities, behaviours and relationships shape well-being as well as the effects of children's family situation and school and neighbourhood environments. It also summarises key areas of public policy for promoting children's social and emotional well-being. The chapter considers the cross-national data available on child social and emotional well-being and discusses the way forward, highlighting key data gaps and setting out priorities for data development.

5.1. Introduction and main findings

The purpose of this chapter is to analyse the key determinants of children's social and emotional well-being and identify the main data gaps and priorities for data collection. The chapter reviews the available evidence on children's social and emotional well-being and discusses different approaches to measurement to better capture social and emotional well-being across different stages of childhood.

The quality of children's early caregiving relationships is fundamental to healthy social-emotional development. From the very first months of life, children learn to recognise and manage their emotions, with the support of parents and other caregivers. Throughout the course of childhood, children develop the ability to form positive relationships with peers and adults and to cope with adversities or set-backs they might encounter, thanks to the resources available in the family, at school, in friendships networks or in the community environment. Missing out on opportunities to develop strong social-emotional skills serves children a disadvantage as young adults in terms of various well-being outcomes.

Social and emotional skills have persistent and cumulative effects on various child and later life outcomes. For example, good social skills can help children adapt better to the school environment and consequently perform better in school. This, in turn, is related to better occupational status, health, and life satisfaction in adulthood. Likewise, being curious and having an active approach towards learning is an important prerequisite for developing and improving innate cognitive capacities (Kautz et al., 2014^[1]; OECD, 2021^[2]). Social and emotional skills are also fundamentally dependent on cognitive skills such as perception, memory, and reasoning (Schoon et al., 2015^[3]). Cognitive, and social and emotional skills are dynamically interconnected in such a way that a person's higher skills in one area may be able to better influence the development of skills in other areas. There is also evidence that socio-emotional and cognitive skills in early childhood have independent effect on later outcomes, and that knowing more about children's socio-emotional well-being is therefore key to designing policies with lifelong impact (Schoon, Nasim and Cook, 2021^[4]).

All stages of childhood shape children's social-emotional development, in their own important way. Early childhood is a crucial period of development as children learn to self-regulate and have their first informative experiences with their physical and relational environments. The things that children learn and experience in the first years of life lay the foundations for later social-emotional and cognitive development, and continue to have their own effect on various dimensions of adult-well-being. For example, early self-regulation skills benefit language development, as well as the development of reading and numerical literacy (Schoon et al., 2015^[3]; Shuey and Kankaras, 2018^[5]). Conversely, experiencing adverse circumstances in early childhood can have an effect on the development of later difficulties. For instance, exposure to domestic violence in the early years is associated with an increased likelihood of academic problems, experiencing anxiety, and developing aggressive behaviours (Kitzmann, 2012^[6]; Berger, 2019^[7]).

During middle childhood and adolescence, children develop social relationships and friendships, and spend an increasing amount of time away from the family and caregivers, making the quality of resources found in school, the community and the neighbourhood very critical. How successfully children navigate school life and manage interpersonal relationships are predicative of aspects of adult well-being. For instance, the reporting of self-isolation and lack of school or social connectedness in middle- to late-childhood is associated with higher prevalence of mental health difficulties and anxiety symptoms, as well as lower global life satisfaction and adult well-being (Ann and Vincent Bowles, 2013^[8]; Shochet et al., 2006^[9]; Olsson et al., 2013^[10]). On the other hand, social competence (i.e. the successful use of social behaviours to achieve goals) in middle- to late-childhood was found to have a persistent effect on adult employment and social outcomes. For instance, Masten et al. (2010^[11]) found that social competence in middle-childhood and early adolescence, as captured by peer acceptance, the formation of friendships, and the maintenance of those relationships, was associated with better work competence (i.e. a record of holding down a job successfully and carrying out responsibilities well) at around age 20.

The changing nature of work and the labour market is another key reason to pay close attention to nurturing the development of children's social-emotional skills (OECD, 2019^[12]). Younger generations are expected to have longer working lives than their predecessors, changing jobs more often and retiring much later. Moreover, the job tasks attached to most occupations is being altered by technological advances and associated changes in work organisation, which brings about a rising demand for high-level cognitive and complex social-interaction skills (OECD, 2019^[12]). Low-skilled adults working in jobs that are very intensive in simple and repetitive tasks are likely to be most exposed to these changes. Therefore, to navigate the working world well as adults, children will be required to have the capabilities to keep their skills up-to-date and in line with the needs of the job market, and to transition between job sectors (OECD, 2019^[13]). Social-emotional skills such as curiosity, openness, and persistence will become all the more important, as well as the ability to adapt to new workplaces and challenges. Education systems and parents need to prepare children to become life-long learners and to develop the capacity to adapt to the many changes that may lie ahead (Lippman, 2015^[14]; John and De Fruyt, 2015^[15]).

The following main findings stem from the literature review carried out in the rest of the chapter:

- Self-regulation, defined as the ability to control or modulate the intensity of one's emotional state and behaviours to an adaptive end, starts to develop in the first few years of life and is critical for children's learning and development of relationship skills.
- Interpersonal relationships are crucial to building the emotional security needed by children to develop fully and thrive. In the first few years of life, the bonding relationships with parents and caregivers are critical. As children get older, the quality of relationships with peers and other adults gain importance.
- Children's conscientiousness, which refers to their commitment in regards to performing well in the activities they undertake, is fundamental for succeeding at school and performing well later in the workplace.
- Children's propensity to cooperate, empathise and take others' perspectives into account is key to developing social capital and dealing constructively with collective issues. These kind of pro-social behaviours develop early, with many different forms observable in everyday contexts from the early years of life – through, for example, helping, sharing, comforting and cooperating with others.
- The home, school, community and neighbourhood environments provide important resources to help foster children social and emotional well-being. At home, parental active involvement in childcare and joint activities with children promote child-parent attachment. The adoption of a parenting style that combines warmth and responsiveness, while also establishing expected rules of conduct and clear limits, is conducive to children's perception of being protected and safe, listened to, and well supported. The school climate and interactions with teachers and school-mates are also key for children's feelings of self-confidence and social connectedness. The neighbourhood is also important, particularly with regards to ensuring that children can move around freely and safely without coming into harm's way, and by providing opportunities for leisure, cultural activities, sports and other group-based activities.
- Conversely, children's social and emotional well-being can be compromised by risk factors present in these different environments. For example, the presence of conflict between family members or domestic violence deeply affect the emotional and affective well-being of children. School can be a place where bullying occurs, or where children struggle to fit in. Deprived neighbourhoods where poverty and crime are more common expose children to higher risks and reduce their sense of safety. The absence of recreational facilities and green spaces leave children without adequate places to play safely and hang around with friends.

The literature review provides a basis for identifying a set of priorities to improve data collection of children's social and emotional well-being:

- At the international level, data collection should aim to measure children’s social and emotional well-being through outcomes that are relevant to the different stages of childhood and that have also been shown to have a proven link to present or future well-being. At present, internationally comparable information comes from surveys with different focuses and is not based on a common understanding of social-emotional development across childhood. As a consequence, there is a lack of alignment in the social-emotional dimensions explored at different ages.
- When it comes to social and emotional well-being, it is especially important to consider what matters to children. Basically, this involves asking children about issues that are important to them, such as family and school life, and their feeling of safety in the neighbourhood or the availability of green and outdoor leisure spaces. It also entails focusing on children’s perceptions with regards to whether they feel listened to or not, and if they feel supported in their different life domains (Rees, 2017^[16]). However, while there is some information on these areas in respects to middle-childhood in the *Children’s Worlds* data, for example, there is no equivalent international information available on adolescents’ views.
- The evidence available for a few countries shows that new risks to the social and emotional well-being of children are surfacing. For example, while historically common risky behaviours such as smoking are becoming less frequent, there is evidence of adolescents making use of alternative substances for recreational purposes, including prescription pharmaceuticals (e.g. painkillers, tranquillisers, sedatives). The internet and social networks are also creating new risks at the same time as new opportunities for children. The nature of these risks and opportunities are changing rapidly, requiring the strengthening of efforts to not only understand these changes but also to make data on the relevant issues available for a wider range of countries.

Finally, the chapter identifies important gaps in knowledge about the social and emotional well-being of children, including:

- The social and emotional well-being of the most vulnerable children and adolescents, in particular, children with disabilities, children in care institutions, homeless children, or children experiencing maltreatment. These children are generally not well covered by general population surveys and other sources of information on children’s social and emotional well-being.
- The social and emotional well-being of children in early- and middle-childhood. Thanks to HBSC and PISA, the information on adolescents’ social-emotional status is larger than that of younger children. It is imperative that the data gaps for younger children are filled.
- The very limited information available on children’s and adolescents’ personal, social and cultural identities. Identities play an important role in well-being, including by helping foster a sense of purpose and belonging and by shaping the ways children interact with others. More information about children’s identity formation, their participation in group activities, their trust in institutions, and their knowledge of and interest in global and societal issues is valuable for strengthening future social cohesion.
- The links between children’s mental health and socio-emotional well-being and their educational and physical health outcomes. Many studies point to evidence of “developmental cascades”, which refers to the cumulative consequences of interactions across domains of child development (Masten and Cicchetti, 2010^[17]). Social-emotional difficulties or mental health problems can have negative consequences for physical health and academic achievement. Breaking this cycle requires effective interventions and joined-up policies, which, ultimately, rely on joined-up data.

This chapter begins with a deep review of the literature on the key dimensions of children’s social and emotional well-being with reference to the different stages of social-emotional development and their determinants. The chapter moves on to provide an overview of the available cross-national data on children’s social and emotional well-being. The chapter concludes by identifying the priority areas for data development moving forward.

5.2. Key aspects of social and emotional well-being

Children's social and emotional well-being cuts across several research disciplines. In a general sense, social and emotional well-being refers to the ways children behave and think and feel about themselves and others. It includes being able to form adaptive coping strategies and resilience in the face of life's many challenges, and being able to achieve interpersonal goals and positive social outcomes. It also covers the types and strength of children's affective states – for example, feelings of happiness and joy, sadness and insecurity – and broader subjective well-being, as well as children's mental health more generally. Children's social and emotional well-being relies to a large extent on the quality of interpersonal relationships with parents, teachers, peers, and the experiences these afford children. At the same time, it is very much shaped by culture, temperament and individual differences.

Each research discipline tend to favour a means of intervention to enhance social and-emotional well-being. The medical sciences and clinical psychology focus on pathology (i.e. the cause, development and outcomes of a mental disorder) and providing diagnoses of disorders that can be either treated or medically managed. Developmental psychology understands children's development as occurring along an expected trajectory (i.e. milestone competencies) and supported by a responsive and loving caregiving relationship, and influenced through the interactions between the environment and biology. Economic research focusses on the acquisition of human capital during childhood (i.e. the various skills that the child develops through parental and/or state investment) which contributes to adult socio-economic success and self-sufficiency (Conti and Heckman, 2014^[18]). More broadly, economic research has also demonstrated the value of subjective well-being measures such as "life satisfaction" as a means for understanding social and emotional well-being (Kahneman and Deaton, 2010^[19]; Diener et al., 2009^[20]; Proctor, Linley and Maltby, 2009^[21]).

Children are continuously developing social and emotional skills during childhood and into adulthood. As with other areas of child well-being, many aspects or components of social and emotional well-being follow a developmental trajectory (Box 5.1), making age appropriateness a key factor in measurement. Children learn to master different set of social-emotional skills that enable them to gain self-control, and to form and sustain close, stable and nurturing relationships. These sets of skills help children feel safe and secure enough to explore their environment, go into their imaginations, and to learn from experience and from doing (OECD, 2020^[22]; Chernyshenko, Kankaraš and Drasgow, 2018^[23]). Children's social-emotional development also depends on the interaction of a large number of factors. These include individual endowments, the quality of care a child receives, relationships with parents, caregivers, teachers and peers, and the quality of the physical environment, among others.

Box 5.1. Children's social-emotional development in a nutshell

During the first year of life, infants begin to recognise emotions and develop bonding relationships with parents and other caregivers. If infants' physical and emotional needs are well met on a consistent basis, infants learn to develop a basic sense of trust in their caregivers and, by effect in the world (Kuther, 2019^[24]; Belsky et al., 2020^[25]). Through supportive caregiving Infants develop the capacity to regulate their own emotional reactions, learning that arousal in the presence of a caregiver does not lead to feeling overwhelmed (Howe, 2005^[26]). The mental health of parents during the perinatal period is critical for bonding and the quality of caregiving relationships (Schoon, 2015^[27]; McDaid, Hewlett and Park, 2017^[28]).

Early childhood is defined by marked increases in social-emotional development. The family remains to be the primary social tie to children but relationships with other children become important (Belsky et al., 2020^[25]; Zaouche-Gaudron, 2015^[29]). Young children get better at emotional regulation, and are more aware of own feelings and characteristics. They internalise expectations of behaviours for themselves and others, and can feel guilt when they do not uphold the rules or miss objectives. They also become better at perspective-taking, and showing empathy and other pro-social behaviour. These skills represent the basic building blocks for the later development of complex of social and emotional skills that form throughout childhood and whose influence remains detectable on a wide range of later outcomes, including educational and socio-economic attainment, health and life satisfaction (Schoon, 2015^[27]; Shuey and Kankaras, 2018^[5]; Belsky et al., 2020^[25]). Much of this development takes place through play, where young children experiment and learn to cooperate to achieve common goals, thus learning about themselves and the social world (Kuther, 2019^[24]).

During middle childhood, children make important gains in refining the rudimentary social-emotional skills developed during the preschool years. The transition to primary school represent an increasing involvement with peers and adults outside of the family (Carr, 2011^[30]). From ages six to 12 years, children develop multiple strategies for autonomously self-regulating and managing interpersonal relationships in increasingly sophisticated ways. They start learning about how the world operates, and about their different roles and responsibilities (Yücelyiğit, 2020^[31]).

During adolescence interpersonal relationships become more sophisticated (Kuther, 2020^[32]). Particularly during transitions (e.g. starting secondary school and undergoing puberty), adolescents are highly sensitive to peer influences and feel under pressure to conform, from aspects of their personal appearance to engaging in pro-social behaviour, but also in risky behaviours too. Adolescents can develop strong feelings of empathy, solidarity and trust, yet also be defiant and rejecting of certain behaviours or values.

Adolescents' self-concept becomes more complex, differentiated and organised. They become more introspective and start to consider what matters to them more, who they really are, and how they fit into the world. This process involves trying out new things like different clothing styles, music, art or hanging around in new friendship groups. Many adolescents also search for new experiences and to push the boundaries, with a few engaging in risky behaviours, such as substance misuse or non-protected sex. Forming a sexual identity is a key developmental task, which requires adolescents to have an awareness and comfort of personal sexual attitudes, behaviours and interests (Kuther, 2020^[32]).

Adolescents seek more independence regarding how they live and lead their lives and prefer to spend more time with friends and peers and less with family. They often start to develop a stronger individual sense of values and morals, and begin questioning things more. While adolescents are required to learn how to become fully responsible, they still need guidance and support from adults along the way. Becoming more independent sees family routines changing and relationships maturing.

Table 5.1 provides a summary of key aspects of children’s social and emotional well-being, as well as related aspects tied to children’s social and cultural identities. The table is divided into four panels, structured in a similar way to the child well-being measurement framework outlined in Chapter 2:

- Panel A covers key child social and emotional outcomes, as well as related cultural outcomes. These outcomes include children’s basic emotional needs like attachment to caregivers, emotional security and the need to be loved and cared for; children’s basic social needs such as being listened to, respected, fairly treated and socially recognised; children’s sense of identity and belonging (including ethnic and/or cultural identities); and pro-social behaviours. Also included here are a range of socio-emotional skills or competences that children develop during childhood to help them self-regulate, engage with others, and engage in learning processes (e.g. emotional regulation, conscientiousness, open-mindedness; see Box 5.2), key aspects of mental health (including disorders), and children’s life satisfaction, both in general and in key domains, such as with home and family life and with school life.
- Panel B highlights important child-level drivers, influences and determinants of children’s social and emotional outcomes. These include time, activities and relationships with parents and the family as a whole, as well as their participation in social, leisure and civic activities, their friendships and relationships with peers, and their digital activities and behaviours, including internet and social media use. Aspects of children’s brain development are also included here; healthy brain development overlaps with elements of physical well-being, but is also a foundational component of social and emotional well-being.
- Panel C focuses on key environment-level drivers and influences of children’s social and emotional outcomes. This includes in particular aspects of the family and household environment, especially factors relating to the safety, security and stability of the family environment (e.g. living and custody arrangements, parental conflict, and family violence), but also family financial resources and family physical and mental health. Several aspects of children’s community and physical environment are also covered here – including crime rates and access to local resources such as parks and museums – as well as the environments children face at school or in early childhood education and care (ECEC).
- Lastly, Panel D highlights policies that can influence children’s social and emotional outcomes. There are a wide variety of policies relevant here. These include several types of family policy, especially family and parenting support services but also family financial supports and family employment-related policies such parental leave; housing and built-environment policies and regulations, such as public housing supports and “child-friendly city” policies; health policies, including physical and mental health supports available to mothers/parents during pregnancy and in the period after childbirth, as well as child mental health supports; and education policies, including both ECEC policies and regulations and school and wider education policies and regulations.

More detail on the various aspects covered and their empirical basis is given in this and the following sections of this chapter.

Table 5.1. Key aspects of children's social and emotional well-being throughout childhood

		Pregnancy and infancy (0-2 years)	Early childhood (3-5 years)	Middle childhood (6-12 years)	Late childhood (13-17 years)
Panel A. Child social, emotional and cultural outcomes					
Safety, emotional security, and basic emotional needs	Feeling safe, secure, and protected from harm				
	Bonding and attachment	Feeling loved, supported and cared for			
Identity, social and cultural identities, and basic social needs	Age- and stage-appropriate development of identity and a sense of self				
	-	Pro-social behaviours, sense of connection and belonging, feeling respected, sense of being treated fairly (at home, school, in community)			
Social and emotional skills	Age- and stage-appropriate development of skills, including emotion regulation, conscientiousness/task performance, open-mindedness, extraversion, collaboration, and important compound skills (e.g. self-efficacy)				
	-	Development of strong and positive social identities, including ethnic/cultural, gender, and sexual identities			
Mental health status and disorders	Age- and stage-appropriate development of skills, including emotion regulation, conscientiousness/task performance, open-mindedness, extraversion, collaboration, and important compound skills (e.g. self-efficacy)				
	-	-	Internalising disorders (e.g. depression, anxiety), externalising disorders (e.g. conduct disorder, oppositional defiant disorder), eating disorders, self-harm, substance abuse, suicidal behaviours.		
Life satisfaction and satisfaction with home life, with school life, and with community life	General and domain-specific life satisfaction, sense of purpose of life, affective states (e.g. happiness, joy, sadness, anger).				
	-	-			
Panel B. Child activities, behaviours and relationships, and other child-level determinants					
Individual determinants		Healthy brain development, child health status, disability & and neurodevelopmental disorders (incl. ASD, ADHD, communication disorders, learning disorders, motor disorders)			
Family activities and relationships	Activities with parents and family	Direct parental interactions (e.g. verbal interactions, shared reading, play)	Direct parental interactions	Parental expectations and support (e.g. discipline, setting routines, discussing school and friendships)	
	Child parent and family relationships	Strength and quality of relationships with parents and with the family			
Social, leisure and civic activities and relationships	Social and leisure activities	-	Participation in age- and stage-appropriate social activities (e.g. friends round to play, meeting friends outside the home) and regular leisure activities, unpaid and paid work activities		
	Friendships, peer relationships, and social support	-	Strength and quality of friendships and child-peer relationships, access to a trusted adult		
	Civic and voluntary activities	-	-	Participation in civic, voluntary and cultural activities (e.g. clubs, organisations)	
Digital activities and behaviours	Early over-exposure to digital tools (e.g. smartphones, computers, tablets, video games)		Use of digital tools (e.g. smartphones, computers, tablets, video games)		
	-		-	Internet and social media use	
Panel C. Children's settings and environments					
Family and home environment	Family financial resources and work arrangements	Household disposable income			
		Family financial stress			
		-	Child perceptions of family financial stress		
	Family living and custody arrangements	Family stability, custody arrangements			
Family physical and mental health	Parental emotion regulation (e.g. coping strategies, mental health)				
	Barriers to bonding (e.g. parental post-natal depression)	-			

		Pregnancy and infancy (0-2 years)	Early childhood (3-5 years)	Middle childhood (6-12 years)	Late childhood (13-17 years)
	Family relationships	Parental conflict and quality of parents' relationships			
	Family violence and abuse	Safety of the child (e.g. free from risk of abuse and neglect), exposure to family violence			
School and ECEC environment	School and ECEC climate	ECEC climate, including structural quality (e.g. staff-child ratios, staff qualifications) and process quality (e.g. emotional climate, instructional quality)		School climate (e.g. school safety, disciplinary climate, class size, classroom cooperation and competition)	
Community and physical environment	Crime and violence	Neighbourhood crime rates, risk of violence			
	Local green spaces	Access to green spaces (e.g. parks, gardens and playing fields)			
	Local cultural and learning services/facilities	Access to affordable age- and stage-appropriate cultural and learning services/facilities (e.g. libraries, museums, performing arts)			
	Local play and leisure services/facilities	Access to affordable age- and stage-appropriate play and leisure services/facilities (e.g. play parks, sports facilities and lessons)			
	Community social support services and activities	Community parenting supports (e.g. lessons, counselling, signposting)			
Panel D. Public policies					
Family policies	Family financial support policies	Public financial supports (e.g. cash transfers, tax credits)			
	Family employment support policies	Statutory leave policies, flexible working arrangement policies			
	Family and parenting support service policies	Family and parenting support services (e.g. family counselling, parenting supports)			
Housing policies	Public family housing supports	Public housing supports (e.g. housing allowances, social housing)			
	Housing and built-environment regulations and policies	Child-friendly city policies (e.g. footpaths and bicycle paths, traffic calming)			
Health policies	Preventative physical and mental health services	Pregnancy health checks and maternal mental health supports	-	-	-
	Curative physical and mental health services	Child mental health services and supports			
Education policies	ECEC regulations and policies	Public ECEC support and policies to promote availability and affordability		-	-
		Regulations (e.g. staff-child ratios, staff qualification requirements), staff and group supports and working conditions (e.g. pay, instruction and working hours)		-	-
	Education regulations and policies	-	-	Regulations (e.g. class size, staff qualification requirements), teacher and classroom supports and working conditions (e.g. instruction and working hours)	
		-	-	School-based mental health supports (e.g. counselling, signposting)	

Box 5.2. What are social-emotional skills?

It is not at all surprising that social-emotional skills are the subject of interest across many different disciplines when one considers their link with many types of child outcomes, and contributions to the prosperity of the economy and societies. The domain of social-emotional skills covers individual capacities manifested in consistent patterns of thoughts, feelings and behaviours. These capacities are developed and mastered through relationships and formal and informal learning experiences.

Social-emotional skills are often called non-cognitive skills or soft skills. Over the years, the term “skills” has gained a preference over the term “traits”, in recognition of their malleability as opposed to them being fixed and immutable. They develop gradually throughout childhood and early adulthood and there is the potential to affect improvements through policy interventions.

Social and emotional skills are instrumental in increasing the returns on cognitive skills. Social and emotional skills differ from cognitive skills, in as far as they mainly concern how people manage their emotions and feelings, perceive themselves and engage with others, rather than indicating the raw ability to process information. But, similar to cognitive skills, they are dependent on situational factors and are responsive to change and development through formal and informal learning experiences. Like every aspect of mental functioning, they involve some form of information processing and cognition, such as individual perception, memory and reasoning abilities. In other words, while useful to identify social-emotional and cognitive skills separately, their interaction has an effect on a large range of individual personal and social outcomes. Much research underlines how this interaction can have a large influence on educational and employment outcomes (Cunha and Heckman, 2007^[33]; Heckman, Stixrud and Urzua, 2006^[34]). For example, evidence from the Dunedin study suggests that children who are classified as inhibited at age three (i.e. showing signs of social withdrawal and shyness) are more likely to leave school early and experience unemployment between the ages of 15 and 21 (Caspi, 2000^[35]).

Social and emotional skills have powerful consequences for many important personal and social life outcomes, including physical and mental health (Strickhouser, Zell and Krizan, 2017^[36]), job and life satisfaction (Judge, Heller and Mount, 2002^[37]), adolescent and young adult conduct problems (OECD, 2015^[38]), civic engagement (Omoto, Snyder and Hackett, 2010^[39]), and the involvement in criminality. For a comprehensive overview see: (Kautz et al., 2014^[1]; OECD, 2015^[38]; Chernyshenko, Kankarás and Drasgow, 2018^[23]).

A challenge in measuring social-emotional skills is that surveys use heterogeneous measures to assess social-emotional skills, with little agreement about how different skill sets should be defined and measured, while the terms and concepts are not always consistently applied (Pirus and Léridon, 2010^[40]; Schoon, 2015^[27]).

A well-known framework of social-emotional skills is the Big Five model. This model comprises of five broad categories which encompass of a grouping of mutually-related skills. They are openness to experience, conscientiousness, emotional stability, extraversion and agreeableness. They are grouped together in such way as to ensure a systematic, comprehensive and balanced consideration of individuals’ social and emotional skills. The Big Five dimensions and its facets are clearly present in most cultures and languages, although some cultural-specific constructs do exist. The OECD’s Study on Social and Emotional Skills (SSES) draws on this framework (Annex 5.A).

The processes behind the development of social-emotional skills are interdependent and reinforcing of another. In particular, the literature on child social-emotional development strongly highlights the importance of the quality of the relationships children have with parents, caregivers, teachers and peers for social-emotional development. Interpersonal relationships are the drivers behind helping children

develop strong socio- emotional skills, to gain self-confidence as well as being able to trust others. Critically, the literature shows that the single most common protective factor shared by resilient children is the support of one stable and committed relationship with an adult, be it a parent, caregiver or other adult (Center on the Developing Child at Harvard University, 2016^[41]).

Attachment, emotional security, and the fundamental role of relationships for social-emotional development

Throughout childhood, the relationships children develop with others are a central component of their social and emotional well-being. Overall, parents have a great influence on child development through the parent-child relationship, and this goes well beyond meeting a child's physical needs. The early caregiving relationship between parent and child is thought to help lay the foundations for future healthy relationships, and is considered as a prototype for future relationships (Malekpour, 2007^[42]).

Infants come into the world vulnerable and dependent on others' for care and protection. They born with a set of inbuilt behaviours (i.e. attachment behaviours) to increase their survival. Attachment behaviours have the goal of protection and get activated when infants perceive a threat or danger. Once this goal has been achieved – through reunion or proximity to a caregiver – the attachment behaviour is deactivated. Infants form attachments to their caregiver(s) through repeated caregiving interactions and growing familiarity. Children's attachment patterns are typically classified under two main categories: secure and insecure (ambivalent, avoidant and disorganised). Children develop secure attachments when the caregiving experience is adequately sensitive, loving, responsive and consistent, whereas they form a variant of insecure attachments when caregivers are unwilling or unable to respond to their needs, or if the caregiving experience is inconsistent or a source of distress (Howe, 2005^[26]).

Infants usually have a number of attachment figures, who provide a secure base from which they feel confident to explore their environment and have a safe haven to return to when in need of support or protection. The attachment figures help him or her make sense of and manage their own feelings (i.e. emotional regulation). Most infants form clear-cut attachments to more than one attachment figure from the ages of six to nine months. Attachment figures are hierarchically organised, with the person who is the most regularly involved in the care and the protection of the child the primary attachment figure, which often is the mother (Howe, 2005^[26]). Research highlights the benefits of father's involvement in the early years, with the attachment formed between father and child having a long-lasting influence on child outcomes and life chances (Chung, 2021^[43]).

Children's patterns of attachment form early on and are expected to be stable yet open to revision in light of experiences throughout childhood, adolescence and adulthood (McConnell and Moss, 2011^[44]). Much research underlines the far-reaching effects of children's attachment patterns on the development of emotional, social and cognitive skills (Ranson and Urichuk, 2008^[45]; Widom et al., 2018^[46]; Alhusen, Hayat and Gross, 2013^[47]). The early caregiving experiences lead to children forming internal working models, representing beliefs and expectations they hold about themselves, the social world and relationships. Securely attached children enjoy higher self-esteem and self-confidence, and are able to self-regulate and be resilient. Insecurely attached children have difficulties self-regulating and managing stress, and are more likely to experience relationship difficulties in adulthood and encounter difficulties in rearing their own children (Howe, 2005^[26]). Early attachment security is found to influence measures of emotional health, self-esteem, agency and self-confidence, positive affect, ego resiliency, and social competence in interactions with peers, teachers, romantic partners, and others (Sroufe et al., 2005^[48]). Attachment security is also an important consideration in numerous childhood health and behavioural difficulties and neurodevelopmental disorders (Rees, 2005^[49]).

During infancy, numerous factors can inhibit the ability of caregivers to form a bonding attachment and respond sensitively to infant's needs. These include poor maternal mental and physical health, parents'

difficult adaption to their new roles as mother and father, parents' own attachment history, and the quality of parents' own couple relationship. The bonding process is also influenced by socio-cultural factors, which include gender roles, level of education, and support networks (Karakas and Dağlı, 2019^[50]).

Pregnancy and childbirth are times of critical psychological adjustment for women. Some changes to women's mental states and functioning are to be expected as part of normal adaption to parenthood. However, many women experience high levels of mental distress around pregnancy and childbirth, as reflected in the prevalence (one in eight new mothers) of mental health difficulties such as anxiety and depression in the ante-natal and post-natal period (Woody et al., 2017^[51]; Dennis, Falah-Hassani and Shiri, 2017^[52]). These difficulties have consequences for mothers' well-being and that for their children.. For example, maternal depression or anxiety during pregnancy is associated with internalising and externalising behavioural problems in middle childhood (Leis et al., 2014^[53]), with potential long run effects into adolescence and adulthood. Overall, prenatal depression and anxiety may account for 10-15% of the attributable risk of childhood behavioural problems (Glover, 2014^[54]). Persistent post-natal depression of a severe nature beyond the baby's first six months also increases the risk of behavioural issues. All of these issues underscore the importance of ensuring women have access to adequate social and emotional support during pregnancy and following childbirth. How much support women receive from their partners can make a critical difference; greater partner support during pregnancy is associated with lower maternal emotional distress postpartum and less infant distress to novelty (Tanner Stapleton et al., 2012^[55]). Moreover, parenting interventions starting during the pregnancy can have long-term benefits for children's behaviours (Glover, 2014^[54]).

In early childhood, parent-child interactions influence the development of empathy and pro-social behaviours. Other caregivers and early childhood teachers also play similar roles, helping children learn how to understand their own and others' emotions, express their emotions appropriately and help others (Kuther, 2019^[24]). In Early Childhood Care and Education (ECEC) settings, the teacher-child relationship is centred on proximal processes, which promote children's self-regulation. For example, intimate caregiving tasks like feeding and soothing the child provide teachers with plenty of opportunities to engage in sensitive and responsive caregiving (Mortensen and Barnett, 2015^[56]). A few studies have found a positive effect of ECEC participation on children's social-emotional skills but the evidence is not as robust as it is for academic outcomes (Phillips et al., 2017^[57]). One English study found better scores for self-regulation and pro-social behaviour and lower scores for hyperactivity at age 16 years among those who had attended high-quality pre-school. The quality of pre-school was especially important for children whose parents have a lower level of education (Brief et al., 2014^[58]). Young children are eager to develop peer relationships. These relationships are based in play, and have implications for all areas of development. Play encourages children to see that everyone does not perceive things in the same way and to take the perspectives of others on board (Kuther, 2019^[24]).

In middle childhood, the parent-child relationship becomes less close as children become more interested in forming and nurturing peer relationships. Parent and children spend time together engaging in task-orientated activities, for example, doing homework and shopping. Older children look for more independence and can be more disregarding of parental authority. Compared to early childhood, peer relationships become complex and reciprocal in nature as children become increasingly able to take on the perspectives of others and consider their needs. Social acceptance by peers becomes very important and is informed by children's social skills. Children find it easier to maintain peer relationships when they can self-regulate and have the capacity to provide emotional support (Kuther, 2019^[24]).

Beginning in early adolescence, the time spent with parents declines as time spent with friends increases. Friendships offer adolescence a source of belonging and support and a medium to develop relationships skills. When parent-child relationships are poor, adolescents often turn to friends for emotional support which can alleviate some of the associated negative effects (Kuther, 2019^[24]). Moreover, the presence of supportive adults in a young person's life who are not the parent is associated with higher levels of self-esteem, lower levels of conduct problems, substance abuse, and sexual activity. Supportive adults serve

a purpose that a parent or a peer cannot or may not be able to fulfil; they can provide advice based on experience and discuss with adolescences situations that they may be too embarrassed to do with their parents (Sterrett et al., 2011^[59]).

Children in out-of-home care are an example of one group who experiences difficulties in forming secure attachments to their caregivers. Prior to their reception into care, in families where neglect, abuse or addiction were issues, children are likely to have experienced a difficult caregiving environment (Howe, 2005^[26]). Coming into care often implies changing schools and neighbourhoods and being a distance from family and friends, which disrupts children's relationships; the same can be said for placement breakdowns. What children need from the care system is stability and certainty to help them acquire safety, progress developmentally, and have good outcomes. However, placement breakdowns are not uncommon, with research indicating that many children experience a high rate of (multiple) placement moves, for instance, upwards to half of all children in out-of-home care in the United States (Jedwab et al., 2019^[60]). Children with the more extensive involvement with child protection services prior to coming into care are more likely to face repeat placement breakdowns.

Self-regulation

Self-regulation is a complex, multi-component construct that operates across several levels of functioning (including motor, physiological and socio-emotional, as well as cognitive functions; see Chapter 6 on the latter). Broadly, it is the ability to control or modulate the intensity of one's emotional state and behaviours to an adaptive end (Montroy et al., 2016^[61]). Children's ability to draw on, integrate, and manage these multiple processes increases as they get older. Children who can self-regulate have learnt to keep their emotions in check and temper under control. When upset, they are capable of calming themselves. They can adjust to changes in expectations, and handle frustration without an outburst. When children begin to quickly recognise how emotions affect their own behaviour and that of others, they understand the social world and become socially competent. They are at low risk of developing behavioural and mental health difficulties. Whereas when children struggle with understanding their own and others' emotions, they are poor at managing their feelings of arousal and are not competent in dealing with interpersonal relationships (Howe, 2005^[26]). Many of the core capabilities possessed by resilient children which allows them to thrive in the face of adversity fall under self-regulation (Center on the Developing Child at Harvard University, 2016^[41]).

In the family context, the early development of self-regulating behaviours concerns children modelling the responses and reactions of parents, which takes on a larger verbal component as children grow. Parenting practices have a role, for example parental conditional regard in its positive and negative sense (i.e. how parents vary the level of attention and affection towards a child, depending on the desirability of the child's behaviour). Another aspect is the emotional climate of the family measured by the child-parent attachments and parents' own couple relationship, for example the presence of marital discord (Rutherford et al., 2015^[62]).

Promoting self-regulation in children during the pre-school years is found to help improve school readiness and has a positive effect on academic performance in primary school (Ursache, Blair and Raver, 2012^[63]; McClelland and Cameron, 2011^[64]). The research on early childhood focuses on the mental processes that develop in the first years of life when children are learning how to self-regulate: for instance, the ability to store and manipulate or use information, in order to complete a task; being able focus attention and control impulsive behaviours; and being able to shift between rules, adapt to changing circumstances and juggle multiple tasks successfully (Shuey and Kankaras, 2018^[5]; OECD, 2020^[22]; McClelland et al., 2017^[65]).

The ways in which self-regulation can be measured vary with the age of children. At young ages, children cannot reliably be asked directly about their emotions and feelings, but it is possible to collect information through play-based assessments (OECD, 2020^[22]), through observations of children's behaviours in different situations, or through parental and/or caregiver reports. As children grow older, it becomes

possible to ask more direct questions on how they manage their emotions and the feelings that different situations evoke.

Though encompassing certain aspects of emotion regulation, self-control as a standalone concept describes a child's ability to regulate emotions, desires and behaviours in the service of later rewards. Within child psychology self-control has been studied with reference to delayed gratification. In other disciplines it is described similarly and is understood as a vital component of strong executive functioning and good self-discipline, and allows individuals to be act conscientiously and without impulsivity. The capability of young children to exercise self-control have been shown to have lasting impacts on many facets of adult well-being, including health, wealth accumulation, parenting, drug misuse and involvement in criminality (Poulton, 2011^[66]; Moffitt et al., 2011^[67]).

Conscientiousness

Conscientiousness (or task performance) relates to the commitment children display in regards to performing well in the activities they undertake. It appears to be a significant predictor of educational attainment, health and labour market outcomes, coming up as strong as measures of cognitive ability (Heckman and Kautz, 2012^[68]; Nofle and Robins, 2007^[69]; Rosander and Bäckström, 2014^[70]; Chernyshenko, Kankaraš and Drasgow, 2018^[23]). Individuals who show traits of conscientiousness have a lower likelihood of engaging in risky health behaviours and are more likely to enjoy a higher degree of financial security (Bogg and Roberts, 2004^[71]; Moffitt et al., 2011^[67]).

Conscientiousness involves a combination of different facets of the personality working together, but each can be measured separately. These include achievement motivation, persistence in effort, self-control, the ability to follow norms and rules, and the ability to take responsibility and be held accountable. For instance, achievement motivation means accomplishing something difficult, as quickly and as independently as possible. It implies working hard to meet one's own high standards and putting in a consistent effort to be productive and achieve good results. It requires self-discipline and self-control (Hulleman et al., 2010^[72]). Persistence in efforts capture individuals attitudes towards completing work and finishing a task, and for students it is found to be related in a positive way to school performance at age 10 and 15 (OECD, 2021^[2]).

Middle childhood is a critical period in the forming and evolution of children's achievement motivations (Wigfield, Muenks and Rosenzweig, 2015^[73]; Eccles et al., 1999^[74]). During the early stage of middle childhood, the first few years of primary school are often associated with a decline in children's achievement motivation and school attachment. This effect is particularly marked among children with low self-esteem and less well-developed self-control, and those who have poorer self-organisational strategies, and more problematic behaviours (Wigfield et al., 2007^[75]; Eccles, 2007^[76]). These types of children are vulnerable as they are also more likely to report symptoms of internalised distress such as depression and social isolation, as well as greater signs of externalising behaviours such as anger or aggression. As children get older, experiencing this kinds of difficulties contributes to disengagement from school work (Wigfield, Muenks and Rosenzweig, 2015^[73]; Eccles et al., 1999^[74]).

Self and social identity

Children's sense of identity and understanding of their "self" plays a central role in their development, behaviour and overall well-being. Just as adults do, children need an idea of self to guide their behaviours and responses to the world. This idea of self starts to develop early (Cimpian et al., 2017^[77]): even in infancy, many children are able to demonstrate at least a basic understanding of who they are and what makes them unique through, for example, a grasp of personal ownership (Davoodi, Nelson and Blake, 2020^[78]; Ross, Friedman and Field, 2015^[79]). These understandings become increasingly detailed and organised over time, especially during adolescence, during which children begin to form a fuller sense of "identity" (Kuther, 2019^[24]).

There are two main components to individuals' sense of self (Campbell et al., 1996^[80]; Kuther, 2019^[24]). The first is a knowledge component, sometimes called “self-concept”, which refers to peoples' understandings and descriptions of the type of person they are. It addresses the question “Who am I?” The second is self-esteem, which is evaluative and reflects feelings of self-worth, either globally or in specific areas. It answers “How do I feel about myself?” A key developmental challenge for children, particularly during adolescence, is the exploration and organisation of these components and the formation of a balanced and coherent sense of self (Crocetti and Van Dijk, 2016^[81]). Arriving at this stable sense of self is sometimes called “identity achievement” (Schwartz et al., 2013^[82]).

Both self-concept and self-esteem have been shown to be important for children's (and adults) well-being outcomes. For self-concept, it is not always the *content* of the concept that matters for outcomes, as much as the *structure*.¹ Self-concept clarity – the extent to which an individual has a stable and consistent perception of the self, whatever that perception is² – has been linked to various aspects of adolescents' and young people's mental health and well-being (Van Dijk et al., 2014^[83]; Crocetti and Van Dijk, 2016^[81]). One explanation is that uncertainty around who and what you are contributes to anxiety and internalising problems, possibly through lower self-esteem (Van Dijk et al., 2014^[83]). Self-esteem itself, meanwhile, has strong and clear links with a range of outcomes. Among adolescents, low self-esteem and a negative view of the self has been linked to depression and education drop-out, as well as a range of outcomes later in life, including depression and anxiety, criminality, employment and finances, and self-esteem itself (Swann, Chang-Schneider and McClarty, 2007^[84]; Orth and Robins, 2014^[85]; Steiger et al., 2014^[86]). Identity achievement more generally is associated with adolescents' and young people's life satisfaction and sense of purpose (Waterman, 2007^[87]; Schwartz et al., 2011^[88]; Schwartz et al., 2013^[82]), as well as several other aspects of self-evaluation and socio-emotional well-being, including pro-social behaviour (Kuther, 2019^[24]) and a stronger sense of control over one's own life – sometimes referred to as an “internal locus of control” – which itself has been linked to a range of educational, health and socio-emotional outcomes (OECD, 2019^[89]; Lillevoll, Kroger and Martinussen, 2013^[90]; Nowicki et al., 2018^[91]).

Social identity

Social identity – a person's sense of who they are based on membership and affiliation to social groups – plays an important role in shaping children's over-arching self-image. Children, like adults, have a fundamental need to “belong” and to feel connected to others (Baumeister and Leary, 1995^[92]). Indeed, from an early age, children display an eagerness to both join and conform to the behaviours of peer groups (Bennett, 2011^[93]). Social identities help people form these connections. By attaching themselves to and adopting the norms and behaviours associated with social groups, children can feel part of something bigger and wider than themselves. These identities influence the ways children perceive their self and their place in society; they provide a sense of belonging, and a means with which children can categorise people's behaviour, identify to groups and take part in collective action (Tajfel and Turner, 2004^[94]; Bennett, 2011^[93]).

Children's social identities take many forms. They can range from identities based on small groups such as the family, a group of friends, or the classroom, to wider collective identities rooted in, for example, gender, sexuality, ethnicity, culture and religion. Importantly, identifying with a social group is not the same or as simple as being a *member* of a social group (Brewer, 1991^[95]). Group membership itself may be chosen (e.g. sports team affiliations) or imposed (e.g. gender or ethnicity); social identities, on the other

¹ However, there is evidence linking self-concept content to outcomes, such as in cases where adolescents' actual self-concepts do not match up to their ideal or desired images of the self (Kuther, 2019^[24]).

² Self-concept clarity is often captured through responses to multi-item scales. Examples of items include “My beliefs about myself often conflict with one another” and “In general, I have a clear sense of who I am and what I am” (Campbell et al., 1996^[80]).

hand, become meaningful only when membership of the group is important (at some level) to children themselves (Cruwys et al., 2014^[96]). The effects of strong social and group identification are not always positive: they can lead to in-group bias and prejudice towards others, for instance (Bennett, 2011^[93]). At the same time, however, clear social identities have been linked to clearer personal identities, an improved sense of belonging, and better subjective well-being outcomes, including among young people (Baumeister and Leary, 1995^[92]; Bennett, 2011^[93]; Taylor and Osborne, 2010^[97]; Osborne and Taylor, 2010^[98]; Gardner and Garr-Schultz, 2018^[99]; Kayama and Yamakawa, 2020^[100]).

While social identity can be studied globally through aggregate measures (Nario-Redmond et al., 2004^[101]; Cheek and Cheek, 2018^[102]), measurement and investigation usually concentrates on specific identities considered important for children's outcomes. One example is children's gender identity. Often operationalised through multi-dimensional instruments (Egan and Perry, 2001^[103]), studies have found links between various sub-aspects of gender identity – including gender typicality (feeling one is a typical member of the assigned gender), gender contentment (satisfaction with the assigned gender), and “felt pressure” to conform to gender stereotypes – and children's psychological well-being (Egan and Perry, 2001^[103]; Carver, Yunger and Perry, 2003^[104]).

A second example is ethnic or cultural identity – that is, an individual's sense of membership of and attachment to their ethnic or cultural group(s). Particularly important here is the strength, clarity and positivity of ethnic/cultural identities, which are associated with a range of outcomes, among both adults (Taylor and Osborne, 2010^[97]; Osborne and Taylor, 2010^[98]) and children (Carlson, Uppal and Prosser, 2000^[105]; Umaña-Taylor, Gonzales-Backen and Guimond, 2009^[106]; Rivas-Drake et al., 2014^[107]). While research on ethnic/cultural identity often uses group-specific measures (Phinney and Ong, 2007^[108]), instruments that are more widely applicable are also available. Examples include the Multigroup Ethnic Identity Measure – a multi-item measure of the clarity and positivity of ethnic identities and practices (Phinney, 1992^[109]) – and Osborne and Taylor's Cultural Identity Clarity Scale – also a multi-item scale, aimed at capturing the clarity of cultural identities (Osborne and Taylor, 2010^[98]).

Supporting the development of ethnic and/or cultural identity is likely to be particularly important for children from minority groups, such as those with migrant backgrounds, children in out-of-home care placed with a family from a different background, and those from historically oppressed groups, such as Aboriginal peoples (Taylor and Osborne, 2010^[97]; Osborne and Taylor, 2010^[98]). These children may have to navigate multiple and at times conflicting cultural identities, or face a situation where their heritage culture has been suppressed. Added to this, both parental opposition to integration and discrimination and hostility from wider society can make it difficult for these children to construct clear and coherent identities (Kuther, 2019^[24]). This can lead to identity confusion, feelings of being “lost”, and a lack of belonging (Kayama and Yamakawa, 2020^[100]). At the same time, however, a strong and positive sense of ethnic and cultural identity can help build child resilience (Kuther, 2019^[24]). For example, a strong ethnic identity can help children and young people reject negative views of their culture (Rivas-Drake et al., 2014^[107]), and may help mitigate the impact of discrimination (Seaton, 2009^[110]; Galliher, Jones and Dahl, 2011^[111]; Romero et al., 2014^[112]).

Which exact social identities matter most to and for children is not easy to pin down. The importance of different identities seems to vary from person to person (Kiang, Yip and Fuligni, 2008^[113]), often in ways that reflect their circumstances and background. For instance, comparing the relative importance of gender and ethnicity identities among 5- to 12-year-old children in the United States, Turner and Brown (2007^[114]) found that ethnic majority children place greater importance on gender than ethnicity, while ethnic minority children value them equally. Others (Onnie Rogers and Meltzoff, 2017^[115]) find that gender identities are consistently ranked as more important than ethnic identities, but to different extents across ethnic groups.

Pro-social behaviour

Pro-social behaviour comprises actions that are beneficial to others, such as cooperating, helping others at some sacrifice to oneself, intervening to prevent harm, and volunteering, among other things. Pro-social behaviour is driven by a broad range of biological, motivational, cognitive, and social processes, with the idea that they are not reflexive actions but rather are preceded by a physiologically-based affective or motivational state. Empathy and perspective-taking play an important role in motivating pro-social behaviours. For instance, altruistic actions aimed at improving the situation of a person in need can be aroused by feelings of sympathy and compassion at another's distress. Sometimes the underlying goal of these actions may be more egotistically motivated and aimed at relieving one's own negative emotional state. Overall, due to a sense of group belonging, people are inclined towards helping others who belong to their "own group" – those with whom they share social identities – as opposed to "other groups" (Tajfel and Turner, 2004^[94]; Penner et al., 2005^[116]).

Pro-social behaviour develops early in life, with many different forms observable before children turn two years old, for example helping, sharing, comforting and cooperating with others, especially in everyday contexts when a caregiver is nearby to provide affective and behavioural support. Young children are not indiscriminately pro-social and may have a preference for one form of pro-social behaviour over another (Brownell, 2013^[117]). There is evidence to suggest that at age two children are also autonomously pro-social (Brownell et al., 2013^[118]). The individual differences in pro-social behaviours that emerge in the preschool years are predictive of later pro-social tendencies and overall social adjustment. For instance, sharing in the preschool years is associated with pro-social behaviour in adolescence, while cooperation at age four is associated with compliance and low levels of disruptive behaviours at age 11 (Hay and Cook, 2007^[119]).

During adolescence, pro-social behaviour is expected to either increase or temporarily decrease due to a range and combination of physical, cognitive and relational changes. For instance, advances in perspective-taking should translate into greater ability for moral reasoning, which in turn promotes pro-social actions. At the same time, however, brain maturation might challenge self-regulation, among other changes, and diminish adolescents' ability to attune to others' emotions. Moreover, gender-specific socialisation pressures can lead to increasingly adherence to gender stereotypes, for example girls displaying nurturing and caring behaviours while boys inhibiting these (Van der Graaff et al., 2018^[120]).

Social capital

The development of pro-social behaviours is key to enhancing the formation of social capital, which Putnam defines as "features of social organisation such as networks, norms and social trust that facilitate coordination and cooperation for mutual benefit" (Putnam, 1995^[121]). Put differently, social capital describes the benefits that are derived from personal social relationships (within families and communities) and social affiliations (Runyan et al., 1998^[122]). For children, social capital is primarily viewed as a resource within family relationships which enables children and adolescents to gain access to good quality services, schools, or leisure opportunities (Leonard, 2005^[123]; Morrow, 1999^[124]). However, children's social capital is also drawn outside the family, increasing so with age i.e., at school, with the network of friends, or through their participation in leisure and other group activities (Leonard, 2005^[123]; Harpham, 2002^[125]).

The expectation that current generations of children will have to deal with global issues in an interconnected and culturally diverse world during their adult lives explains why strengthening children's and adolescent social capital is seen as a critical issue (Huber et al., 2014^[126]; Suárez-Orozco, 2007^[127]; OECD, 2018^[128]). In this perspective, the key challenge is to help children and young people to develop their capacity to examine issues and situations of local, global and cultural significance (e.g. poverty, economic interdependence, migration, inequality, environmental risks, conflicts, cultural differences and stereotypes), as well as their capacity to understand and appreciate different perspectives and world views,

and their ability to establish positive interactions with people of different national, ethnic, religious, social or cultural backgrounds or gender (OECD, 2018_[128]).

Capturing children's social capital is challenging because it refers to a heterogeneous set of relational resources that shape children's opportunities and mind-sets. For example, in order to measure the effect of children's social capital on health, Klocke and Stadtmüller (2019_[129]) construct a social capital index that includes information on the quality of relationships with parents ("is it easy to communicate with parents"), the quality of the school climate ("are other students caring and accepting of me?"), and the quality of relationships in the neighbourhood ("do people like to talk to each other and do they trust each other?"). Yet, measuring what matters in terms of social capital requires a more complete theory of the origins, maintenance, transformation, and effects of social capital (Morrow, 1999_[124]; Levi, 1996_[130]).

Key aspects of children and adolescents' social relationships are argued to be measurable and important for future adult social capital (Runyan et al., 1998_[122]; Furstenberg and Hughes, 1995_[131]; Harpham, 2002_[125]). These include: the extent of networks (often proxied through, for instance, children's and adolescent's participation in leisure, sport, cultural activities); perceived support received from family, peers, and community networks; perceived trust in society and trust in institutions; and the perception of shared norms and shared responsibility (that for instance can be measured by adolescents civic engagement, participation in volunteering activities, but also by collecting information on children's knowledge of and interest in society-level developments, challenges and trends).

Mental health, mental health conditions, and substance use

Recognition of the critical importance of supporting child and adolescent mental health has been gaining in prominence over recent years, and deservedly so; on average in the OECD around 1 in 8 children report a low level of life satisfaction; and, worldwide between 10 to 20% of children and adolescents experience clinical-level mental health difficulties, such as depression and anxiety, with the reported prevalence of psychiatric disorders growing over the last few decades (Kieling et al., 2011_[132]; Collishaw, 2015_[133]; Choi, 2018_[134]). Moreover, available evidence suggests that the mental health gap between children in relatively advantaged and disadvantaged socioeconomic circumstances is growing (Elgar et al., 2015_[135]; Collishaw et al., 2019_[136]).

Mental health is about much more than the simple absence or presence of mental distress or a mental health condition. As illustrated by a definition offered by the World Health Organisation, it is "a state of well-being in which every individual realises his or her own potential, can cope with the normal stresses of life, can work productively, and is able to contribute to their community" (WHO, 2018_[137]). Just like physical health, staying in good mental health requires effort, care and attention.

Despite growing efforts to understand and prevent the emergence of child and adolescent mental ill-health, parents, teachers and other professionals are concerned that that the current generation suffer from worse mental health than previous generations (Collishaw, 2015_[138]). Mental health conditions and substance disorders represent a growing share of the burden of disease amongst adolescents (Patton et al., 2016_[139]). However, the extent to which increases in reported prevalence represents real growth in mental health conditions – as opposed to changes in awareness, help-seeking behaviour, and diagnosing – is subject to ongoing debates among experts (Choi, 2018_[134]).

Given the varied nature and development of mental health conditions, identifying which children and young people are vulnerable and in need of support is challenging. Recent estimates developed by the Institute for Health Metrics and Evaluation (IHME) indicate that in 2017, the average prevalence of mental health conditions among the under-twenties population in the OECD was 12% (IHME, 2019_[140]). Worldwide estimates are higher, at between 10-20% of children and adolescents (Kieling et al., 2011_[132]; WHO, 2018_[137]). For successful management, early identification of mental health difficulties is key, particularly among children as the propensity to develop mental ill-health often has its roots in childhood; an analysis

of World Health Surveys based on 17 countries in the early 2000s suggested that around half of severe mental health conditions begin by age 14, and three-quarters by the time a person is in their mid-twenties 20s (Kessler et al., 2007^[141]; Kessler et al., 2007^[142]).

Children's states of mental health determine how well they can manage the different kinds of emotions, affects and feelings that life events arouse, which at times can be intense and varied in nature. One way to measure mental health is to ask about subjective life evaluations, i.e. how happy one thinks he or she is, and how one feels about him or herself and life in general. This is usually possible from middle childhood onwards. Then it is common to ask children how they are feeling at a particular point in time i.e. core affect. This type of feeling varies over time and does not have a beginning nor an end, and may not necessarily be directed at anything. Often it can be feeling happy, or relaxed, or satisfied, or in a calm state or full of energy. These are among the feelings referred to as "core affects" (Barrett and Russell, 1999^[143]; Rees, 2017^[16]).

Life satisfaction assessments rely on a more fundamental judgement about children's satisfaction with their life taken as a whole, or by just focusing on separate areas of life such as family, school or social relationships. There is a strong argument for measuring child and adult satisfaction separately. In general, there has been little correlation found between the average national level of children's life satisfaction, on one hand, and respectively adults' satisfaction and country gross national income, on the other (Rees, 2017^[16]).

The assessment of mental health conditions among adolescents is made easier by virtue of the fact that adolescents can more easily respond to questions about their mental states and subjective well-being, both in surveys and as part of medical examinations. A number of studies indicate that an increasing number of adolescents report symptoms of depression and anxiety (including anxiety about school work) and higher rates of teenagers reporting psychological complaints, including sleep disorders, low mood, etc. (Choi, 2018^[134]; Hewlett, 2020^[144]; OECD, 2017^[145]). In the transition to adulthood (up to 30 years of age), mental health conditions such as psychosis, bipolar disorder, eating disorders, and substance abuse disorders become more prevalent, while disruptive behaviour orders, social anxiety disorder, and generalised anxiety disorder become less common (Costello, Copeland and Angold, 2011^[146]). These difficulties can spell severe consequences for youth engagement in education and employment, and social outcomes.

Mental health conditions

A well-known distinction made in the field of child psychology and psychiatry is between "externalising" and "internalising" disorders. Though this dichotomy is far from perfect, it does provide a good framing for discussing children's mental health difficulties and the respective implications for different age-groups. The two concepts are closely linked to how effectively a child self-regulates their emotions i.e. express and manage emotions and behaviours in an adaptive and healthy manner. As explained earlier, a child's ability to self-regulate is very much informed by their sense of safety and security in their environment.

When children have difficulty coping with negative emotions or stressful situations, they may sometimes lock their feelings inside (i.e. internalising behaviour). For example, a child may respond to being bullied by a peer by using self-blame or withdrawing from social activities and peer relationships. As internalising behaviours are not outward and do not cause the same level of disruption in the classroom or at home as externalising behaviours would, they are sometimes not visible to others. Internalising of difficult emotions gives rise to negative psychological states such as depressed behaviours, extreme withdrawal, low mood, anxiety, irritability as well as feelings of inferiority, self-consciousness, shyness, or hypersensitivity or subjective health complaints. Broadly speaking, internalising disorders are categorised as either taking the form of a depressive disorder (e.g. major depressive disorder) or an anxiety disorder (e.g. generalised anxiety disorder and social anxiety disorder), but the distinction in young children is not very clear cut. These disorders can also co-occur. Overall, the understanding of internalising disorders in early childhood

has lagged behind advances in the assessment of externalising disorders (Tandon, Cardeli and Luby, 2009_[147]).

Internalising disorders are more difficult to detect in the very young as they have less developed verbal skills and a more limited capacity to describe how they are feeling inside. Among this age group, internalising disorders can take the form of quiet, internal distress, meaning that there is a tendency for parents, teachers, and other caregivers to view these type of states as less problematic and therefore less of a priority for seeking help over. However, advances in research methodologies have facilitated the ability to screen better how young children may be feeling inside and to identify early symptoms of depression, anxiety and other forms of negative emotional states (Schoon, 2015_[27]; Jamnik and DiLalla, 2019_[148]). For instance, Wichstrøm et al. (2012_[149]) found that in the city of Trondheim in Norway during the regular community health check-ups for four-year-olds, symptoms of anxiety were detected in nearly 9% and symptoms of depression in 2% of children. However, much work remains yet to be done to come up with some kind of gold standard measurement of internalising disorders in young children.

Children's feelings can take the form of negative behaviours directed outwards at other people or at things in their environment (i.e. externalising behaviours). Externalising behaviours includes strong disobedience of rules, hyperactivity, being disruptive or aggressive, and using threatening behaviours, and using threatening behaviours, with common examples of externalising disorders in children including conduct disorder (CD) and oppositional defiant disorder (ODD) (Huberty, 2004_[150]). For school-age children, repeated involvement in physical scuffles or bullying classmates are common measures of externalising disorders.

Eating disorders

Eating disorders include anorexia nervosa, bulimia nervosa, binge eating disorder, and related syndromes. Eating disorders are on the rise in many countries, including high-income countries (Schmidt et al., 2016_[151]; Treasure, Duarte and Schmidt, 2020_[152]; Galmiche et al., 2019_[153]). While much of the scientific literature on eating disorders has focused largely on prevalence and treatment among young women, increasing attention is now also being paid to the ways in which eating disorders occur among young men (Limbers, Cohen and Gray, 2018_[154]). In addition to the psychological and social implications of eating disorders, there can be strong physical implications too. Eating disorders are also difficult to treat, and many sufferers go without help, or do not recover or only partially so. Mortality rates among people with eating disorders are almost twice as high as in the general population, and nearly six times higher for people with anorexia nervosa. To put into context, the mortality risk from anorexia nervosa in individuals aged 15-24 years is higher than for any other serious disease, such as asthma or type 1 diabetes (Schmidt et al., 2016_[151]; Zipfel et al., 2015_[155]).

Self-harm and suicide

Self-harm is another expression of mental distress. Self-harm is often hidden, and frequently under-reported (Madge et al., 2011_[156]; Borschmann et al., 2017_[157]; Muehlenkamp et al., 2012_[158]). One study from the United Kingdom, for example, matched survey-based self-report self-harm data to medical records, finding that approximately 20% of self-harm hospital admissions were not disclosed by survey respondents (Mars et al., 2016_[159]). Nonetheless, evidence from both hospital presentations and survey data suggest that the frequency of self-harm may be increasing among adolescents, especially girls (McManus et al., 2019_[160]). Self-harm takes on different degrees of severity, with a history of more severe self-harming associated with greater rates of depression, anxiety and impulsivity and lower self-esteem. Self-harm is more prevalent among adolescents with experiences of traumatic life events, and those who have problems with schoolwork and/or peers, or struggles with their individual or sexual identity (Madge et al., 2011_[156]).

Experiencing heightened mental distress can lead children and adolescents to make an attempt to end their own lives. Suicide is the third leading cause of death among adolescents worldwide (WHO, 2014_[161]). Between 2000 and 2015, the average number of deaths by suicide recorded amongst young people aged 15 to 25 years old in the OECD fell by 31%, but rose by 10% or more in a small number of countries (Australia, Luxembourg, Mexico, Netherlands, New Zealand, Sweden, and the United States). Comparing suicide statistics across countries is not straightforward. There are differences between countries in how the cause of death by suicide is determined. Moreover, the varying levels of stigma attached to suicide may influence the rates of suicides that are officially recorded (OECD, 2020_[162]). Caution is therefore required in interpreting variations across countries.

Similar to the adult population, death by suicide amongst children and young people is correlated with access to a lethal means, poor mental health, and a history of prior suicide attempts. The latter two findings point to the need for overall strengthening of access and the provision of mental health services and to school-based interventions as a meaningful means of reducing incidences of attempted suicide, and suicidal ideations and behaviours (Hewlett, 2020_[144]).

Substance abuse

The occasional use of alcohol and drugs is not necessarily harmful for mental health and may not be indicative of a young person having a need for help. A young person's use of alcohol and drugs is considered as substance abuse when an ongoing pattern of usage develops that generates negative consequences for individuals and for those around them. Young people have a substance dependence problem when they develop psychological and physiological dependency on alcohol and/or drugs. This is a more serious issue than substance abuse as it implies addictive and dependent patterns of use and often the consequences for individuals are much greater (Cannon et al., 2013_[163]). The younger the age of initiation, the higher the risk of adverse consequences for physical and mental health and for lifelong substance use disorders (Belcher and Shinitzky, 1998_[164]). In particular, early drug use (i.e. before 14 years of age) is associated with the highest risk (Jordan and Andersen, 2017_[165]).

Risk taking during the teenage years can be seen as part and parcel of growing up but it leaves young people at risk of developing a vulnerability to alcohol and drugs abuse, even if relatively few go onto develop substance use disorders. In many OECD countries, the use of traditionally common drugs such as nicotine and alcohol by adolescents has declined steadily in recent years. For example, according to data from the European School Survey Project on Alcohol and Other Drugs (ESPAD) – a Europe-wide survey that includes 22 OECD countries – between 1995 and 2019, on average across 30 European countries, the share of 15- and 16-year-old students reporting ever having used cigarettes fell from 68% to 42%, and the share reporting daily use of cigarettes halved, from 20% to 10%. Over the same period, the share of 15- and 16-year-olds reporting ever having used alcohol fell from 88% to 80%, although the share reporting “heavy episodic drinking” (binge drinking) has remained relatively stable (ESPAD Group, 2020_[166]). Lifetime use of cannabis is less common than cigarettes and alcohol (16% in 2019), and has declined slightly in recent years since peaking at 18% in 2011 (ESPAD Group, 2020_[166]).

One issue that has received increasing attention in recent years is harmful substances that adolescents can access in their homes. These substances include inhalants (e.g. glues), and prescription pharmaceuticals such as painkillers, tranquillisers, sedatives and anabolic steroids taken for non-medical use. In the 2019 wave of the ESPAD survey, on average across 30 European countries, about 7% of 15- and 16-year-olds reported ever having used tranquillisers or sedatives without a prescription – down very slightly on 1995 (7.4%) (ESPAD Group, 2020_[166]). 8% reported ever having used inhalants – a slight increase on 1995 (7.4%), but down from a peak of 10% in 2011. New psychoactive substances (sometimes called “legal highs”) such as synthetic cannabinoids are a more recent development. In 2019, about 3% of 15- and 16-year-olds reported ever having tried at least one new psychoactive substance (ESPAD Group, 2020_[166]).

Substance use during adolescence is problematic given the significant changes occurring to the body and brain, not to mention to the environment and in socialisation. It is associated with alterations in brain structure and functioning, and in neuro-cognition (Squeglia and Gray, 2016^[167]; Squeglia, Jacobus and Tapert, 2009^[168]). Adolescence is a unique period of neurodevelopment, where the brain undergoes substantial physiological changes. The evidence suggests that the impact of substance use on brain development differs by substance use pattern. For example, heavy drinking during adolescence, particularly heavy binge drinking, can lead to decreased performance on cognitive tasks and changes in the brain structures.

The co-occurrence of mental health difficulties and substance abuse is common. However, there is variance in the temporal sequencing i.e. which problem pre-dates the other. For example, among late-teens social anxiety disorders are found to be a precursor to alcohol abuse, while post-traumatic stress disorder are found to predict all types of substance use disorders. The use of substances to alleviate mental distress is thought to be a factor (Wolitzky-Taylor et al., 2012^[169]). On the other hand, cannabis use is associated with an earlier mean age of the onset of psychotic illness such as schizophrenia and other psychotic disorders, perhaps because of an interaction between genetic and environmental factors or by disrupting brain development (Large et al., 2011^[170]). There is mixed evidence on alcohol and drug abuse being a precursor for the development of anxiety and mood disorders (Barker and Kay-Lambkin, 2016^[171]). Better understanding of comorbidity patterns and their temporal relationship would help improve timing and targeting of prevention and treatment.

5.3. Key influences on children's social and emotional outcomes

Children's social and emotional well-being is determined by a variety of different factors operating at the individual and environmental levels. Individual dimensions stem from cognitive, emotional, and physical capabilities or personal circumstances, such as having a serious health issue or a disability, or a neurodevelopmental disorder. Environmental factors include the family and home environment, especially the safety, security and stability of the family environment, to the school and care service environment, and to the neighbourhood and built environment. These "environmental" factors can be modified by public policies and are therefore important levers for promoting children's social and emotional well-being.

Serious health issues, developmental delays and disabilities

Children with chronic health conditions or disabilities can face a whole host of extra challenges when it comes enjoying good social and emotional well-being. For young children, chronic ill health can impact on school readiness. For example an Australia-based study found that having an early childhood chronic illness increases the risk of a child being classified delayed in social, emotional and language developmental domains by the time he or she starts school, even after controlling for socio-demographic characteristics (Bell et al., 2016^[172]). Compared to healthy peers, children and adolescences suffering from a chronic illness experience, on average, higher levels of depressive symptoms. Of note, depressive symptoms were highest for highest in children reporting chronic fatigue syndrome, diseases characterised by chronic pain (fibromyalgia, migraine/tension-type headache), cleft lip and palate, and epilepsy diseases (Pinquart and Shen, 2011^[173]). Moreover, children and adolescents living with chronic pain are found to have fewer friends, report more peer victimisation, and are viewed as more isolated and less likeable than healthy peers (Compas et al., 2012^[174]).

Children with disabilities sometimes face specific difficulties in social communication and interactions and therefore require extra support in developing emotional and social skills (McCollow and Hoffman, 2019^[175]). Typically children with disabilities participate in significantly fewer social and recreational activities and report not having fewer friends (Solish, Perry and Minnes, 2010^[176]; Hunt, 2019^[177]; Bult et al., 2011^[178]).

Neurodevelopmental disorders

Neurodevelopmental disorders, for example, Autism Spectrum disorders (ASD) and Attention Deficit and Hyperactivity Disorders (ADHD), are the result of impairments in the growth and development of the brain and/or central nervous system. These impairments typically appear during childhood and directly impact a child's ability to learn or to understand the social world (Carpenter Rich et al., 2009^[179]; Şahin et al., 2018^[180]). Given the close connection between neurodevelopmental disorders and social and emotional well-being, greater awareness, and better methods for making an early clinical diagnosis are fundamental. This would also include providing better early intervention to neurodiverse children (Cosci and Fava, 2013^[181]).

Neurodevelopmental disorders appear to be becoming more prevalent. The few national data available for a small number of countries suggest that the prevalence of ADHD diagnoses is on the rise (Hinshaw et al., 2011^[182]; Visser et al., 2014^[183]; Danielson et al., 2018^[184]), and the same seems to be also the case for Autism Spectrum Disorders (Van Naarden Braun et al., 2015^[185]). However, part of the reported increases in ADHD and ASD prevalence may reflect the increased attention and improved methods to diagnose and provide support for children.

Improvements in the diagnosis of neurodevelopmental disorders among young children may help alleviate the obstacles these disorders present for children's development if it is accompanied by appropriate support (Daley and Birchwood, 2010^[186]; Vivanti et al., 2017^[187]). Therefore, tracking neurodevelopmental disorders with sound data from the early years of life appear to be particularly useful to encourage early diagnosis and make visible the need to offer appropriate support to children to manage these differences (Ewald et al., 2018^[188]).

Family and home environment

The vulnerability of some families to big stressors such as financial hardship, intra-familial conflict, or social exclusion can have an adverse impact on children's social and emotional well-being (Golombok and Tasker, 2015^[189]). These stressors influence children's social-emotional development through their effect on parenting behaviours, parental mental well-being, and parents' couple relationships (Labella and Masten, 2018^[190]; Golombok and Tasker, 2015^[189]). Higher conflict and discord in the family is associated with behavioural problems and child maladjustment, while an increase in supportiveness between parents is associated with a reduction in behavioural problems (Goldberg and Carlson, 2014^[191]).

It is not uncommon for children to have lived through a parental separation and the disruption it causes. In the OECD, on average 1 in 6 children live in a single-parent family while 1 in 10 in a step-family (i.e. with a step-parent and potentially step-siblings) (Miho and Thévenon, 2020^[192]). Parental separation contributes to socio-economic disadvantage, increased parental distress, and child exposure to parental conflict. Often parental separation is preceded by conflict, and in families where the intensity of conflict is high across the different stages of the separation, there is a stronger negative effect on child behavioural difficulties. In part, this reflects the cumulative effect of parental conflict on children (Xerxa et al., 2020^[193]; Golombok and Tasker, 2015^[189]).

The type of child custody arrangements agreed upon by parents after they go their separate ways can be a source of ongoing tension. Joint parental custody arrangements are becoming more common place. They can benefit children in terms of being able to maintain close relationships with both parents. Though the evidence is scarce, children in joint custody arrangements may experience lower stress and have higher self-esteem compared to children subject of sole custody arrangements (Steinbach, 2019^[194]). This may partly reflect that shared custody allows contact with both parents to be maintained within with a predictable regularity. However, rather than reflecting a causal effect, this may be due to the fact that shared custody arrangements are more likely to occur when parents' relationships are not highly conflictual.

The social-emotional climate in the home as expressed through parenting practices is critical to children's social-emotional development. Broadly, parenting that is based fundamentally on dismissive, overbearing and punitive practices appear to be associated with low degree of child happiness and feeling of being supported. Perceived parental rejection by the child is associated with declines in pro-social behaviour and school performance, and with increases in internalizing and externalizing disorders (Putnick et al., 2015_[195]). Corporal punishments are recognised as a denial of children's fundamental rights, and for this reason prohibited by United Nations Convention on the Rights of the Child. By contrast, parenting that is based on warmth, acceptance, and where children can exercise a say in the decision affecting them has a positive effect on children's social-emotional adjustment and well-being: they are more likely to feel listened to and supported by their family (Rodrigo, Byrne and Rodríguez, 2014_[196]; Ulferts, 2020_[197]; NIPH, 2019_[198]). Acceptance involves parents and caregivers treating children with warmth and being responsive to their needs. (MacDonald, 1992_[199]). This, however, does not mean that child does what he or she wants to do. Instead, children thrive on having a routine and knowing what rules to follow and where the boundaries lie. Routine and predictability promote good behaviour in children and provide a sense of stability and security in their environment (Bornstein and Putnick, 2018_[200]). On the contrary, the absence of discipline and rules may be neglectful or seen by the child as a lack of parental interest in their well-being (Lansford, 2019_[201]).

As children grow older, they desire to become more autonomous, yet nonetheless the need to feel well supported and guided by parents remains as they manage a heavy schedule of school work and examinations and considering decisions about their future. The degree of pressure parents place children under to succeed along the lines of a particular path in life and the level of control they exert have consequences. If excessive, it is associated with higher levels of anxiety, lower school engagement, externalising behaviours, and overweight (Ulferts, 2020_[197]).

School and ECEC environment

For many children across the OECD, early childhood education and care (ECEC) can be their first experience of interacting with other adults and children on a regular basis away from the family setting. These interactions provide children with important opportunities to develop social skills, emotional skills and to foster resilience. For example, participation in (high-quality) ECEC can help promote children's self-regulation skills. One mechanism for this comes through intimate caregiving tasks such as feeding and soothing: these tasks provide staff with opportunities to engage in sensitive and responsive caregiving, which is critical for children's development of adaptive self-regulation (Mortensen and Barnett, 2015_[56]).

However, the quality of ECEC matters. Important here is both the "structural" quality of ECEC (for example, child-staff ratios, staff pre-service qualifications, and staff participation in in-service training) and what is known as "process quality", that is, the quality of the processes and interactions that affect children's everyday experiences in ECEC (OECD, 2018_[202]). The latter includes factors such as the sensitivity of teachers to children's emotions and behaviours, as well as individual needs, collaboration between staff members, and collaboration between staff and parents (OECD, 2015_[203]).

Schools and the school environment can directly affect the social and emotional well-being of school-age children. In addition to the overall role schools play in supporting students (OECD, 2019_[204]; OECD, 2020_[205]), including through programmes and interventions (see later in this section), the school environment can impact on social and emotional well-being through its effects on children's interactions and relationships. One specific example is classroom climate (e.g. classroom disciplinary climate). Classroom climate can impact the perceived quality of peer relationships, and also affects teachers' abilities to provide individualised support to each student (Collie, Shapka and Perry, 2012_[206]; Rucinski, Brown and Downer, 2018_[207]). Perceived support from teachers appears to be positively valued by students and is associated with better social-emotional well-being outcomes of primary school age children and adolescents (Tennant et al., 2015_[208]; Danielsen et al., 2009_[209]). Among children with behavioural

problems, close relationships with teachers are associated with improved academic and social-emotional functioning, while for children with either externalising and internalising problems, relationships with teachers that are conflictual in nature are associated with exacerbated negative outcomes (Sabol and Pianta, 2012^[210]; Curby, Brock and Hamre, 2013^[211]). For older children, feeling respected at school and supported by teachers are key to their well-being at school as well as to their life satisfaction in general (OECD, 2017^[145]; Rees, 2017^[16]).

A related issue for many children is the institutions in which they spend time outside of (pre-) school hours. As touched on in Chapter 3, in some OECD countries, it is common for children to attend out-of-school-hours (OSH) services before and/or after (pre-) school, and also during school holidays (OECD, 2019^[212]). Often provided on school premises, OSH services typically offer a mixture of schoolwork-focused activities (e.g. homework help) and extra-curricular activities, such as sports training and arts education – themselves important for children’s well-being (Box 5.4) – depending on child age. These kinds of OSH services can help promote well-being in several ways. One report from the U.S., for example, highlights a range of benefits from OSH service participation, especially for children from low-income families, including better learning motivation and cognitive outcomes, as well as potentially improved social, emotional and behavioural outcomes (Bartko et al., 2020^[213]). However, in many countries, the (structural) quality and quality standards of OSH services can differ sharply (Plantenga and Remery, 2017^[214]).

Neighbourhood and the built environment

Neighbourhood quality matters for children's social-emotional well-being at all stages of childhood. For children who have not yet started school, there is evidence that growing up in a safe neighbourhood, with strong social ties, and high quality childcare institutions, green spaces and playgrounds at a walkable distance have a positive effect on language, emotional, and behavioural outcomes (Minh et al., 2017^[215]; Christian et al., 2015^[216]). Neighbourhood quality tends to be an even more crucial determinant of older children’s social-emotional well-being, as this age group spend a larger amount of their time outside the family home and are nearing the transition from compulsory education. Adolescents growing up in a disadvantaged neighbourhood (i.e. a neighbourhood with high levels of poverty, crime rates and a lack of recreational facilities) are also more likely to exhibit mental health problems, commit delinquency, have unprotected sex, and use drugs (Choi, 2018^[134]; Leventhal, Dupéré and Brooks-Gunn, 2009^[217]). Adolescent often secure their first job in the local community, meaning that the opportunities in the local labour market are fundamental for helping acquire early work experience (Deutscher, 2018^[218]).

Perceived neighbourhood security is a very important dimension of neighbourhood quality. A neighbourhood environment that is characterised by a high crime rates and where delinquency or violence are problems erodes a child’s sense of predictability and trust in the environment, increasing the risk of child misconduct problems (Leventhal and Brooks-Gunn, 2000^[219]). By contrast, a neighbourhood where children and families feel safe and where there are good physical facilities provides children with invaluable opportunities to develop relationships with people outside of the family extra-familial and to pursue social activities and personal interests (McKendrick, 2014^[220]). A growing body of research argues that neighbourhoods have a causal effect on child and later adult outcomes, distinct from family factors (Chetty and Hendren, 2018^[221]; Chetty, Hendren and Katz, 2016^[222]; Deutscher, 2018^[218]; OECD, 2019^[223]).

The built environment is another important aspect of neighbourhood quality for children’s social-emotional well-being. In designing neighbourhoods, both the needs of children and factors that hinder or promote child well-being should be kept mind. Built environment features such as walk/bicycle paths, recreational facilities, low street traffic are positively associated with children’s levels of physical activity and social-emotional competence (Binns et al., 2009^[224]; Pellegrini, 2009^[225]; Ferguson et al., 2013^[226]). So too is children’s access to “green space”, such as parks, gardens and playing fields. One review of the evidence finds that children’s green space access is positively associated with a range of mental and socio-emotional outcomes – including self-discipline, stress moderation, and symptoms of disorders like attention deficit

hyperactivity disorder (ADHD) – as well as indicators of physical health and cognitive development (McCormick, 2017^[227]).

Reports on children’s views on the impact of neighbourhood quality on child well-being affirm what is found in the research. When asked about the dimensions of the neighbourhood environment that matter most, children identify having places where they can meet up with friends safely, and open green spaces and play areas. Among the factors listed by children as compromising their well-being are high levels of unsafety and insecurity – due for instance to violence in the neighbourhood – dense car traffic and unsafe outdoor equipment), pollution and lack of green space, and poor sanitation (Christensen and O’Brien, 2003^[228]; Bartlett, 2002^[229]; Nordström, 2010^[230]; Ergler, Kearns and Witten, 2017^[231]). However, as one report from the United Kingdom notes, children’s thoughts, views and needs are not always well integrated into planning policies and decision-making mechanisms (Wood, Bornat and Biquelet-Lock, 2019^[232]).

Public policies

Policies supporting families with children, care service and school policies, and policies and regulations impacting neighbourhood quality provide a set of resources that ultimately can affect children’s social-emotional outcomes.

Interventions during pregnancy and infancy can be effective ways to support children’s development in all its aspects, including social-emotional development. Supporting maternal mental health can be effective in reducing the mother’s risk of developing perinatal depression, and in turn increases the chances of developing a bonding relationship with their new-born. A Cochrane review found that women who received any psychological or psychosocial intervention had a 22% reduction in their risk of developing perinatal depression compared with those who received standard care (Dennis and Dowswell, 2013^[233]). Subgroup analysis found that the most effective types of intervention for the perinatal and postpartum period were intensive, individualised postpartum home visits, lay (peer)-based telephone support, and interpersonal psychotherapy. Home visit programmes following the birth of a child are also particularly effective to reach families who would otherwise lack the information or social capital to use the services to which they are entitled. Home visits provide information, resources, and support to expecting parents and families with young children, typically infants and toddlers, in their home (Michalopoulos et al., 2017^[234]; Duggan et al., 2018^[235]).

Parental leave policies are another way of providing opportunities for parents to spend time bonding with and caring for their children, while giving economic assurance. Parental leave is also associated with better mental health outcomes for mothers (Van Niel et al., 2020^[236]; Galtry and Callister, 2005^[237]). However, the evidence for the impact of leave on child outcomes is mixed. Some evidence suggests that parental leave is associated with higher quality mother-child interactions and the forming of a secure attachment. Positive impacts on early child health and nutrition have also been found (Plotka and Busch-Rossnagel, 2018^[238]; Clark et al., 1997^[239]). There is also evidence to suggest that greater paternal involvement in caregiving – which may be facilitated by parental leaves targeted at fathers – is associated with better child cognitive development (Huerta et al., 2013^[240]). However, others studies suggests little or no impact of leave on child developmental outcomes, including cognitive development and academic achievement (Huebener, Kuehnle and Spiess, 2018^[241]; Baker and Milligan, 2008^[242]).

Policies aimed at fostering the quality of early childhood education and care can also help promote young children’s social-emotional development. As discussed above, there is extensive evidence that high-quality staff-child interactions can impact children’s behavioural outcomes, for instance, and that children’s skills can develop more effectively when staff engage in quality developmental activities with children (OECD, 2018^[202]). There are a range of policy factors associated with quality in ECEC. These include minimum standards regulations (e.g. staff-child ratios, group sizes), minimum qualification requirements, staff in-service training and professional development, and aspects of staff working conditions, such as staff salaries and well-being (OECD, 2018^[202]).

School-based interventions can improve child well-being (OECD, 2019^[204]; OECD, 2020^[205]). A range of interventions delivered in school are found to have beneficial effects on children's mental health, social, emotional and educational outcomes (Weare and Nind, 2011^[243]; Durlak et al., 2011^[244]). In addition to longer term benefits associated with better mental health, there may be more immediate impacts including better school attachment (or the sense of belonging that children have about the school that they attend), as well as having less risky behaviours. The characteristics of more effective school interventions include teaching skills, focusing on positive mental health, starting early with the youngest children and continuing with older ones; operating for a lengthy period of time, embedding this work within the school curriculum and better liaison with parents.

More generally, family support services can be helpful at preventing and addressing problems in children's social-emotional development (Riding et al., 2021^[245]). Mental health supports can be tailored for families through counselling, psychiatric assessments and medication support as well as health interventions such as assessments, prescriptions, and referrals to specialists. Services may also aim to support family functioning by providing family counselling services, access to specialised social services agencies, respite services (short term family support with care for children during times of family crisis), in-home supports (individualized planning and service coordination provided within the family home) or additional assistance, services and resources for families coping with chronic stress.

5.4. Overview of data availability

In recent years, the development of data on children's social and emotional well-being and mental health has earned a growing amount of attention. Different types of data have been developed but they do not cover all stages of childhood with the same level of depth.

To date, there exists no large-scale cross-national datasets to provide comparable information on the social and emotional well-being of children under school-going age (current initiatives to fill this gap are discussed in the next section). Middle childhood and adolescence are better covered by the available international data, particularly adolescence. Closing these data gaps is important to ensure that policy responses to the problems affecting younger children are adequately tailored to age and need. Given the awareness of the need to intervene early, before problems emerge or have the time to become more complex, data on younger children would aid the development of more effective preventative policies. Table 5.2 summarizes the data available for the different age groups, while a more detailed inventory is provided in Annex 5.B.

The main source of data available on middle childhood are from the *Children's Worlds* surveys, which covers the subjective well-being of children aged 8, 10 and 12 years. On average, data are collected on children living in 40 countries, including about 20 OECD countries (which provides a fair geographical coverage compared to country coverage of surveys for adolescents). An important strength of these data is that they provide information on children's satisfaction and emotional affects with regards to different life domains, including family life, school life, peer relationships, the neighbourhood and child's personal possessions. They also provides information on the quality of interpersonal communication, support and time spent with parents, friends, teachers and adults in general, as well as basic information on identity and self-esteem. The surveys do not provide any information on children's attitudes towards schoolwork, or their self-confidence and self-awareness, or how opened-minded they are; these dimensions are fairly well covered in surveys for adolescents. Furthermore, children are not asked about their use of the internet and digital tools, and of any associated positive or negative experiences. This is in spite of middle childhood often being the time when children first start using digital technologies (see next section).

Table 5.2. Overview of available data sources

		Age coverage	Country coverage	Main data source	Regular update?	Dis-aggregation
Relationships, identities, and social attitudes, activities, connections and support	Family, school, and social connections, relationships, and support	Middle childhood & adolescence	Moderate & good	Children's Worlds, HBSC and PISA	Yes	Yes
	Pro-social attitudes	Adolescence	Good	PISA 2018	Uncertain	No
	Social and civic activities	Adolescence	Good & moderate	PISA, EU-SILC, World Values Surveys	Yes	Yes
	Identity and sense of belonging	Middle childhood & adolescence	Moderate & good	Children's Worlds, TIMSS, PIRLS, PISA	Yes	Yes
Social and emotional skills	Emotional regulation / reflective thinking	Adolescence	Good	PISA	Concept varies across waves	Yes
	School-work conscientiousness	Adolescence	Good	PISA	Yes	Yes
Mental health and life satisfaction	Life satisfaction & affects	Middle childhood & adolescence	Moderate & good	Children's Worlds, HBSC and PISA	Yes	Yes
	Neurodevelopmental disorders	All ages	Good	GBD	Yes	No
	Internalising disorders and other psychological conditions	All ages	Good	GBD	Yes	No
	Substance use	Adolescence	Moderate	HBSC, ESPAD	Yes	No
	Suicide rates	Adolescence	Good	Administrative	Yes	No
	Conduct disorders	Middle childhood & adolescences	Moderate	Children's Worlds & HBSC	Yes	Yes
Digital activities and behaviours	Use of the internet and social networks	Adolescence	Good	PISA, HBSC	Yes	Yes

Note: The Children's Worlds surveys include: Belgium, Chile, Estonia, Finland, France, Germany, Greece, Hungary, Israel, Ireland, Italy, Norway, Poland, Portugal, Spain, Switzerland, South Korea, Turkey, the United Kingdom and the United States. "Disaggregation" means that the publicly available data allows for disaggregation by at least basic socio-economic and demographic groups, such as by sex, age, family status, and family income.

Thanks to two major surveys conducted in a large number of OECD countries, the data available for adolescents cover a wider range of social-emotional dimensions. The *Health Behaviours of School-aged Children* data cover adolescents aged 11, 13 and 15 years living in Canada and European OECD countries. It uses the same harmonised questionnaire for all participating countries, which is advantageous for comparability. The *OECD Programme for International Student Assessment* (PISA) surveys provide data on 15-year-olds students. PISA first began in the early 2000s and over time its content has gradually expanded to include a growing number of items to capture students' social and emotional well-being. Taken together, these two surveys include information on a broad spectrum of mental health and social-emotional outcomes. Moreover, the access to individual data make it possible to disaggregate information according to a range of socio-demographic characteristics, within the limits of constraints imposed by sample sizes.

The data collated through these two surveys provide information on mental health outcomes, including subjective health complaints (including physical complaints), substance use and conduct disorders (understood as involvement in physical fight, bullying or cyberbullying perpetration or victimisation). The PISA surveys also gather information on conscientiousness towards schoolwork, ability to deal with stressful situations, self-confidence, sense of belonging, and beliefs towards the value attached to efforts

(with the distinction between students with “growth” *versus* a “fixed” mind-set). For the 2018 wave, PISA added questions on the global skills needed by adolescents to solve problems and cooperate with others, as well as on pro-social intercultural knowledge, attitudes and skills and attitudes towards change (OECD, 2019^[246]).

A few other data sources in addition to PISA and HBSC provide some information on adolescents' participation in domestic chores and volunteer work, but their scope is restricted to adolescents aged 15 years and older. More generally, there is a lack of data on children's participation in sport, leisure, social and cultural activities, in and outside of school. Similarly, there is no systematic collection of data on children's perceptions of their physical environment, including aspects of safety, and the appropriateness of local facilities and amenities for children to partake in leisure and social activities, and to meet up with friends. There is also a lack of cross-national data on adolescents' sense of belonging outside of school and their personal, social and cultural identities more generally.

Last but not least, both PISA and HBSC collect data on the use of the internet and social media by adolescents, but as will be discussed in the following section, the information collected does not sufficiently capture nor pre-empt all of the potential risks to children's social and emotional well-being.

The Global Burden of Disease study by the IHME provide a comprehensive worldwide observational epidemiological dataset, which includes population-level estimates on mental health and neurodevelopmental disorders experienced by children, from birth all the way up to becoming young adults. These data are made available by age group, which allows for instance information on pre-school children to be separated from that on older children. Though the data can be disaggregated by gender, the same cannot be done for other socio-demographic characteristics. As already mentioned in the Chapter 4, these data collections are not without problems; lack of transparency is an issue as the documentation for the estimates contain a few discrepancies to those found in national official statistics (Shiffman and Shawar, 2020^[247]; Mahajan, 2019^[248]). A stronger commitment by national statistical offices to produce these data could lead to a greater consensus on data validity. Alternatively, though, greater obligations for transparency with respects to the estimates published by the IHME could improve the quality of the data and their comparability, and provide the confidence on the data critical to policy making.

Important steps on gathering data on the most vulnerable groups of children that would cover all stages of childhood remain outstanding. It is first desirable to have data that make visible those groups of children whose social or family circumstances put their social and emotional well-being particularly at risk. The big issue of the rise of children's usage of digital tools, starting in early childhood, also requires better assessment, as well as of the associated opportunities and risks.

5.5. The way forward

Designing and steering policies to support children's social and emotional well-being is of crucial importance and requires sound data to monitor trends in mental well-being and map of the risks affecting children who are particularly vulnerable for whatever reason. Tracking trends in child mental health and their wider social and emotional well-being is invaluable for the planning of investments in services to address present and future needs, and in determining whether these efforts are successful or not. Good data are also required on risk factors and the new challenges that put certain groups of children in very vulnerable situations and that are driving the observed rise in mental health inequalities. Understanding which groups of children are the most affected is critical to raise children's social-emotional well-being at the population level (Collishaw and Sellers, 2020^[249]).

It is of fundamental importance for policy makers to ascertain whether children's outcomes are changing, especially for those who suffer from poor mental health and/or social-emotional problems. Policy monitoring in this area requires good quality data on the levers and resources that countries have at their

disposal to support the social-emotional development of all groups of children, to promote good mental health, and to provide assistance to children experiencing psychological or emotional disorders.

Improve the tracking of vulnerable children

The evidence presented in this chapter illustrates the many ways in which children's social and emotional well-being is put at risk due to different individual, family or social circumstances. The key risk factors for social and emotional well-being are largely the same as those for physical health.

There is a dearth of comparable data on the vulnerable groups of children (e.g. children in out-of-home care), the prevalence of child maltreatment (see Chapter 3), and the effects of experiencing adversity on well-being outcomes. One of the main reasons behind this lack of data is often these groups of vulnerable children are not living in stable "private" housing, or are living in institutions, or have disabilities, and therefore are not covered by general standard household surveys. These children remain invisible in official statistics when special surveys are not carried out. Given the higher likelihood of poor outcomes, data on vulnerable children is crucial to improve policy design and monitoring.

Addressing the data gaps for these groups of vulnerable children is critical to ensure that they are visible and receive the political attention needed to develop better policies to address their particular needs. To this end, the *Conference of European Statisticians* has set up a Task Force mandated to review data gaps, sources, standards and definition and collection mechanisms used in UNECE countries and to develop a set of recommendations for a harmonized improvement of the availability of data in these areas.

Bridge data gaps for preschool-age children and children in middle childhood

Developing policies to enhance children's well-being requires reliable indicators of social-emotional outcomes that have the potential of being positively influenced during childhood. However, as the data availability section highlights, there is a real lack of comparative data for preschool-age and primary school-age children. Filling these data gaps is challenging, not least because collecting cross-national comparable data will require the building of a broad consensus on which dimensions of social and emotional well-being should be assessed at particular age, along with how these should be measured. This has yet to be reached.

The scientific literature on the influence of the first few years of life on well-being outcomes across the life course has raised awareness in many countries of the need to collect data on children from birth (and even from the point of a child's conception). Several countries have started the process of collecting data on young children, and have done so via experimental surveys or longitudinal surveys that follow a sample of children throughout childhood from birth at a local or national level. However, such surveys are costly and few countries have the opportunity to repeat them at regular intervals to measure progress and changes in the risk factors and challenges (Reiska et al., 2019^[250]).

To address the lack of comparable data, several strategies are currently being pursued. At the European level, a few research networks aim to disseminate harmonised child cohort data or to promote the adoption of common data collection methodologies. Another strategy targets the development of international surveys at well-defined ages of children. This has the advantage of reducing the scope of the survey, which can reduce costs and encourage the repetition of surveys at regular time intervals. This is, for example, the approach of the OECD-led surveys with the PISA surveys focusing on 15-year-olds, the *Early Learning and Child Well-Being Study* for the 5-year-olds carried out in three countries (OECD, 2020^[22]), and the *Study on Social and Emotional Skills* targeted at 10-year-olds and 15-year-olds (Box 5.3). In Europe, the birth cohort survey GUIDE (Growing Up In Digital Europe: EuroCohort (2020^[251])) also aims at providing longitudinal statistical evidence on very young and school-age children for years to come.

A particularly pressing challenge for early childhood data development comes from the fact that care and education practices and policies are not only very diverse across countries but also within countries,

making it not always possible to define standards and measurement procedures that can be used homogeneously within and across countries (Diaz-Diaz, Semeneć and Moss, 2019^[252]; Moss and Urban, 2020^[253]; Nóvoa, 2018^[254]).

For middle-childhood, the data challenges are fairly comparable, despite one example of a comparable cross-sectional survey infrastructure on child well-being already existing in the form of the *Children's Worlds Surveys*. As discussed in data availability section, these surveys provide information mainly on children's affects, satisfaction with various life areas, and on interpersonal relationships. Many important aspects of this age-group's social and emotional well-being are not covered such as for instance children's experience with the digital world, and social-emotional skills important for school-work. By contrast, these areas are one of the main focuses of PISA data on adolescents' well-being. The different focus of child surveys is an advantage because it sheds light on different facets of child well-being; its limitation is that some dimensions of social and emotional well-being are measured at one age and not at another, which implies that one may miss when in childhood certain problems may emerge.

The OECD's Study on Social and Emotional Skills is an important endeavour encouraging countries to fill in this data gap. This survey, in its first phase, covers 10 and 15-year-old children in 10 municipalities around the world, and aims primarily to demonstrate that valid, reliable, comparable information on social and emotional skills of children in middle childhood can be collected across diverse populations and settings. This survey will progress the building of a common understanding of issues, which is needed before countries commit to large-scale data collection on social and emotional well-being in middle childhood.

Box 5.3. Ongoing OECD studies on Early learning and Social and Emotional Skills

The [International Early Learning and Child Well-being Study](#) (IELS) is a survey that assesses five-year-old children, to enable countries to benchmark, compare and monitor children's early learning outcomes over time. The survey has a balanced focus across children's cognitive skills, self-regulation, and social-emotional skills such as trust, empathy and pro-social behaviours. The study also collects information from children on what they enjoy and what they want to do or be when they grow up. In addition, it looks at the relationship between children's early development, their home learning environment, childcare settings and parental background. A total of about 7 000 five-year-olds in England, Estonia and the United States were surveyed in 2018. The first results show that children from low socio-economic backgrounds were more likely to be reported as having learning or behavioural difficulties, especially boys. However, children from low socio-economic backgrounds who had participated in ECEC, had children's books at home, and whose parents read to them every day, achieved significantly higher outcomes (OECD, 2020^[22]).

The [OECD's Study on Social and Emotional Skills \(SSES\)](#) aims to assist cities and countries to better support the development of social and emotional skills of their students. In order to assess these skills, the Study draws on a well-known framework in the field of social and emotional skills – the Big Five model. Out of the 19 skills that were assessed during the Study's Field Trial in 2018, a broad and balanced set of 15 skills were chosen for the main study based on their policy relevance, validity and reliability. Two indices, a compound skill (self-efficacy) and achievement motivation, were also included, created from items that are used to evaluate other skills in the assessment. The first round of the survey covers students aged 10 and 15 years old in 10 cities: Ottawa (Canada), Houston (USA), Manizales (Colombia), Bogota (Colombia), Sintra (Portugal), Helsinki (Finland), Istanbul (Turkey), Moscow (Russia), Daegu (South Korea), and Suzhou (China). Three findings from this survey can be highlighted:

- In general, social and emotional skills are more strongly related to school performance for 15-year-olds than 10-year-olds.

- Intellectual curiosity and persistence in efforts are the skills most strongly related to higher school performance for both 10- and 15-year-olds.
- Optimism is the skill that is most strongly related to both life satisfaction and current psychological well-being, followed by trust. Stress resistance and optimism are most strongly related to students' test anxiety.

Improve the scope of data on adolescents

The PISA and HBSC surveys provide a much broader set of data on the social and emotional well-being of adolescents than for other age groups. Nevertheless, the environment in which adolescents live is changing rapidly, and one of the challenges is to collect data that reflect changes in risks, practices and behaviours. For example, the evidence reviewed earlier for European countries showed that the use of new psychoactive substances such as painkillers, tranquillizers, sedatives and anabolic steroids has emerged as a new form of substance abuse among adolescents that requires close monitoring beyond the patchy evidence pulled together so far.

Another limitation of the data on adolescent well-being is that there is very little information on the activities and the physical environments where adolescents spend their time outside of school and the home. There is a wealth of evidence confirming that extra-curricular activities – including sports, arts education or musical training – can play an important role in the development of a range of cognitive, emotional and social skills (Box 5.4). One option for collecting better data on this could be to extend and expand Time Use Surveys (TUSs) – a rich source of information on how people spend their time – to better cover children and adolescents. Currently, children are covered only inconsistently in national TUSs: while in some countries TUSs cover all household members from a young age (e.g. Italy from age 3 (Istat, 2018^[255]) and the United Kingdom from age 8 (Gershuny and Sullivan, 2017^[256])), in others, coverage often starts from age 15 or older. Even where children and adolescents are already covered, it may be beneficial to expand and revise time use data collections to better capture modern activities, such as the use of digital tools, as well as to better measure children and adolescents affective states (e.g. enjoyment, happiness, anxiety) when engaging in different activities.

The quality of the built neighbourhood environment is very important for facilitating the engagement of adolescents (and children too) in extra-curricular activities, such as accessible and well-equipped outdoor spaces, leisure or sport facilities, that are in the case of an urban context within walking or cycling distance and where children feel safe. Making cities and local areas child-friendly, therefore, is an important driver to promote children's well-being (UNICEF, 2004^[257]; 2018^[258]; Woolcock, Gleeson and Randolph, 2010^[259]; Nam and Nam, 2018^[260]). Data on how adolescents (and younger children) perceive their environment would be particularly useful to inform decisions at the local or national level to be taken in order to ensure that adolescents all get good opportunities to develop positive social contacts and activities that are key to their social-emotional well-being. This information is particularly useful for adolescents whose social life outside the family setting becomes more intense, but similar information for children in middle childhood would also be useful to ensure that their perspectives are taken into account at a time in their lives when extracurricular and/or outdoor activities start to develop.

The lack of information on children's satisfaction and perceptions of their family situation and practical family living arrangements is also a limitation of the existing data, given that about 1 in 6 children live in a single-parent family in the OECD, and 1 in 10 in a step family (Miho and Thévenon, 2020^[192]). In countries such as Sweden and Norway, more than 1 in 6 teenage girls also live between the two homes of their separated parents. These situations may not necessarily lead to financial hardship, poverty, family conflict or stress, and it is important to look at these issues from a child perspective. Children raised by same-sex couples may also face discrimination or exclusion that needs to be measured in order to combat it (Golombok and Tasker, 2015^[189]).

Last, although international surveys provide highly comparable data for a large number of countries, a few countries are not covered by the available data. To fill this gap, some countries may have national surveys that could be used to extract equivalent information. However, it is likely that differences in sampling, question wording, metrics and measurement scales may not cause major comparability issues. In such case, an alternative is that a few questions taken from PISA or HBSC surveys are added to national surveys and make sure that the sampling used in national and international surveys are consistent.

Box 5.4. Sport training and arts education: the benefits for children

Research on the effects of participation in sports and music lessons and training on children's development is relatively rare and recent, but the available evidence suggests that they both contribute and foster physical, emotional, and social skills. These are not just fun activities; they play a role in helping children develop fine motor skills, such as coordination and balance, and contribute to learning teamwork, discipline, and how to focus on achieving a goal (Bidzan-Bluma and Lipowska, 2018^[261]). Children also benefit from the experience of merely taking part in something fun (Eime et al., 2013^[262]).

The role played by sport in improving physical health is one obvious one, but there is also evidence showing that it increases self-esteem among adolescents, fosters mutual understanding and helps children to learn how to resolve conflict (UNICEF, 2019^[263]). Engaging in sport is also found to improve children's school performance and peer relations (Felfe, Lechner and Steinmayr, 2016^[264]). Music training and other types of arts education are found to stimulate creative thinking; they teach children how to express their feelings and emotions and improve their language and reasoning skills (CBNCCAS, 2012^[265]). There is also evidence to suggest that learning to play a musical instrument affects the brain networks that enable executive functioning, thereby enhancing cognitive abilities (Sachs et al., 2017^[266]; Habibi et al., 2018^[267]).

Organised sporting activities can foster positive outcomes in vulnerable children through developmentally appropriate tasks and positive child-adult relationships. There is evidence that participation in sport is a protective factor against delinquency. Moreover, research shows that opportunities to develop musical and artistic abilities benefit vulnerable children's school performance and social-emotional skills (OECD, 2019^[223]).

Collect data on children's self and social identity, and social capital

Childhood is the period of life when, through their experiences, encounters and contacts with peers and adults, children build up an image of themselves and their connection to groups that contributes to the development of their personal, social and cultural identity. Scattered data exist on some dimensions of children's perceptions of their identity, but more systematic information in this area can help to understand the challenges that may exist for children to have a fulfilling personal and social life. Children's sense of self, perceived locus of control and, for adolescents, their perceived autonomy are among the important dimensions of personal identity that the literature show to be connected with children's sense of well-being.

Group identities also develop throughout childhood and over time children may feel some proximity, sense of belonging to and acceptance by various "social" groups. Children's perception of their gender identity, and their possible attachment to certain cultural traditions and values, are two dimensions that can impact on their contacts with people who belong or not to the same groups. A positive image of belonging to a social, ethnic or cultural group can be a resource in a period of life when children and adolescents are questioning the meaning of life and their place in the world. More negatively, group belongingness, perceived or real, can be associated with subjective feeling of discrimination or exclusion, undermining social cohesion.

Measuring the social capital of adolescents is also important to understand whether the erosion of social cohesion that is often highlighted in public opinions surveys has its roots in childhood. Specifically, understanding how social capital develops requires attention being paid to children and adolescents' participation in group activities (e.g., participation in leisure, sport, cultural activities, as well as in volunteering activities), but also data being collected on their perception of the support they receive from family, peers, and community networks, the trust they have in the institutions that govern their life and on their knowledge and degree of concerns with regards to global and societal issues.

Improve the tracking of the risks and opportunities provided by the digital environment

Using digital technologies has become a major staple of everyday life, and for children it is no different. The current generation of children have been exposed to digital technology for their entire lives and are the most frequent users of emerging online and digital services. The digital environment has an influence on children's social and emotional well-being, with the development of internet-connected devices, social networks and digital tools are changing the ways in which children learn, spend their leisure time and interact with peers. While digital technologies create new opportunities for children's learning and social relationships, they also bring new challenges and risks (Burns and Gottschalk, 2019^[268]; OECD, 2018^[269]).

The age of children's first use of digital devices is dropping, with many pre-schoolers now familiar with digital tools before they are even exposed to books (Hooft Graafland, 2018^[270]). In 2015, 61% of 15-years old students across the OECD reported that they accessed the Internet for the first time when they were younger than 10 years of age, and 18% reported that they did so at or before the age of six. Recent data from the 2018 *OECD Early learning and Child Well-Being Study* on five-year-olds children in England (United Kingdom), Estonia and the United States, indicates even earlier use with the vast majority (83%) of preschool children using a digital device at least once a week and 42% doing so on a daily basis. Very little is still known about how early use of digital tools impacts children's development, with the results of this study suggesting that the relationship between regular use of electronic devices and children's skills development is mixed. For example, a positive relationship between the frequency of device use and the mental flexibility skills of children was found in Estonia and the United States but this was not the case in England. There were also some positive associations between device use and emergent literacy in England and the United States, but not in Estonia (OECD, 2020^[221]).

One concern around children's use of digital tools is that it could potentially displace physical activity or other activities considered important for child development. Some evidence suggests that screen exposure during the first three years is linked to negative health outcomes, including increased Body Mass Index, decreased cognitive and language development and reduced academic success (Duch et al., 2013^[271]). In light of these observations, the World Health Organization recommends that children under the age of five should not be exposed to sedentary screen time for more than one hour a day, recommending, if possible, a shorter duration supported by parental interactions (WHO, 2019^[272]).

The number of children with access to the internet at home and to a range of digital devices has been steadily increasing in OECD countries; in 2015, the proportion of 15-year-olds with access to internet at home was 95% across the OECD on average (OECD, 2017^[273]). On average across OECD countries, in 2015 about 7 in 10 students reported that they use the internet for at least two hours outside of school on a typical weekday (OECD, 2020^[274]). Also, a typical 15-year-old student had been using the internet since the age of 10, spending an average 29 hours per week on the Internet. However, the international development of data on the digital environment of children has mainly concentrated on adolescents, and there is a lack of comparable data on the amount of time children spend before they reach adolescence, the type of use and their learning of the Internet and digital tools.

Evidence on the effect of internet use and digital devices on school-age children is still limited. What is available suggests that moderate use can bring benefits, whilst both too much use or no activity in the digital environment can have a negative impact on children's mental well-being, including life satisfaction

(Burns and Gottschalk, 2019^[268]; Kardefelt-Winther, 2017^[275]; Przybylski and Weinstein, 2017^[276]; Inchley, 2016^[277]; OECD, 2018^[278]). A large-scale study of adolescents in England looked at moderate use of digital devices and suggested that the impact depended in part on whether it was a week-day or the weekend, with some digital activities better suited to week-days than others, for example switching between tasks on a computer versus playing a video game. Furthermore, whether digital activities actually interfered with other structured activities was relevant. Overall, moderate use was found not to present a material risk to social and emotional well-being, although high levels of engagement may have a measurable, albeit small, negative influence (Przybylski and Weinstein, 2017^[276]).

PISA data points to a negative association between time spent on the internet and life satisfaction, with extreme internet users (more than 6 hours a day) showing lower life satisfaction than any other student, while moderate internet users (1-2 hours a day) had the highest life satisfaction (OECD, 2017^[273]). In addition, both “extreme” and “high internet users” (i.e. more than 6 hours a week, and between 2 and 6 hours per week day respectively) are at greater risk of school disengagement school. One in four “extreme internet users” reported that they had arrived late for school in the two weeks prior to the PISA test – a share of 11 percentage points larger than the share of “moderate Internet users”. Moreover, the share of student expecting not to continue in education after secondary education was much higher among extreme internet users than in other groups.

The research shows an association between social media use and poor physical and mental health outcomes. For example, excessive social media use is associated with poorer sleeping patterns, and body image concerns and associated disordered eating among young women and men (with possibly the association strengthening over time) (OECD, 2018^[278]). Moreover, recent research on the effects of social media on clinically diagnosed depressed children underlines that social media can exacerbate depressive symptoms, with girls being more adversely affected than boys (Rich, 2019^[279]) (Royal College of Psychiatrists, 2020^[280]). Yet, the evidence base is still emerging and therefore it remains quite problematic to establish clear causality. One issue is that those children who already suffer from anxiety or depression appear to be also more prone to digital overdependence (OECD, 2019^[281]; Burns and Gottschalk, 2019^[268]).

Beyond measuring whether the intensity of Internet or social media use is problematic, it is important for policy makers to understand the different types of risks children can encounter online. Children face a variety of online risks, which are classified under the OECD revised Typology of Risk as content risks, conduct risks, contact risks and consumer risks (Box 5.5). The Typology also identifies risks that cut across these four risk categories, for instance privacy risks, and can have wide ranging effects on children’s lives. The different categories of risks requires countries to engage different sorts of protective measures, which is no mean feat given how rapidly the digital environment is evolving (OECD, 2020^[282]).

In order to help countries develop measures that adequately safeguard and protect children, more robust research is needed on the associated risks and opportunities, including the types of activities engaged in and of children’s experiences. This would help ascertain in a fuller sense the impact on children’s well-being. To this aim, PISA data provide information on the time spent by 15-years-old students on the Internet and it also gives some information on whether students use internet to play online games, participate in social networks, or online chat. The PISA survey also asks students whether they have been victims of cyberbullying. Data from the 2017/18 wave of the HBSC survey contained information on whether teenagers had any kind of negative experience with social media, encompassing cyberbullying and addiction like symptoms such as loss of control over one’s use of social media at the expense of other important life domains, including relationships with peers and parents, and hobbies (Van Den Eijnden, Lemmens and Valkenburg, 2016^[283]). On average, about 7% of 11, 13 and 15 year-old adolescents classified as problematic social media users (but the rate can be as high as 16% of 15 year-old adolescents in Spain, for example).

Further development of data in this area is important to better identify the positive benefits associated with certain type of digital use, Children should be taught about the positives and negatives outcomes of using

digital devices and empowered to build on their digital literacy skills. The development of data on the type of support received by children at home or at school is necessary to assess unmet needs in this area and to monitor the effectiveness of measures taken by countries to develop school-based learning in this area. To this aim, PISA 2018 asks students whether they have received any teaching at school on how to decide whether to trust information they read on the internet, how to detect phishing emails, or how well they understand the consequences of making personal information public on the internet. Though some children may not receive any teaching at school, their parents or other family members may be able to guide them well in this regard, but in some cases the opposite may be true. It seems desirable to collect information on children receiving guidance, either at school or at home, and on the quality of the guidance to children and parents.

Box 5.5. Children in the Digital Environment: Revised Typology of Risks

The OECD recently published a Revised Typology of Risks to provide an update to the 2011 Typology of Risks. The original Typology was adopted by Council and informed the 2012 OECD Recommendation on the Protection of Children Online. Such an update was regarded as necessary given the significant changes in nature of existing risks in the digital environment and the emergence of a number of new risks.

The Revised Typology of Risk contains four risk categories, which are: i) Content Risks; ii) Conduct Risks; iii) Contact Risks; and iv) Consumer Risks. Though the Revised Typology recognises some of the broad categories identified in 2011 (such as content and contact risks) as still relevant for today's children, it highlights that the substantive acts underlying these risks have changed and evolved over time. In particular, pre-existing risks, such as cyberbullying or exposure to harmful content have changed in nature, while different types of exploitation may pose as risks (e.g. sextortion). Among the new concerns that have emerged are the spread of mis- or dis-information ("fake news") or children acting in peer-to-peer exchanges where their own conduct can make them vulnerable (conduct risks).

The Revised Typology of Risk further identifies risks that cut across the four risk categories and that have the potential for wide ranging impacts on children's lives. These are: i) privacy risks; ii) advanced technology risks; and iii) health and wellbeing risks. For example, with the abundance of personal information collected, processed and shared through advanced technologies such as artificial intelligence and predictive analytics, children's data may also be used for the purpose of profiling, potentially affecting their fundamental legal rights and freedoms. There is also emerging concerns about the health and wellbeing effects of the digital technologies, for example, the consequences of screen time on cognitive and social-emotional development, and the effect of social media on mental health.

Source: Children in the Digital Environment: Revised Typology of Risks, (OECD, 2021^[284]).

Monitor progress on social inclusion of children with disabilities

Children with disabilities face higher social and environmental barriers to their full participation in society. Given the central role that school plays in children's lives, the *Convention on the Rights of Persons with Disabilities* affirms children's right to access inclusive, quality and free primary education and secondary education on an equal basis with others in the communities in which they live. Access to a local school helps children with disabilities integrate in the community and can also facilitate children remaining living at home with their families. Often children with disabilities need individual assistance to fully participate in a regular classroom. Therefore, to assess how countries' practices are evolving with regards to children

with disabilities inclusion in mainstream schools, indicators are needed on the numbers enrolled in mainstream schools and if they are receiving all of the appropriate support.

But at schools and in education are not the only areas in which children with disabilities may face obstacles. Section 5.3 above emphasised the importance of the neighbourhood and the built environment for children's social and emotional well-being, including access to green space, while earlier chapters stressed the importance of local learning, cultural and leisure facilities (e.g. play parks, recreation centres). Having access to these resources is no less important for children with disabilities than for other children, but they can be excluded due, for example, to the way these facilities and the broader built environment are constructed. Better data on the availability, accessibility and broader inclusiveness of these types of facilities/services – as well as on the accessibility of homes, shops, and community services, more generally – are important for understanding the additional barriers that children with disabilities may face to full participation in society.

Connect the dots: mental health issues, child outcomes and policies

While meeting the needs of children with mental health issues requires the provision of appropriate therapeutic supports, it also requires addressing needs arising in other areas of life, such as in education and physical health. For instance, children with mental health problems often experience difficulties at school. They have on average poorer educational outcomes and are over-represented among early school leavers. Later in life, poor mental health is a barrier to full participation in the labour market (OECD, 2015^[285]; OECD, 2018^[286]). From a data perspective, breaking this cycle requires the development of indicators comparing educational outcomes such as school drop-out rates, school performance, rates of transition to secondary education or the workforce between children with and without mental health issues.

Some children's level of mental health difficulties reach the threshold of requiring support from specialised mental health services. However, some children are unable access appropriate services for a variety of reasons: the family may not be aware of existing services, cost is prohibitive, services are inaccessible at a reasonable distance from the family home, or demand for services outstrips supply. In order to develop these services on an appropriate scale, it is necessary to develop information on the coverage of health care services and the different reasons for children in need not being able to access an adequate level of care.

Last but not least, addressing children's mental health problems requires significant public investment to provide supports that are age-appropriate and able to address the different sorts of mental health needs. For policy monitoring purposes, it is then important to measure public expenditure and how it evolves in response to mental health trends. There remain significant methodological challenges in collecting and comparing mental health spending, in particular scope of what services are included, and whether government expenditure or all expenditure is included (Hewlett, 2020^[144]).

References

- Alhusen, J., M. Hayat and D. Gross (2013), "A longitudinal study of maternal attachment and infant developmental outcomes", *Archives of Women's Mental Health*, Vol. 16/6, pp. 521-529, <http://dx.doi.org/10.1007/s00737-013-0357-8>. [47]
- Ann, K. and T. Vincent Bowles (2013), "The Importance of Belonging for Adolescents in Secondary School Settings", *The European Journal of Social & Behavioural Sciences*, pp. 2301-2218, <http://dx.doi.org/10.15405/ejsbs.72>. [8]

- Baker, M. and K. Milligan (2008), *Evidence From Maternity Leave Expansions of the Impact of Maternal Care on Early Child Development*, National Bureau of Economic Research, Cambridge, MA, <http://dx.doi.org/10.3386/w13826>. [242]
- Barker, D. and F. Kay-Lambkin (2016), *Alcohol and other drug use by young people with a mental illness Two at a time*, Orygen, The National Centre of Excellence in Youth Mental Health, <http://www.orygen.org.au> (accessed on 12 January 2021). [171]
- Barrett, L. and J. Russell (1999), "The Structure of Current Affect", *Current Directions in Psychological Science*, Vol. 8/1, pp. 10-14, <http://dx.doi.org/10.1111/1467-8721.00003>. [143]
- Bartko, W. et al. (2020), *Providing an Essential Service: An Overview of Afterschool Program Support of Children's Social-Emotional, Behavioral, and Physical Health During Middle Childhood*, Office of the Assistant Secretary for Planning and Evaluation & Office on Women's Health, Office of the Assistant Secretary for Health, U.S. Department of Health and Human Services, https://aspe.hhs.gov/system/files/pdf/265236/2_MCASP_Overview_Brief.pdf (accessed on 18 May 2021). [213]
- Bartlett, S. (2002), "Building Better Cities with Children and Youth", *Environment and Urbanization*, Vol. 14/2, pp. 3-10, <http://dx.doi.org/10.1177/095624780201400201>. [229]
- Baumeister, R. and M. Leary (1995), "The need to belong: Desire for interpersonal attachments as a fundamental human motivation.", *Psychological Bulletin*, Vol. 117/3, pp. 497-529, <https://doi.org/10.1037/0033-2909.117.3.497> (accessed on 24 March 2021). [92]
- Belcher, H. and H. Shinitzky (1998), "Substance abuse in children: Prediction, protection, and prevention", *Archives of Pediatrics and Adolescent Medicine*, Vol. 152/10, pp. 952-960, <http://dx.doi.org/10.1001/archpedi.152.10.952>. [164]
- Bell, M. et al. (2016), "Chronic illness and developmental vulnerability at school entry", *Pediatrics*, Vol. 137/5, p. 20152475, <http://dx.doi.org/10.1542/peds.2015-2475>. [172]
- Belsky, J. et al. (2020), *The Origins of You: How Childhood Shapes Later Life*, Harvard University Press, <https://www.hup.harvard.edu/catalog.php?isbn=9780674983458> (accessed on 31 May 2020). [25]
- Bennett, M. (2011), "Children's social identities", *Infant and Child Development*, Vol. 20/4, pp. 353-363, <http://dx.doi.org/10.1002/icd.741>. [93]
- Berger, M. (2019), *Sur la violence gratuite en France*, <https://www.decitre.fr/livres/sur-la-violence-gratuite-en-france-9782810009237.html> (accessed on 28 January 2021). [7]
- Bidzan-Bluma, I. and M. Lipowska (2018), "Physical Activity and Cognitive Functioning of Children: A Systematic Review", *International Journal of Environmental Research and Public Health*, Vol. 15/4, <http://dx.doi.org/10.3390/IJERPH15040800>. [261]
- Binns, H. et al. (2009), *The built environment: Designing communities to promote physical activity in children*, American Academy of Pediatrics, <http://dx.doi.org/10.1542/peds.2009-0750>. [224]
- Bogg, T. and B. Roberts (2004), *Conscientiousness and health-related behaviors: A meta-analysis of the leading behavioral contributors to mortality*, <http://dx.doi.org/10.1037/0033-2909.130.6.887>. [71]

- Bornstein, M. and D. Putnick (2018), "Parent–Adolescent Relationships in Global Perspective - Oxford Scholarship", in Lansford, J. and P. Banati (eds.), *Handbook of Adolescent Development Research and Its Impact on Global Policy* \$Users Without A Subscription Are Not Able To See The Full Content. *Handbook of Adolescent Development Research and Its Impact on Global Policy*, Oxford University Press, <http://dx.doi.org/10.1093/oso/9780190847128.003.0006> (accessed on 6 July 2020). [200]
- Borschmann, R. et al. (2017), "20-year outcomes in adolescents who self-harm: a population-based cohort study", *The Lancet Child and Adolescent Health*, Vol. 1/3, pp. 195-202, [http://dx.doi.org/10.1016/S2352-4642\(17\)30007-X](http://dx.doi.org/10.1016/S2352-4642(17)30007-X). [157]
- Brewer, M. (1991), "The Social Self: On Being the Same and Different at the Same Time", *Personality and Social Psychology Bulletin*, Vol. 17/5, pp. 475-482, <http://dx.doi.org/10.1177/0146167291175001>. [95]
- Brief, R. et al. (2014), *Students' educational and developmental outcomes at age 16 Effective Pre-school, Primary and Secondary Education (EPPSE 3-16) Project*, Institute of Education, University of London, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/351499/RB354_-_Students_educational_and_developmental_outcomes_at_age_16_Brief.pdf (accessed on 20 January 2021). [58]
- Brownell, C. (2013), "Early Development of Prosocial Behavior: Current Perspectives", *Infancy*, Vol. 18/1, pp. 1-9, <http://dx.doi.org/10.1111/inf.12004>. [117]
- Brownell, C. et al. (2013), "Mine or Yours? Development of Sharing in Toddlers in Relation to Ownership Understanding", *Child Development*, Vol. 84/3, pp. 906-920, <http://dx.doi.org/10.1111/cdev.12009>. [118]
- Bult, M. et al. (2011), "What influences participation in leisure activities of children and youth with physical disabilities? A systematic review", *Research in Developmental Disabilities*, Vol. 32/5, pp. 1521-1529, <http://dx.doi.org/10.1016/j.ridd.2011.01.045>. [178]
- Burns, T. and F. Gottschalk (eds.) (2020), *Education in the Digital Age: Healthy and Happy Children*, Educational Research and Innovation, OECD Publishing, https://www.oecd-ilibrary.org/education/education-in-the-digital-age_1209166a-en (accessed on 7 May 2021). [205]
- Burns, T. and F. Gottschalk (eds.) (2019), *Educating 21st Century Children: Emotional Well-being in the Digital Age*, Educational Research and Innovation, OECD Publishing,, <https://www.oecd-ilibrary.org/content/publication/b7f33425-en> (accessed on 7 May 2021). [204]
- Burns, T. and F. Gottschalk (eds.) (2019), *Educating 21st Century Children: Emotional Well-being in the Digital Age*, Educational Research and Innovation, OECD Publishing, Paris, <https://dx.doi.org/10.1787/b7f33425-en>. [268]
- Campbell, J. et al. (1996), "Self-Concept Clarity: Measurement, Personality Correlates, and Cultural Boundaries", *Journal of Personality and Social Psychology*, Vol. 70/1, pp. 141-156, <http://dx.doi.org/10.1037/0022-3514.70.1.141>. [80]
- Cannon, M. et al. (2013), *The Mental Health of Young People in Ireland: A report of the Psychiatric Epidemiology Research across the Lifespan (PERL) Group*, Royal College of Surgeons Ireland, Dublin, <http://www.rcsi.ie> (accessed on 6 January 2021). [163]

- Carlson, C., S. Uppal and E. Prosser (2000), "Ethnic Differences in Processes Contributing to the Self-Esteem of Early Adolescent Girls", *Journal of Early Adolescence*, Vol. 20/1, pp. 44-67, <https://journals.sagepub.com/doi/pdf/10.1177/0272431600020001003> (accessed on 30 March 2021). [105]
- Carpenter Rich, E. et al. (2009), "Social functioning difficulties in ADHD: Association with PDD risk", *Clinical Child Psychology and Psychiatry*, Vol. 14/3, pp. 329-344, <http://dx.doi.org/10.1177/1359104508100890>. [179]
- Carr, A. (2011), "Social and Emotional Development in Middle Childhood", in *Child Psychology and Psychiatry*, John Wiley & Sons, Ltd, <http://dx.doi.org/10.1002/9781119993971.ch10>. [30]
- Carver, P., J. Yunger and D. Perry (2003), "Gender identity and adjustment in middle childhood", *Sex Roles*, Vol. 49/3-4, pp. 95-109, <http://dx.doi.org/10.1023/A:1024423012063>. [104]
- Caspi, A. (2000), "The child is father of the man: Personality continuities from childhood to adulthood", *Journal of Personality and Social Psychology*, Vol. 78/1, pp. 158-172, <http://dx.doi.org/10.1037/0022-3514.78.1.158>. [35]
- CBNCCAS (2012), *Child Development and Arts Education: A review of Current Research and Best Practices*, College Board for The National Coalition for Core Arts Standards, <https://www.nationalartsstandards.org/sites/default/files/College%20Board%20Research%20-%20Child%20Development%20Report.pdf> (accessed on 14 June 2019). [265]
- Center on the Developing Child at Harvard University (2016), *From Best Practices to Breakthrough Impacts: A science-based approach to building a more promising future for young children and families*, <http://www.developingchild.harvard.edu> (accessed on 23 May 2019). [41]
- Cheek, N. and J. Cheek (2018), "Aspects of identity: From the inner-outer metaphor to a tetrapartite model of the self", *Self and Identity*, Vol. 17/4, pp. 467-482, <http://dx.doi.org/10.1080/15298868.2017.1412347>. [102]
- Chernyshenko, O., M. Kankaraš and F. Drasgow (2018), "Social and emotional skills for student success and well-being: Conceptual framework for the OECD study on social and emotional skills", *OECD Education Working Papers*, No. 173, OECD Publishing, Paris, <https://dx.doi.org/10.1787/db1d8e59-en>. [23]
- Chetty, R. and N. Hendren (2018), "The Impacts of Neighborhoods on Intergenerational Mobility I: Childhood Exposure Effects*", *The Quarterly Journal of Economics*, Vol. 133/3, pp. 1107-1162, <http://dx.doi.org/10.1093/qje/qjy007>. [221]
- Chetty, R., N. Hendren and L. Katz (2016), *The effects of exposure to better neighborhoods on children: New evidence from the moving to opportunity experiment*, American Economic Association, <http://dx.doi.org/10.1257/aer.20150572>. [222]
- Choi, A. (2018), "Emotional well-being of children and adolescents: Recent trends and relevant factors", *OECD Education Working Papers*, No. 169, OECD Publishing, Paris, <https://dx.doi.org/10.1787/41576fb2-en>. [134]
- Christensen, P. and M. O'Brien (2003), *Children in the City: Home Neighbourhood and Community* - Google Books, Routledge, <https://www.routledge.com/Children-in-the-City-Home-Neighbourhood-and-Community/Christensen-OBrien/p/book/9780415259255> (accessed on 7 July 2020). [228]

- Christian, H. et al. (2015), *The influence of the neighborhood physical environment on early child health and development: A review and call for research*, Elsevier Ltd, <http://dx.doi.org/10.1016/j.healthplace.2015.01.005>. [216]
- Chung, H. (2021), *Shared care, father's involvement in care and family well-being outcomes A Literature Review*, Government Equalities Office, United Kingdom, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/957538/Shared_care_and_well-being_outcomes- Literature_review.pdf (accessed on 21 January 2021). [43]
- Cimpian, A. et al. (2017), "Young Children's Self-Concepts Include Representations of Abstract Traits and the Global Self", *Child Development*, Vol. 88/6, pp. 1786-1798, <http://dx.doi.org/10.1111/cdev.12925>. [77]
- Clark, R. et al. (1997), "Length of Maternity Leave and Quality of Mother-Infant Interactions", *Child Development*, Vol. 68/2, p. 364, <http://dx.doi.org/10.2307/1131855>. [239]
- Collie, R., J. Shapka and N. Perry (2012), "School climate and social-emotional learning: Predicting teacher stress, job satisfaction, and teaching efficacy", *Journal of Educational Psychology*, Vol. 104/4, pp. 1189-1204, <http://dx.doi.org/10.1037/a0029356>. [206]
- Collishaw, S. (2015), "Annual research review: Secular trends in child and adolescent mental health", *Journal of Child Psychology and Psychiatry and Allied Disciplines*, Vol. 56/3, pp. 370-393, <http://dx.doi.org/10.1111/jcpp.12372>. [138]
- Collishaw, S. (2015), "Annual Research Review: Secular trends in child and adolescent mental health", *Journal of Child Psychology and Psychiatry*, Vol. 56/3, pp. 370-393, <http://dx.doi.org/10.1111/jcpp.12372>. [133]
- Collishaw, S. et al. (2019), "Brief report: a comparison of child mental health inequalities in three UK population cohorts", *European Child and Adolescent Psychiatry*, Vol. 28/11, pp. 1547-1549, <http://dx.doi.org/10.1007/s00787-019-01305-9>. [136]
- Collishaw, S. and R. Sellers (2020), "Trends in Child and Adolescent Mental Health Prevalence, Outcomes, and Inequalities", http://dx.doi.org/10.1007/978-981-10-0753-8_9-1. [249]
- Compas, B. et al. (2012), "Coping with Chronic Illness in Childhood and Adolescence", *Annual Review of Clinical Psychology*, Vol. 8/1, pp. 455-480, <http://dx.doi.org/10.1146/annurev-clinpsy-032511-143108>. [174]
- Conti, G. and J. Heckman (2014), "Economics of child well-being", in *Handbook of Child Well-Being: Theories, Methods and Policies in Global Perspective*, Springer Netherlands, http://dx.doi.org/10.1007/978-90-481-9063-8_21. [18]
- Cosci, F. and G. Fava (2013), *Staging of mental disorders: Systematic review*, S. Karger AG, <http://dx.doi.org/10.1159/000342243>. [181]
- Costello, E., W. Copeland and A. Angold (2011), "Trends in psychopathology across the adolescent years: What changes when children become adolescents, and when adolescents become adults?", *Journal of Child Psychology and Psychiatry*, Vol. 52/10, pp. 1015-1025, <http://dx.doi.org/10.1111/j.1469-7610.2011.02446.x>. [146]

- Crocetti, E. and M. Van Dijk (2016), "Self-Concept Clarity", in Levesque, R. (ed.), *Encyclopedia of Adolescence*, Springer International Publishing, http://dx.doi.org/10.1007/978-3-319-32132-5_808-2. [81]
- Cruwys, T. et al. (2014), "Depression and Social Identity: An Integrative Review", *Personality and Social Psychology Review*, Vol. 18/3, pp. 215-238, <http://dx.doi.org/10.1177/1088868314523839>. [96]
- Cunha, F. and J. Heckman (2007), "The technology of skill formation", *American Economic Review*, Vol. 97/2, pp. 31-47, <http://dx.doi.org/10.1257/aer.97.2.31>. [33]
- Curby, T., L. Brock and B. Hamre (2013), "Teachers' Emotional Support Consistency Predicts Children's Achievement Gains and Social Skills", *Early Education & Development*, Vol. 24/3, pp. 292-309, <http://dx.doi.org/10.1080/10409289.2012.665760>. [211]
- Daley, D. and J. Birchwood (2010), "ADHD and academic performance: why does ADHD impact on academic performance and what can be done to support ADHD children in the classroom?", *Child: Care, Health and Development*, Vol. 36/4, pp. 455-464, <http://dx.doi.org/10.1111/j.1365-2214.2009.01046.x>. [186]
- Danielsen, A. et al. (2009), "School-related social support and students' perceived life satisfaction", *Journal of Educational Research*, Vol. 102/4, pp. 303-320, <http://dx.doi.org/10.3200/JOER.102.4.303-320>. [209]
- Danielson, M. et al. (2018), "Prevalence of Parent-Reported ADHD Diagnosis and Associated Treatment Among U.S. Children and Adolescents, 2016", *Journal of Clinical Child and Adolescent Psychology*, Vol. 47/2, pp. 199-212, <http://dx.doi.org/10.1080/15374416.2017.1417860>. [184]
- Davoodi, T., L. Nelson and P. Blake (2020), "Children's Conceptions of Ownership for Self and Other: Categorical Ownership Versus Strength of Claim", *Child Development*, Vol. 91/1, pp. 163-178, <http://dx.doi.org/10.1111/cdev.13163>. [78]
- Dennis, C. and T. Dowswell (2013), *Psychosocial and psychological interventions for preventing postpartum depression*, John Wiley and Sons Ltd, <http://dx.doi.org/10.1002/14651858.CD001134.pub3>. [233]
- Dennis, C., K. Falah-Hassani and R. Shiri (2017), *Prevalence of antenatal and postnatal anxiety: Systematic review and meta-analysis*, Royal College of Psychiatrists, <http://dx.doi.org/10.1192/bjp.bp.116.187179>. [52]
- Deutscher, N. (2018), "Place, jobs, peers and the importance of the teenage years: exposure effects and intergenerational mobility", Crawford School of Public Policy, <https://www.rse.anu.edu.au/media/2326614/Deutscher-Paper-2018.pdf> (accessed on 12 June 2019). [218]
- Diaz-Diaz, C., P. Semeneć and P. Moss (2019), "Editorial: Opening for debate and contestation: OECD's International Early Learning and Child Well-being Study and the testing of children's learning outcomes", *Policy Futures in Education*, Vol. 17/1, pp. 1-10, <http://dx.doi.org/10.1177/1478210318823464>. [252]
- Diener, E. et al. (2009), "New Measures of Well-Being", in *Soc Indic Res*, http://dx.doi.org/10.1007/978-90-481-2354-4_12. [20]

- Duch, H. et al. (2013), *Screen time use in children under 3 years old: A systematic review of correlates*, BioMed Central, <http://dx.doi.org/10.1186/1479-5868-10-102>. [271]
- Duggan, A. et al. (2018), *Implementation of Evidence-Based Early Childhood Home Visiting: Results from the Mother and Infant Home Visiting Program Evaluation*, OPRE - MDRC, Washington, <http://www.mdrc.org>. (accessed on 20 November 2018). [235]
- Durlak, J. et al. (2011), "The Impact of Enhancing Students' Social and Emotional Learning: A Meta-Analysis of School-Based Universal Interventions", *Child Development*, Vol. 82/1, pp. 405-432, <http://dx.doi.org/10.1111/j.1467-8624.2010.01564.x>. [244]
- Eccles, J. (2007), "Families, Schools, and Developing Achievement-Related Motivations and Engagement. - PyscNET", in Grusec, J. and P. Hastings (eds.), *Handbook of socialization: Theory and research*, Guilford Press, <https://psycnet.apa.org/record/2006-23344-026> (accessed on 18 June 2020). [76]
- Eccles, J. et al. (1999), "Academic and motivational pathways through middle childhood", in Balter, L. and C. Tamis-LeMonda (eds.), *Child Psychology: A Handbook of Contemporary Issues*, Garland Press, <https://www.researchgate.net/publication/233896108> (accessed on 18 June 2020). [74]
- Egan, S. and D. Perry (2001), "Gender identity: a multidimensional analysis with implications for psychosocial adjustment.", *Developmental psychology*, Vol. 37/4, pp. 451-463, <http://dx.doi.org/10.1037/0012-1649.37.4.451>. [103]
- Eime, R. et al. (2013), *A systematic review of the psychological and social benefits of participation in sport for children and adolescents: Informing development of a conceptual model of health through sport*, <http://dx.doi.org/10.1186/1479-5868-10-98>. [262]
- Elgar, F. et al. (2015), "Socioeconomic inequalities in adolescent health 2002-2010: A time-series analysis of 34 countries participating in the Health Behaviour in School-aged Children study", *The Lancet*, Vol. 385/9982, pp. 2088-2095, [http://dx.doi.org/10.1016/S0140-6736\(14\)61460-4](http://dx.doi.org/10.1016/S0140-6736(14)61460-4). [135]
- Ergler, C., R. Kearns and K. Witten (2017), *Children's Health and Wellbeing in Urban Environments*, Routledge, <https://www.routledge.com/Childrens-Health-and-Wellbeing-in-Urban-Environments/Ergler-Kearns-Witten/p/book/9780367218997> (accessed on 7 July 2020). [231]
- ESPAD Group (2020), *ESPAD Report 2019: Results from the European School Survey Project on Alcohol and Other Drugs*, EMCDDA Joint Publications, Publications Office of the European Union, <https://europa.eu/!Xy37DU> (accessed on 7 May 2021). [166]
- Ewald, D. et al. (2018), "Development of a core set of quality indicators for paediatric primary care practices in Europe, COSI-PPC-EU", *European Journal of Pediatrics*, <http://dx.doi.org/10.1007/s00431-018-3140-z>. [188]
- Felfe, C., M. Lechner and A. Steinmayr (2016), "Sports and Child Development.", *PloS one*, Vol. 11/5, p. e0151729, <http://dx.doi.org/10.1371/journal.pone.0151729>. [264]
- Ferguson, K. et al. (2013), "The physical environment and child development: An international review", *International Journal of Psychology*, Vol. 48/4, pp. 437-468, <http://dx.doi.org/10.1080/00207594.2013.804190>. [226]

- Furstenberg, F. and M. Hughes (1995), "Social Capital and Successful Development among At-Risk Youth", *Journal of Marriage and the Family*, Vol. 57/3, p. 580, <http://dx.doi.org/10.2307/353914>. [131]
- Galliher, R., M. Jones and A. Dahl (2011), "Concurrent and Longitudinal Effects of Ethnic Identity and Experiences of Discrimination on Psychosocial Adjustment of Navajo Adolescents", *Developmental Psychology*, Vol. 47/2, pp. 509-526, <http://dx.doi.org/10.1037/a0021061>. [111]
- Galmiche, M. et al. (2019), "Prevalence of eating disorders over the 2000-2018 period: a systematic literature review", *Am J Clin Nutr*, Vol. 109, pp. 1402-1413, <http://dx.doi.org/10.1093/ajcn/nqy342>. [153]
- Galtry, J. and P. Callister (2005), "Assessing the Optimal Length of Parental Leave for Child and Parental Well-Being How Can Research Inform Policy?", <http://dx.doi.org/10.1177/0192513X04270344>. [237]
- Gardner, W. and A. Garr-Schultz (2018), "Understanding our groups, understanding ourselves: The importance of collective identity clarity and collective coherence to the self", in Lodi-Smith, J. and K. DeMarree (eds.), *Self-Concept Clarity: Perspectives on Assessment, Research, and Applications*, Springer International Publishing, http://dx.doi.org/10.1007/978-3-319-71547-6_7. [99]
- Gershuny, J. and O. Sullivan (2017), *United Kingdom Time Use Survey, 2014-2015*, Centre for Time Use Research, IOE, University College London, <http://doi.org/10.5255/UKDA-SN-8128-1> (accessed on 28 April 2021). [256]
- Glover, V. (2014), "Maternal depression, anxiety and stress during pregnancy and child outcome: What needs to be done", *Best Practice and Research: Clinical Obstetrics and Gynaecology*, Vol. 28/1, pp. 25-35, <http://dx.doi.org/10.1016/j.bpobgyn.2013.08.017>. [54]
- Goldberg, J. and M. Carlson (2014), "Parents' Relationship Quality and Children's Behavior in Stable Married and Cohabiting Families", *J Marriage Fam*, Vol. 76/4, pp. 762-777, <http://dx.doi.org/10.1111/jomf.12120>. [191]
- Golombok, S. and F. Tasker (2015), "Socioemotional Development in Changing Families", in *Handbook of Child Psychology and Developmental Science*, John Wiley & Sons, Inc., <http://dx.doi.org/10.1002/9781118963418.childpsy311>. [189]
- GUIDE (2020), *Growing Up In Digital Europe: EuroCohort*, <https://www.eurocohort.eu/>. [251]
- Habibi, A. et al. (2018), "Music training and child development: a review of recent findings from a longitudinal study", *Annals of the New York Academy of Sciences*, Vol. 1423/1, pp. 73-81, <http://dx.doi.org/10.1111/nyas.13606>. [267]
- Harpham, T. (2002), *Measuring the social capital of children*, Young Lives: An International Study of Childhood Poverty. [125]
- Hay, D. and K. Cook (2007), "The Transformation of Prosocial Behavior from Infancy to Childhood", in Brownell, C. and C. Kopp (eds.), *Socioemotional Development in the Toddler Years: Transitions and Transformations*, The Guilford Press, London, New York. [119]
- Heckman, J. and T. Kautz (2012), "Hard evidence on soft skills", *Labour Economics*, Vol. 19/4, pp. 451-464, <http://dx.doi.org/10.1016/j.labeco.2012.05.014>. [68]

- Heckman, J., J. Stixrud and S. Urzua (2006), “The Effects of Cognitive and Noncognitive Abilities on Labor Market Outcomes and Social Behavior”, *Journal of Labor Economics*, Vol. 24/3, <http://jenni.uchicago.edu/noncog/> (accessed on 3 June 2020). [34]
- Hewlett, E. (2020), *Mental Health Performance Benchmarking – Key Findings*, OECD - 27th Session of the Health Committee. [144]
- Hinshaw, S. et al. (2011), “International Variation in Treatment Procedures for ADHD: Social Context and Recent Trends”, *Psychiatric Services*, Vol. 62/5, pp. 459-464, http://dx.doi.org/10.1176/ps.62.5.pss6205_0459. [182]
- Hoof Graafland, J. (2018), “New technologies and 21st century children: Recent trends and outcomes”, *OECD Education Working Papers*, No. 179, OECD Publishing, Paris, <https://dx.doi.org/10.1787/e071a505-en>. [270]
- Howe, D. (2005), *Child Abuse and Neglect: Attachment, development and intervention*, Palgrave and Macmillan, <https://www.macmillanihe.com/page/detail/child-abuse-and-neglect-david-howe/?sf1=barcode&st1=9781403948267> (accessed on 6 January 2021). [26]
- Huber, J. et al. (2014), *Developing intercultural competence through education*, <http://book.coe.int> (accessed on 27 January 2021). [126]
- Huberty, T. (2004), “Emotional and Behavioral Problems, Students with”, in Spielberger, C. (ed.), *Encyclopedia of Applied Psychology*, Elsevier Science Ltd., <http://dx.doi.org/10.1016/B0-12-657410-3/00791-1>. [150]
- Huebener, M., D. Kuehnle and C. Spiess (2018), *Parental Leave Policies and Socio-Economic Gaps in Child Development: Evidence from a Substantial Benefit Reform Using Administrative Data*, <http://www.iza.org> (accessed on 9 December 2020). [241]
- Huerta, M. et al. (2013), “Fathers’ Leave, Fathers’ Involvement and Child Development: Are They Related? Evidence from Four OECD Countries”, *OECD Social, Employment and Migration Working Papers*, No. 140, OECD Publishing, Paris, <https://dx.doi.org/10.1787/5k4dlw9w6czq-en>. [240]
- Hulleman, C. et al. (2010), “A Meta-Analytic Review of Achievement Goal Measures: Different Labels for the Same Constructs or Different Constructs With Similar Labels?”, *Psychological Bulletin*, Vol. 136/3, pp. 422-449, <http://dx.doi.org/10.1037/a0018947>. [72]
- Hunt, P. (2019), *Target Group Discussion Paper on Children with Disabilities - Feasibility Study for a Child Guarantee*, European Commission, Brussels, <https://ec.europa.eu/social/main.jsp?catId=1428&langId=fr&moreDocuments=yes>. [177]
- IHME (2019), *Institute for Health Metrics and Evaluation*, <http://www.healthdata.org/>. [140]
- Inchley, J. (2016), *Growing Up Unequal: Gender and Socioeconomic Differences in Young People’s Health and Well-being, Health Behaviour in School-aged Children (HBSC) Study, International Report from the 2013/2014 Survey*, WHO Regional Office for Europe, <http://www.euro.who.int/en/data-and-evidence/> (accessed on 6 August 2018). [277]
- Istat (2018), *Multiscopo sulle famiglie: uso del tempo*, <https://www.istat.it/it/archivio/216733> (accessed on 28 April 2021). [255]

- Jamnik, M. and L. DiLalla (2019), "Health Outcomes Associated With Internalizing Problems in Early Childhood and Adolescence", *Frontiers in Psychology*, Vol. 10/JAN, p. 60, <http://dx.doi.org/10.3389/fpsyg.2019.00060>. [148]
- Jedwab, M. et al. (2019), "Children and youth in out-of-home care: What can predict an initial change in placement?", *Child Abuse & Neglect*, Vol. 93, pp. 55-65, <http://dx.doi.org/10.1016/j.chiabu.2019.04.009>. [60]
- John, O. and F. De Fruyt (2015), *Framework for the Longitudinal Study of Social and Emotional Skills in Cities*, OECD - Directorate for Education & Skills, [http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=EDU/CERI/CD\(2015\)13&docLanguage=En](http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=EDU/CERI/CD(2015)13&docLanguage=En) (accessed on 3 June 2020). [15]
- John, O., C. Naumann and Soto (2008), "Paradigm shift to the integrative Big-Five trait taxonomy: History, measurement, and conceptual issues", in John, O., R. Robins and L. Pervin (eds.), *Handbook of Personality: Theory and Research*, Guilford Press, New York. [287]
- Jordan, C. and S. Andersen (2017), "Sensitive periods of substance abuse: Early risk for the transition to dependence", *Developmental Cognitive Neuroscience*, Vol. 25, pp. 29-44, <http://dx.doi.org/10.1016/j.dcn.2016.10.004>. [165]
- Judge, T., D. Heller and M. Mount (2002), "Five-factor model of personality and job satisfaction: A meta-analysis", *Journal of Applied Psychology*, Vol. 87/3, pp. 530-541, <http://dx.doi.org/10.1037/0021-9010.87.3.530>. [37]
- Kahneman, D. and A. Deaton (2010), "High income improves evaluation of life but not emotional well-being", *Proceedings of the National Academy of Sciences of the United States of America*, Vol. 107/38, pp. 16489-16493, <http://dx.doi.org/10.1073/pnas.1011492107>. [19]
- Kankaraš, M. and J. Suarez-Alvarez (2019), "Assessment framework of the OECD Study on Social and Emotional Skills", *OECD Education Working Papers*, No. 207, OECD Publishing, Paris, <https://dx.doi.org/10.1787/5007adef-en>. [289]
- Karakaş, N. and F. Dağlı (2019), "The importance of attachment in infant and influencing factors", *Türk Pediatri Arsivi*, Vol. 54/2, pp. 76-81, <http://dx.doi.org/10.14744/TurkPediatriArs.2018.80269>. [50]
- Kardefelt-Winther, D. (2017), "How does the time children spend using digital technology impact their mental well-being, social relationships and physical activity? An evidence-focused literature review.", *Office of Research - Innocenti*, No. 2017-02, UNICEF, <http://www.unicef-irc.org> (accessed on 1 July 2020). [275]
- Kautz, T. et al. (2014), "Fostering and Measuring Skills: Improving Cognitive and Non-cognitive Skills to Promote Lifetime Success", *OECD Education Working Papers*, No. 110, OECD Publishing, Paris, <https://dx.doi.org/10.1787/5jxsr7vr78f7-en>. [1]
- Kayama, M. and N. Yamakawa (2020), "Acculturation and a sense of belonging of children in U.S. Schools and communities: The case of Japanese families", *Children and Youth Services Review*, Vol. 119, p. 105612, <http://dx.doi.org/10.1016/j.childyouth.2020.105612>. [100]
- Kessler, R. et al. (2007), "Age of onset of mental disorders: a review of recent literature.", *Current opinion in psychiatry*, Vol. 20/4, pp. 359-64, <http://dx.doi.org/10.1097/YCO.0b013e32816ebc8c>. [141]

- Kessler, R. et al. (2007), "Lifetime prevalence and age-of-onset distributions of mental disorders in the World Health Organization's World Mental Health Survey Initiative.", *World psychiatry : official journal of the World Psychiatric Association (WPA)*, Vol. 6/3, pp. 168-76, <http://www.ncbi.nlm.nih.gov/pubmed/18188442> (accessed on 4 July 2018). [142]
- Kiang, L., T. Yip and A. Fuligni (2008), "Multiple Social Identities and Adjustment in Young Adults From Ethnically Diverse Backgrounds", *Journal of Research on Adolescence*, Vol. 18/4, pp. 643-670, <http://dx.doi.org/10.1111/j.1532-7795.2008.00575.x>. [113]
- Kieling, C. et al. (2011), *Child and adolescent mental health worldwide: Evidence for action*, Elsevier, [http://dx.doi.org/10.1016/S0140-6736\(11\)60827-1](http://dx.doi.org/10.1016/S0140-6736(11)60827-1). [132]
- Kitzmann, K. (2012), "Domestic Violence and Its Impact on the Social and Emotional Development of Young Children", *Encyclopedia on Early Childhood Development*, <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.567.6850&rep=rep1&type=pdf> (accessed on 9 December 2020). [6]
- Klocke, A. and S. Stadtmüller (2019), "Social Capital in the Health Development of Children", *Child Indicators Research*, Vol. 12/4, pp. 1167-1185, <http://dx.doi.org/10.1007/s12187-018-9583-y>. [129]
- Kuther, T. (2020), "Socioemotional Development in Adolescence", in Kuther, T. (ed.), *Lifespan Development: Lives in Context*, SAGE, London, <https://edge.sagepub.com/node/29991/student-resources/chapter-4> (accessed on 12 June 2020). [32]
- Kuther, T. (2019), *Lifespan Development: Lives in Context*, Sage Publishing, Western Connecticut State University, USA, <https://us.sagepub.com/en-us/nam/lifespan-development/book259288> (accessed on 20 January 2021). [24]
- Labella, M. and A. Masten (2018), *Family influences on the development of aggression and violence*, Elsevier B.V., <http://dx.doi.org/10.1016/j.copsyc.2017.03.028>. [190]
- Lansford, J. (2019), "Parenting and Child Discipline", in *Handbook of Parenting*, Routledge, <http://dx.doi.org/10.4324/9780429401695-3>. [201]
- Large, M. et al. (2011), "Cannabis use and earlier onset of psychosis: A systematic meta-analysis", *Archives of General Psychiatry*, Vol. 68/6, pp. 555-561, <http://dx.doi.org/10.1001/archgenpsychiatry.2011.5>. [170]
- Leis, J. et al. (2014), "Associations between maternal mental health and child emotional and behavioral problems: Does prenatal mental health matter?", *Journal of Abnormal Child Psychology*, Vol. 42/1, pp. 161-171, <http://dx.doi.org/10.1007/s10802-013-9766-4>. [53]
- Leonard, M. (2005), "Children, Childhood and Social Capital: Exploring the Links", *Sociology*, Vol. 39/4, pp. 605-622, <http://dx.doi.org/10.1177/0038038505052490>. [123]
- Leventhal, T. and J. Brooks-Gunn (2000), "The Neighborhoods They Live in: The Effects of Neighborhood Residence on Child and Adolescent Outcomes", *Psychological Bulletin*, Vol. 126/2, pp. 309-337, <http://dx.doi.org/10.1037/0033-2909.126.2.309>. [219]

- Leventhal, T., V. Dupéré and J. Brooks-Gunn (2009), "Neighborhood influences on adolescent development. - PsycNET", in Lerner, R. and L. Steinberg (eds.), *Handbook of adolescent psychology: Contextual influences on adolescent development*, John Wiley & Sons Inc., <https://psycnet.apa.org/record/2009-05795-012> (accessed on 7 July 2020). [217]
- Levi, M. (1996), "Social and Unsocial Capital: A Review Essay of Robert Putnam's Making Democracy Work", *Politics & Society*, Vol. 24/1, pp. 45-55, <http://dx.doi.org/10.1177/0032329296024001005>. [130]
- Lillevoll, K., J. Kroger and M. Martinussen (2013), "Identity Status and Locus of Control: A Meta-Analysis", *Identity: An International Journal of Theory and Research*, Vol. 13/3, pp. 253-265, <http://dx.doi.org/10.1080/15283488.2013.799471>. [90]
- Limbers, C., L. Cohen and B. Gray (2018), "Eating disorders in adolescent and young adult males: prevalence, diagnosis, and treatment strategies", *Adolescent Health, Medicine and Therapeutics*, Vol. Volume 9, pp. 111-116, <http://dx.doi.org/10.2147/ahmt.s147480>. [154]
- Lippman, L. (2015), *Flourishing children : defining and testing indicators of positive development*, Springer, <https://www.springer.com/gp/book/9789401786065> (accessed on 2 June 2020). [14]
- MacDonald, K. (1992), "Warmth as a Developmental Construct: An Evolutionary Analysis", *Child Development*, Vol. 63/4, p. 753, <http://dx.doi.org/10.2307/1131231>. [199]
- Madge, N. et al. (2011), "Deliberate self-harm within an international community sample of young people: comparative findings from the Child & Adolescent Self-harm in Europe (CASE) Study", *Journal of Child Psychology and Psychiatry*, Vol. 49/6, pp. 667-677, <http://dx.doi.org/10.1111/j.1469-7610.2008.01879.x>. [156]
- Mahajan, M. (2019), "The IHME in the Shifting Landscape of Global Health Metrics", *Global Policy*, Vol. 10/S1, pp. 110-120, <http://dx.doi.org/10.1111/1758-5899.12605>. [248]
- Malekpour, M. (2007), "Effects of attachment on early and later development", *British Journal of Developmental Disabilities*, Vol. 53/2, pp. 81-95, <http://dx.doi.org/10.1179/096979507799103360>. [42]
- Mars, B. et al. (2016), "Using Data Linkage to Investigate Inconsistent Reporting of Self-Harm and Questionnaire Non-Response", *Archives of Suicide Research*, Vol. 20/2, pp. 113-141, <http://dx.doi.org/10.1080/13811118.2015.1033121>. [159]
- Masten, A. and D. Cicchetti (2010), "Developmental cascades: Part 1", *Development and Psychopathology*, Vol. 22/3, pp. 491-495, <http://dx.doi.org/10.1017/S0954579410000222>. [17]
- Masten, A. et al. (2010), "The significance of childhood competence and problems for adult success in work: A developmental cascade analysis", *Development and Psychopathology*, Vol. 22/3, pp. 679-694, <http://dx.doi.org/10.1017/S0954579410000362>. [11]
- McClelland, M. and C. Cameron (2011), "Self-regulation and academic achievement in elementary school children", *New Directions for Child and Adolescent Development*, Vol. 2011/133, pp. 29-44, <http://dx.doi.org/10.1002/cd.302>. [64]
- McClelland, M. et al. (2017), "Self-regulation", in *Handbook of Life Course Health Development*, Springer International Publishing, http://dx.doi.org/10.1007/978-3-319-47143-3_12. [65]

- McCollow, M. and H. Hoffman (2019), “Supporting Social Development in Young Children with Disabilities: Building a Practitioner’s Toolkit”, *Early Childhood Education Journal*, Vol. 47/3, pp. 309-320, <http://dx.doi.org/10.1007/s10643-019-00930-y>. [175]
- McConnell, M. and E. Moss (2011), “Attachment across the life span: Factors that contribute to stability and change”, *Australian Journal of Educational & Developmental Psychology*, Vol. 11, pp. 60-77, <http://www.newcastle.edu.au/journal/ajedp/> (accessed on 14 January 2021). [44]
- McCormick, R. (2017), *Does Access to Green Space Impact the Mental Well-being of Children: A Systematic Review*, W.B. Saunders, <http://dx.doi.org/10.1016/j.pedn.2017.08.027>. [227]
- McDaid, D., E. Hewlett and A. Park (2017), “Understanding effective approaches to promoting mental health and preventing mental illness”, *OECD Health Working Papers*, No. 97, OECD Publishing, Paris, <https://dx.doi.org/10.1787/bc364fb2-en>. [28]
- McKendrick, J. (2014), “Geographies of children’s well-being: In, of, and for place”, in *Handbook of Child Well-Being: Theories, Methods and Policies in Global Perspective*, Springer Netherlands, http://dx.doi.org/10.1007/978-90-481-9063-8_12. [220]
- McManus, S. et al. (2019), “Prevalence of non-suicidal self-harm and service contact in England, 2000–14: repeated cross-sectional surveys of the general population”, *The Lancet Psychiatry*, Vol. 6/7, pp. 573-581, [http://dx.doi.org/10.1016/S2215-0366\(19\)30188-9](http://dx.doi.org/10.1016/S2215-0366(19)30188-9). [160]
- Michalopoulos, C. et al. (2017), *Evidence on the Long-Term Effects of Home Visiting Programs: Laying the Groundwork for Long-Term Follow-Up in the Mother and Infant Home Visiting Program Evaluation (MIHOPE)*, <http://www.acf.hhs.gov/programs/opre> (accessed on 20 November 2018). [234]
- Miho, A. and O. Thévenon (2020), “Treating all children equally?: Why policies should adapt to evolving family living arrangements”, *OECD Social, Employment and Migration Working Papers*, No. 240, OECD Publishing, Paris, <https://dx.doi.org/10.1787/83307d97-en>. [192]
- Minh, A. et al. (2017), *A review of neighborhood effects and early child development: How, where, and for whom, do neighborhoods matter?*, Elsevier Ltd, <http://dx.doi.org/10.1016/j.healthplace.2017.04.012>. [215]
- Moffitt, T. et al. (2011), “A gradient of childhood self-control predicts health, wealth, and public safety”, *Proceedings of the National Academy of Sciences of the United States of America*, Vol. 108/7, pp. 2693-2698, <http://dx.doi.org/10.1073/pnas.1010076108>. [67]
- Montroy, J. et al. (2016), “The development of self-regulation across early childhood”, *Developmental Psychology*, Vol. 52/11, pp. 1744-1762, <http://dx.doi.org/10.1037/dev0000159>. [61]
- Morrow, V. (1999), “Conceptualising Social Capital in Relation to the Well-Being of Children and Young People: A Critical Review”, *The Sociological Review*, Vol. 47/4, pp. 744-765, <http://dx.doi.org/10.1111/1467-954X.00194>. [124]
- Mortensen, J. and M. Barnett (2015), “Teacher–Child Interactions in Infant/Toddler Child Care and Socioemotional Development”, *Early Education and Development*, Vol. 26/2, pp. 209-229, <http://dx.doi.org/10.1080/10409289.2015.985878>. [56]

- Moss, P. and M. Urban (2020), "The Organisation for Economic Co-operation and Development's International Early Learning and Child Well-being Study: The scores are in!", *Contemporary Issues in Early Childhood*, p. 146394912092946, <http://dx.doi.org/10.1177/1463949120929466>. [253]
- Muehlenkamp, J. et al. (2012), *International prevalence of adolescent non-suicidal self-injury and deliberate self-harm*, BioMed Central, <http://dx.doi.org/10.1186/1753-2000-6-10>. [158]
- Nam, H. and S. Nam (2018), "Child-friendly city policies in the Republic of Korea", *Children and Youth Services Review*, Vol. 94, pp. 545-556, <http://dx.doi.org/10.1016/j.childyouth.2018.08.033>. [260]
- Nario-Redmond, M. et al. (2004), "The Social and Personal Identities Scale: A Measure of the Differential Importance Ascribed to Social and Personal Self-Categorizations", *Self and Identity*, Vol. 3/2, pp. 143-175, <http://dx.doi.org/10.1080/13576500342000103>. [101]
- NIPH (2019), *Associations between parenting practices and child well-being: a systematic scoping review*, Norwegian Institute of Public Health, <https://www.fhi.no/en/publ/2019/Associations-between-parenting-practices-and-child-well-being/> (accessed on 26 January 2021). [198]
- Noffle, E. and R. Robins (2007), "Personality Predictors of Academic Outcomes: Big Five Correlates of GPA and SAT Scores", *Journal of Personality and Social Psychology*, Vol. 93/1, pp. 116-130, <http://dx.doi.org/10.1037/0022-3514.93.1.116>. [69]
- Nordström, M. (2010), "Children's Views on Child-friendly Environments in Different Geographical, Cultural and Social Neighbourhoods", *Urban Studies*, Vol. 47/3, pp. 514-528, <http://dx.doi.org/10.1177/0042098009349771>. [230]
- Nóvoa, A. (2018), "Comparing Southern Europe: the difference, the public, and the common", *Comparative Education*, Vol. 54/4, pp. 548-561, <http://dx.doi.org/10.1080/03050068.2018.1528781>. [254]
- Nowicki, S. et al. (2018), "Early Home-Life Antecedents of Children's Locus of Control", *Frontiers in Psychology*, Vol. 9, <http://dx.doi.org/10.3389/fpsyg.2018.02032>. [91]
- OECD (2021), "Children in the Digital Environment: Revised Typology of Risks", *OECD Digital Economy Papers*, No. 302, OECD Publishing, Paris, <https://doi.org/10.1787/9b8f222e-en>. [284]
- OECD (2021), *Survey of Social and Emotional Skills*, OECD Publishing. [2]
- OECD (2020), *Adolescents who are high or extreme internet users*, OECD Child Well-Being Data Portal, <http://www.oecd.org/social/family/child-well-being/data/activities/>. [274]
- OECD (2020), *CO4.4 Teenage suicides*, OECD Family Database, <https://www.oecd.org/els/family/database.htm>. [162]
- OECD (2020), *Early Learning and Child Well-being: A Study of Five-year-Olds in England, Estonia, and the United States*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/3990407f-en>. [22]
- OECD (2020), *OECD Draft Recommendation on Children in the Digital Environment: Revised Typology of Risks*, [https://one.oecd.org/document/DSTI/CDEP/DGP\(2020\)3/en/pdf](https://one.oecd.org/document/DSTI/CDEP/DGP(2020)3/en/pdf). [282]

- OECD (2019), *Changing the Odds for Vulnerable Children: Building Opportunities and Resilience*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/a2e8796c-en>. [223]
- OECD (2019), *OECD – University of Zurich Expert Consultation “Protection of Children in a Connected World” - 15-16 October, University of Zurich, Zurich, Switzerland*, [https://one.oecd.org/document/DSTI/CDEP/SPDE\(2019\)3/en/pdf](https://one.oecd.org/document/DSTI/CDEP/SPDE(2019)3/en/pdf). [281]
- OECD (2019), *OECD Employment Outlook 2019: The Future of Work*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9ee00155-en>. [13]
- OECD (2019), *OECD Future of Education and Skills 2030: OECD Learning Compass 2030: A Series of Concept Notes*, OECD, Paris, <https://www.oecd.org/education/2030-project/> (accessed on 5 May 2021). [12]
- OECD (2019), *PF4.3: Out-of-school-hours services*, OECD Family Database, <https://www.oecd.org/els/family/PF4-3-Out-of-school-hours-care.pdf> (accessed on 10 May 2021). [212]
- OECD (2019), *PISA 2018 Assessment and Analytical Framework*, PISA, OECD Publishing, Paris, <https://dx.doi.org/10.1787/b25efab8-en>. [246]
- OECD (2019), *PISA 2018 Results (Volume II): Where All Students Can Succeed*, PISA, OECD Publishing, Paris, <https://dx.doi.org/10.1787/b5fd1b8f-en>. [89]
- OECD (2019), *The Survey of Adult Skills: Reader’s companion, 3rd edition*, OECD Publishing, <https://doi.org/10.1787/f70238c7-en> (accessed on 3 June 2020). [288]
- OECD (2018), *Children & Young People’s Mental Health in the Digital Age: Shaping the future*, OECD Publishing, Paris, <https://www.oecd.org/els/health-systems/Children-and-Young-People-Mental-Health-in-the-Digital-Age.pdf> (accessed on 8 January 2021). [269]
- OECD (2018), *Children and Young People’s Mental Health in the Digital Age*, OECD, Paris, <http://www.oecd.org/els/health-systems/Children-and-Young-People-Mental-Health-in-the-Digital-Age.pdf>. [278]
- OECD (2018), *Engaging Young Children - Lessons from Research about Quality in Early Childhood Education and Care*, OECD Publishing, Paris, <https://doi.org/10.1787/9789264085145-en> (accessed on 31 August 2018). [202]
- OECD (2018), *Mental Health and Work: New Zealand*, Mental Health and Work, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264307315-en>. [286]
- OECD (2018), *Preparing our Youth for an Inclusive and Sustainable World. The OECD PISA Global Competence Framework*, <https://www.oecd.org/education/Global-competency-for-an-inclusive-world.pdf> (accessed on 27 January 2021). [128]
- OECD (2017), *PISA 2015 Results (Volume III) Students’ Well-Being*, OECD Publishing, Paris, <https://doi.org/10.1787/9789264273856-en> (accessed on 14 March 2019). [273]
- OECD (2017), *PISA 2015 Results (Volume III): Students’ Well-Being*, PISA, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264273856-en>. [145]
- OECD (2015), *Fit Mind, Fit Job: From Evidence to Practice in Mental Health and Work*, Mental Health and Work, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264228283-en>. [285]

- OECD (2015), *Skills for Social Progress: The Power of Social and Emotional Skills*, OECD Publishing, Paris, <https://doi.org/10.1787/9789264226159-en> (accessed on 26 May 2020). [38]
- OECD (2015), *Starting Strong IV: Monitoring Quality in Early Childhood Education and Care*, Starting Strong, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264233515-en>. [203]
- Olsson, C. et al. (2013), "A 32-Year Longitudinal Study of Child and Adolescent Pathways to Well-Being in Adulthood", *Journal of Happiness Studies*, Vol. 14/3, pp. 1069-1083, <http://dx.doi.org/10.1007/s10902-012-9369-8>. [10]
- Omoto, A., M. Snyder and J. Hackett (2010), "Personality and Motivational Antecedents of Activism and Civic Engagement", *Journal of Personality*, Vol. 78/6, pp. 1703-1734, <http://dx.doi.org/10.1111/j.1467-6494.2010.00667.x>. [39]
- Onnie Rogers, L. and A. Meltzoff (2017), "Is Gender More Important and Meaningful Than Race? An Analysis of Racial and Gender Identity Among Black, White, and Mixed-Race Children", *Cultural Diversity and Ethnic Minority Psychology*, Vol. 32/3, pp. 323-334, <http://dx.doi.org/10.1037/cdp0000125.supp>. [115]
- Orth, U. and R. Robins (2014), "The Development of Self-Esteem", *Current Directions in Psychological Science*, Vol. 23/5, pp. 381-387, <http://dx.doi.org/10.1177/0963721414547414>. [85]
- Patton, G. et al. (2016), "Our future: a Lancet commission on adolescent health and wellbeing The Lancet Commissions Executive summary", *The Lancet*, Vol. 387, pp. 2423-2478, [http://dx.doi.org/10.1016/S0140-6736\(16\)00579-1](http://dx.doi.org/10.1016/S0140-6736(16)00579-1). [139]
- Pellegrini, A. (2009), "Research and Policy on Children's Play", *Child Development Perspectives*, Vol. 3/2, pp. 131-136, <http://dx.doi.org/10.1111/j.1750-8606.2009.00092.x>. [225]
- Penner, L. et al. (2005), "Prosocial Behavior: Multilevel Perspectives", *Annu. Rev. Psychol.*, Vol. 56, pp. 14-15, <http://dx.doi.org/10.1146/annurev.psych.56.091103.070141>. [116]
- Phillips, D. et al. (2017), "Puzzling It Out: The Current State of Scientific Knowledge on Pre-Kindergarten Effects", in *The Current State of Scientific Knowledge on Pre-Kindergarten Effects*, <https://www.brookings.edu/research/puzzling-it-out-the-current-state-of-scientific-knowledge-on-pre-kindergarten-effects/> (accessed on 20 January 2021). [57]
- Phinney, J. (1992), "The Multigroup Ethnic Identity Measure", *Journal of Adolescent Research*, Vol. 7/2, pp. 156-176, <http://dx.doi.org/10.1177/074355489272003>. [109]
- Phinney, J. and A. Ong (2007), "Conceptualization and Measurement of Ethnic Identity: Current Status and Future Directions", *Journal of Counseling Psychology*, Vol. 54/3, pp. 271-281, <http://dx.doi.org/10.1037/0022-0167.54.3.271>. [108]
- Pinquart, M. and Y. Shen (2011), "Depressive Symptoms in Children and Adolescents with Chronic Physical Illness: An Updated Meta-Analysis", *Journal of Pediatric Psychology*, Vol. 36/4, pp. 375-384, <http://dx.doi.org/10.1093/jpepsy/jsq104>. [173]
- Pirus, C. and H. Léridon (2010), "Large Child Cohort Studies across the World", *Population*, Vol. 65/4, pp. 575-629, https://www.cairn-int.info/article-E_POPU_1004_0671--large-child-cohort-studies-across-the-wo.htm# (accessed on 10 July 2020). [40]

- Plantenga, J. and C. Remery (2017), “Out-of-school childcare: Exploring availability and quality in EU member states”, *Journal of European Social Policy*, Vol. 27/1, pp. 25-39, <http://dx.doi.org/10.1177/0958928716672174>. [214]
- Plotka, R. and N. Busch-Rossnagel (2018), “The role of length of maternity leave in supporting mother–child interactions and attachment security among American mothers and their infants”, *International Journal of Child Care and Education Policy*, Vol. 12/1, pp. 1-18, <http://dx.doi.org/10.1186/s40723-018-0041-6>. [238]
- Poulton, R. (2011), *Childhood Self-control: a key component of resilience?*, University of Otago, https://www.ecc.org.nz/Folder?Action=View%20File&Folder_id=349&File=KEYNOTE4Richie_Poulten.pdf (accessed on 9 December 2020). [66]
- Proctor, C., P. Linley and J. Maltby (2009), *Youth life satisfaction: A review of the literature*, Springer, <http://dx.doi.org/10.1007/s10902-008-9110-9>. [21]
- Przybylski, A. and N. Weinstein (2017), “A Large-Scale Test of the Goldilocks Hypothesis”, *Psychological Science*, Vol. 28/2, pp. 204-215, <http://dx.doi.org/10.1177/0956797616678438>. [276]
- Putnam, R. (1995), “Bowling Alone: America’s Declining Social Capital | Journal of Democracy”, *Journal of Democracy*, Vol. 6/1, pp. 65-78, <https://www.journalofdemocracy.org/articles/bowling-alone-americas-declining-social-capital/> (accessed on 27 January 2021). [121]
- Putnick, D. et al. (2015), “Perceived mother and father acceptance-rejection predict four unique aspects of child adjustment across nine countries”, *Journal of Child Psychology and Psychiatry*, Vol. 56/8, pp. 923-932, <http://dx.doi.org/10.1111/jcpp.12366>. [195]
- Ranson, K. and L. Urichuk (2008), *The effect of parent-child attachment relationships on child biopsychosocial outcomes: A review*, <http://dx.doi.org/10.1080/03004430600685282>. [45]
- Rees, C. (2005), “Thinking about children’s attachments”, *Archives of Disease in Childhood*, Vol. 90/10, pp. 1058-1065, <http://dx.doi.org/10.1136/adc.2004.068650>. [49]
- Rees, G. (2017), *Children’s Views on Their Lives and Well-being: Findings from the Children’s Worlds Project*, Springer, <http://dx.doi.org/10.1007/978-3-319-65196-5> (accessed on 13 June 2019). [16]
- Reiska, E. et al. (2019), *Overview of National Strategies for Longitudinal Data Collection*, EuroCohort Working Paper, <http://www.eurocohort.eu/> (accessed on 10 July 2020). [250]
- Rich, M. (2019), *OECD-University of Zurich Expert Consultation “Protection of Children in a Connected World”*, [https://one.oecd.org/document/DSTI/CDEP/SPDE\(2019\)3/en/pdf](https://one.oecd.org/document/DSTI/CDEP/SPDE(2019)3/en/pdf). [279]
- Riding, S. et al. (2021), *Looking beyond COVID-19: Strengthening family support services across the OECD*, OECD Publishing, Paris, <https://doi.org/10.1787/86738ab2-en>. [245]
- Rivas-Drake, D. et al. (2014), “Ethnic and Racial Identity in Adolescence: Implications for Psychosocial, Academic, and Health Outcomes”, *Child Development*, Vol. 85/1, pp. 40-57, <http://dx.doi.org/10.1111/cdev.12200>. [107]
- Rodrigo, M., S. Byrne and B. Rodríguez (2014), “Parenting styles and child well-being”, in *Handbook of Child Well-Being: Theories, Methods and Policies in Global Perspective*, Springer Netherlands, http://dx.doi.org/10.1007/978-90-481-9063-8_86. [196]

- Romero, A. et al. (2014), "Resilience to discrimination stress across ethnic identity stages of development", *Journal of Applied Social Psychology*, Vol. 44/1, pp. 1-11, <http://dx.doi.org/10.1111/jasp.12192>. [112]
- Rosander, P. and M. Bäckström (2014), "Personality traits measured at baseline can predict academic performance in upper secondary school three years later", *Scandinavian Journal of Psychology*, Vol. 55/6, pp. 611-618, <http://dx.doi.org/10.1111/sjop.12165>. [70]
- Ross, H., O. Friedman and A. Field (2015), "Toddlers Assert and Acknowledge Ownership Rights", *Social Development*, Vol. 24/2, pp. 341-356, <http://dx.doi.org/10.1111/sode.12101>. [79]
- Royal College of Psychiatrists (2020), *Technology use and the mental health of children and young people*, <https://www.rcpsych.ac.uk/docs/default-source/improving-care/better-mh-policy/college-reports/college-report-cr225.pdf>. [280]
- Rucinski, C., J. Brown and J. Downer (2018), "Teacher-child relationships, classroom climate, and children's social-emotional and academic development", *Journal of Educational Psychology*, Vol. 110/7, pp. 992-1004, <http://dx.doi.org/10.1037/edu0000240>. [207]
- Runyan, D. et al. (1998), "Children who prosper in unfavorable environments: The relationship to social capital", *Pediatrics*, Vol. 101/1 I, pp. 12-18, <http://dx.doi.org/10.1542/peds.101.1.12>. [122]
- Rutherford, H. et al. (2015), *Emotion regulation in parenthood*, Mosby Inc., <http://dx.doi.org/10.1016/j.dr.2014.12.008>. [62]
- Sabol, T. and R. Pianta (2012), "Recent trends in research on teacher-child relationships", *Attachment and Human Development*, Vol. 14/3, pp. 213-231, <http://dx.doi.org/10.1080/14616734.2012.672262>. [210]
- Sachs, M. et al. (2017), "Increased engagement of the cognitive control network associated with music training in children during an fMRI Stroop task", *PLOS ONE*, Vol. 12/10, p. e0187254, <http://dx.doi.org/10.1371/journal.pone.0187254>. [266]
- Şahin, B. et al. (2018), "The relationship of clinical symptoms with social cognition in children diagnosed with attention deficit hyperactivity disorder, specific learning disorder or autism spectrum disorder", *Psychiatry Investigation*, Vol. 15/12, pp. 1144-1153, <http://dx.doi.org/10.30773/PI.2018.10.01>. [180]
- Schmidt, U. et al. (2016), "Eating disorders: The big issue", *The Lancet Psychiatry*, Vol. 3/4, pp. 313-315, [http://dx.doi.org/10.1016/S2215-0366\(16\)00081-X](http://dx.doi.org/10.1016/S2215-0366(16)00081-X). [151]
- Schoon, I. (2015), *The Impact of Early Life Skills on Later Outcomes. Report for the OECD*, <https://discovery.ucl.ac.uk/id/eprint/10051902/>. [27]
- Schoon, I., B. Nasim and R. Cook (2021), "Social inequalities in early childhood competences, and the relative role of social and emotional versus cognitive skills in predicting adult outcomes", *British Educational Research Journal*, p. berj.3724, <http://dx.doi.org/10.1002/berj.3724>. [4]
- Schoon, I. et al. (2015), *The Impact of Early Life Skills on Later Outcomes.*, OECD Directorate for Education and Skills, Education Policy Committee, <https://discovery.ucl.ac.uk/id/eprint/10051902/>. [3]

- Schwartz, S. et al. (2011), "Examining the light and dark sides of emerging Adults' identity: A study of identity status differences in positive and negative psychosocial functioning", *Journal of Youth and Adolescence*, Vol. 40/7, pp. 839-859, <http://dx.doi.org/10.1007/s10964-010-9606-6>. [88]
- Schwartz, S. et al. (2013), "Identity in Emerging Adulthood", *Emerging Adulthood*, Vol. 1/2, pp. 96-113, <http://dx.doi.org/10.1177/2167696813479781>. [82]
- Seaton, E. (2009), "Perceived Racial Discrimination and Racial Identity Profiles Among African American Adolescents", *Cultural Diversity and Ethnic Minority Psychology*, Vol. 15/2, pp. 137-144, <http://dx.doi.org/10.1037/a0015506>. [110]
- Shiffman, J. and Y. Shawar (2020), *Strengthening accountability of the global health metrics enterprise*, Lancet Publishing Group, [http://dx.doi.org/10.1016/S0140-6736\(20\)30416-5](http://dx.doi.org/10.1016/S0140-6736(20)30416-5). [247]
- Shochet, I. et al. (2006), "School connectedness is an underemphasized parameter in adolescent mental health: Results of a community prediction study", *Journal of Clinical Child and Adolescent Psychology*, Vol. 35/2, pp. 170-179, http://dx.doi.org/10.1207/s15374424jccp3502_1. [9]
- Shuey, E. and M. Kankaras (2018), *The Power and Promise of Early Learning*, OECD Publishing, Paris, <https://doi.org/10.1787/f9b2e53f-en>. [5]
- Solish, A., A. Perry and P. Minnes (2010), "Participation of children with and without disabilities in social, recreational and leisure activities", *Journal of Applied Research in Intellectual Disabilities*, Vol. 23/3, pp. 226-236, <http://dx.doi.org/10.1111/j.1468-3148.2009.00525.x>. [176]
- Squeglia, L. and K. Gray (2016), *Alcohol and Drug Use and the Developing Brain*, Current Medicine Group LLC 1, <http://dx.doi.org/10.1007/s11920-016-0689-y>. [167]
- Squeglia, L., J. Jacobus and S. Tapert (2009), *The influence of substance use on adolescent brain development*, EEG and Clinical Neuroscience Society (ECNS), <http://dx.doi.org/10.1177/155005940904000110>. [168]
- Sroufe, L. et al. (2005), *The development of the person*, The Guilford Press, <http://dx.doi.org/10.1080/14616730500365886>. [48]
- Steiger, A. et al. (2014), "Low and decreasing self-esteem during adolescence predict adult depression two decades later", *Journal of Personality and Social Psychology*, Vol. 106/2, pp. 325-338, <http://dx.doi.org/10.1037/a0035133>. [86]
- Steinbach, A. (2019), "Children's and Parents' Well-Being in Joint Physical Custody: A Literature Review", *Family Process*, Vol. 58/2, pp. 353-369, <http://dx.doi.org/10.1111/famp.12372>. [194]
- Sterrett, E. et al. (2011), *Supportive Non-Parental Adults and Adolescent Psychosocial Functioning: Using Social Support as a Theoretical Framework*, NIH Public Access, <http://dx.doi.org/10.1007/s10464-011-9429-y>. [59]
- Strickhouser, J., E. Zell and Z. Krizan (2017), "Does personality predict health and well-being? A metasynthesis", *Health Psychology*, Vol. 36/8, pp. 797-810, <http://dx.doi.org/10.1037/hea0000475>. [36]

- Suárez-Orozco, M. (2007), *Learning in the global era: International perspectives on globalization and educations*, University of California Press, <http://dx.doi.org/10.1525/california/9780520254343.001.0001>. [127]
- Swann, W., C. Chang-Schneider and K. McClarty (2007), "Do people's self-views matter? Self-concept and self-esteem in everyday life", *American Psychologist*, Vol. 62/2, pp. 84-94, <http://dx.doi.org/10.1037/0003-066X.62.2.84>. [84]
- Tajfel, H. and J. Turner (2004), "The Social Identity Theory of Intergroup Behavior", in Jost, J. and J. Sidanius (eds.), *Political Psychology: Key Readings*, Psychology Press, <http://dx.doi.org/10.4324/9780203505984-16>. [94]
- Tandon, M., E. Cardeli and J. Luby (2009), *Internalizing Disorders in Early Childhood: A Review of Depressive and Anxiety Disorders*, NIH Public Access, <http://dx.doi.org/10.1016/j.chc.2009.03.004>. [147]
- Tanner Stapleton, L. et al. (2012), "Perceived partner support in pregnancy predicts lower maternal and infant distress", *Journal of Family Psychology*, Vol. 26/3, pp. 453-463, <http://dx.doi.org/10.1037/a0028332>. [55]
- Taylor, D. and E. Usborne (2010), "When I Know Who "We" Are, I Can Be "Me": The Primary Role of Cultural Identity Clarity for Psychological Well-Being", *Transcultural Psychiatry*, Vol. 47/1, pp. 93-111, <http://dx.doi.org/10.1177/1363461510364569>. [97]
- Tennant, J. et al. (2015), "Students' ratings of teacher support and academic and social-emotional well-being", *School Psychology Quarterly*, Vol. 30/4, pp. 494-512, <http://dx.doi.org/10.1037/spq000106>. [208]
- Treasure, J., T. Duarte and U. Schmidt (2020), *Eating disorders*, Lancet Publishing Group, [http://dx.doi.org/10.1016/S0140-6736\(20\)30059-3](http://dx.doi.org/10.1016/S0140-6736(20)30059-3). [152]
- Turner, K. and C. Brown (2007), "The Centrality of Gender and Ethnic Identities across Individuals and Contexts", *Social Development*, Vol. 16/4, pp. 700-719, <http://dx.doi.org/10.1111/j.1467-9507.2007.00403.x>. [114]
- Ulferts, H. (2020), "Why parenting matters for children in the 21st century: An evidence-based framework for understanding parenting and its impact on child development", *OECD Education Working Papers*, No. 222, OECD Publishing, Paris, <https://dx.doi.org/10.1787/129a1a59-en>. [197]
- Umaña-Taylor, A., M. Gonzales-Backen and A. Guimond (2009), "Latino Adolescents' Ethnic Identity: Is There a Developmental Progression and Does Growth in Ethnic Identity Predict Growth in Self-Esteem?", *Child Development*, Vol. 80/2, pp. 391-405, <http://dx.doi.org/10.1111/j.1467-8624.2009.01267.x>. [106]
- UNICEF (2019), *Getting into the Game: Understanding the evidence for child-focused sport for development*, Unicef - Office of Research - Innocenti, <https://www.unicef.org/media/51556/file/%20Getting-into-the-game-summary-2019.pdf%20.pdf>. [263]
- UNICEF (2018), *Strategies: Laws and Policies | Child Friendly Cities Initiative*, <https://childfriendlycities.org/strategies-child-friendly-policies-legal-framework-and-programmes/> (accessed on 9 March 2020). [258]

- UNICEF (2004), *Building Child Friendly Cities: A framework for action*, UNICEF, [257]
<https://www.unicef-irc.org/publications/416-building-child-friendly-cities-a-framework-for-action.html> (accessed on 9 March 2020).
- Ursache, A., C. Blair and C. Raver (2012), *The Promotion of Self-Regulation as a Means of Enhancing School Readiness and Early Achievement in Children at Risk for School Failure*, John Wiley & Sons, Ltd, <http://dx.doi.org/10.1111/j.1750-8606.2011.00209.x>. [63]
- Usborne, E. and D. Taylor (2010), "The role of cultural identity clarity for self-concept clarity, self-esteem, and subjective well-being", *Personality and Social Psychology Bulletin*, Vol. 36/7, pp. 883-897, <http://dx.doi.org/10.1177/0146167210372215>. [98]
- Van Den Eijnden, R., J. Lemmens and P. Valkenburg (2016), "The Social Media Disorder Scale: Validity and psychometric properties", *Computers in Human Behavior*, Vol. 61, pp. 478-487, <http://dx.doi.org/10.1016/j.chb.2016.03.038>. [283]
- Van der Graaff, J. et al. (2018), "Prosocial Behavior in Adolescence: Gender Differences in Development and Links with Empathy", *Journal of Youth and Adolescence*, Vol. 47/5, pp. 1086-1099, <http://dx.doi.org/10.1007/s10964-017-0786-1>. [120]
- Van Dijk, M. et al. (2014), "Self-Concept Clarity Across Adolescence: Longitudinal Associations With Open Communication With Parents and Internalizing Symptoms", *Journal of Youth and Adolescence*, Vol. 43/11, pp. 1861-1876, <http://dx.doi.org/10.1007/s10964-013-0055-x>. [83]
- Van Naarden Braun, K. et al. (2015), "Trends in the prevalence of autism spectrum disorder, cerebral palsy, hearing loss, intellectual disability, and vision impairment, metropolitan Atlanta, 1991-2010", *PLoS ONE*, Vol. 10/4, <http://dx.doi.org/10.1371/journal.pone.0124120>. [185]
- Van Niel, M. et al. (2020), *The Impact of Paid Maternity Leave on the Mental and Physical Health of Mothers and Children: A Review of the Literature and Policy Implications*, Lippincott Williams and Wilkins, <http://dx.doi.org/10.1097/HRP.0000000000000246>. [236]
- Visser, S. et al. (2014), "Trends in the parent-report of health care provider-diagnosed and medicated attention-deficit/hyperactivity disorder: United States, 2003-2011", *Journal of the American Academy of Child and Adolescent Psychiatry*, Vol. 53/1, pp. 34-46.e2, <http://dx.doi.org/10.1016/j.jaac.2013.09.001>. [183]
- Vivanti, G. et al. (2017), "Early Learning in Autism", in *Implementing the Group-Based Early Start Denver Model for Preschoolers with Autism*, Springer International Publishing, http://dx.doi.org/10.1007/978-3-319-49691-7_1. [187]
- Waterman, A. (2007), "Doing Well: The Relationship of Identity Status to Three Conceptions of Well-Being", *Identity*, Vol. 7/4, pp. 289-307, <http://dx.doi.org/10.1080/15283480701600769>. [87]
- Weare, K. and M. Nind (2011), "Mental health promotion and problem prevention in schools: What does the evidence say?", *Health Promotion International*, Vol. 26/SUPPL. 1, <http://dx.doi.org/10.1093/heapro/dar075>. [243]
- WHO (2019), *Guidelines on physical activity, sedentary behaviour and sleep for children under 5 years of age*, World Health Organization, <https://apps.who.int/iris/handle/10665/311664>. (accessed on 30 June 2020). [272]
- WHO (2018), *Child and adolescent mental health*, World Health Organisation, https://www.who.int/mental_health/maternal-child/child_adolescent/en/. [137]

- WHO (2014), *Adolescent Health Epidemiology*, WHO, [161]
https://www.who.int/maternal_child_adolescent/epidemiology/adolescence/en/ (accessed on 12 January 2021).
- Wichstrøm, L. et al. (2012), "Prevalence of psychiatric disorders in preschoolers", *Journal of Child Psychology and Psychiatry and Allied Disciplines*, Vol. 53/6, pp. 695-705, [149]
<http://dx.doi.org/10.1111/j.1469-7610.2011.02514.x>.
- Widom, C. et al. (2018), "Does adult attachment style mediate the relationship between childhood maltreatment and mental and physical health outcomes?", *Child Abuse and Neglect*, Vol. 76, pp. 533-545, [46]
<http://dx.doi.org/10.1016/j.chiabu.2017.05.002>.
- Wigfield, A. et al. (2007), "Development of Achievement Motivation", in *Handbook of Child Psychology*, John Wiley & Sons, Inc., [75]
<http://dx.doi.org/10.1002/9780470147658.chpsy0315>.
- Wigfield, A., K. Muenks and E. Rosenzweig (2015), "Children's Achievement Motivation in School", in Ch. M., J. Stephens and P. Watson (eds.), *International Handbook of the Social Psychology of the Classroom*, Routledge, [73]
<https://www.researchgate.net/publication/286930126> (accessed on 18 June 2020).
- Wolitzky-Taylor, K. et al. (2012), "Longitudinal investigation of the impact of anxiety and mood disorders in adolescence on subsequent substance use disorder onset and vice versa", *Addictive Behaviors*, Vol. 37/8, pp. 982-985, [169]
<http://dx.doi.org/10.1016/j.addbeh.2012.03.026>.
- Wood, J., D. Bornat and A. Biquelet-Lock (2019), *Child Friendly Planning in the UK: A Review*, [232]
<https://www.rtpi.org.uk/media/1633/childfriendlyplanningintheukareview2019.pdf> (accessed on 15 May 2021).
- Woody, C. et al. (2017), *A systematic review and meta-regression of the prevalence and incidence of perinatal depression*, Elsevier B.V., [51]
<http://dx.doi.org/10.1016/j.jad.2017.05.003>.
- Woolcock, G., B. Gleeson and B. Randolph (2010), *Urban research and child-friendly cities: A new Australian outline*, [259]
<http://dx.doi.org/10.1080/14733281003691426>.
- Xerxa, Y. et al. (2020), "The Complex Role of Parental Separation in the Association between Family Conflict and Child Problem Behavior", *Journal of Clinical Child and Adolescent Psychology*, Vol. 49/1, pp. 79-93, [193]
<http://dx.doi.org/10.1080/15374416.2018.1520118>.
- Yüceliyiğit, S. (2020), "Middle Childhood Development", in Neriman, A. (ed.), *Handbook of Research on Prenatal, Postnatal, and Early Childhood Development*, [31]
<http://dx.doi.org/10.4018/978-1-7998-2952-2.ch011>.
- Zaouche-Gaudron, C. (2015), *Le développement social de l'enfant - Du bébé à l'enfant d'âge scolaire - Livre et ebook Psychologie cognitive de Chantal Zaouche Gaudron - Dunod*, Dunod, Paris, [29]
<https://www.dunod.com/sciences-humaines-et-sociales/developpement-social-enfant-du-bebe-enfant-d-age-scolaire-0> (accessed on 31 May 2020).
- Zipfel, S. et al. (2015), *Anorexia nervosa: Aetiology, assessment, and treatment*, Elsevier Ltd, [155]
[http://dx.doi.org/10.1016/S2215-0366\(15\)00356-9](http://dx.doi.org/10.1016/S2215-0366(15)00356-9).

Annex 5.A. The Big Five domains of social-emotional development

The Big Five framework is a well-established taxonomy to which essentially all social and emotional skills can be cross-referenced (John, Naumann and Soto, 2008^[287]; John and De Fruyt, 2015^[15]). This taxonomy provides a simple, parsimonious and organized categorisation of social-emotional development. It is used at the OECD for developing surveys on social-emotional skill development of children, based on the evidence that these domains are predictive of a wide range of later life outcomes including educational success, well-being, health, work performance and social interactions (Chernyshenko, Kankaraš and Drasgow, 2018^[23]; John and De Fruyt, 2015^[15]; Lippman, 2015^[14]; OECD, 2019^[288]).

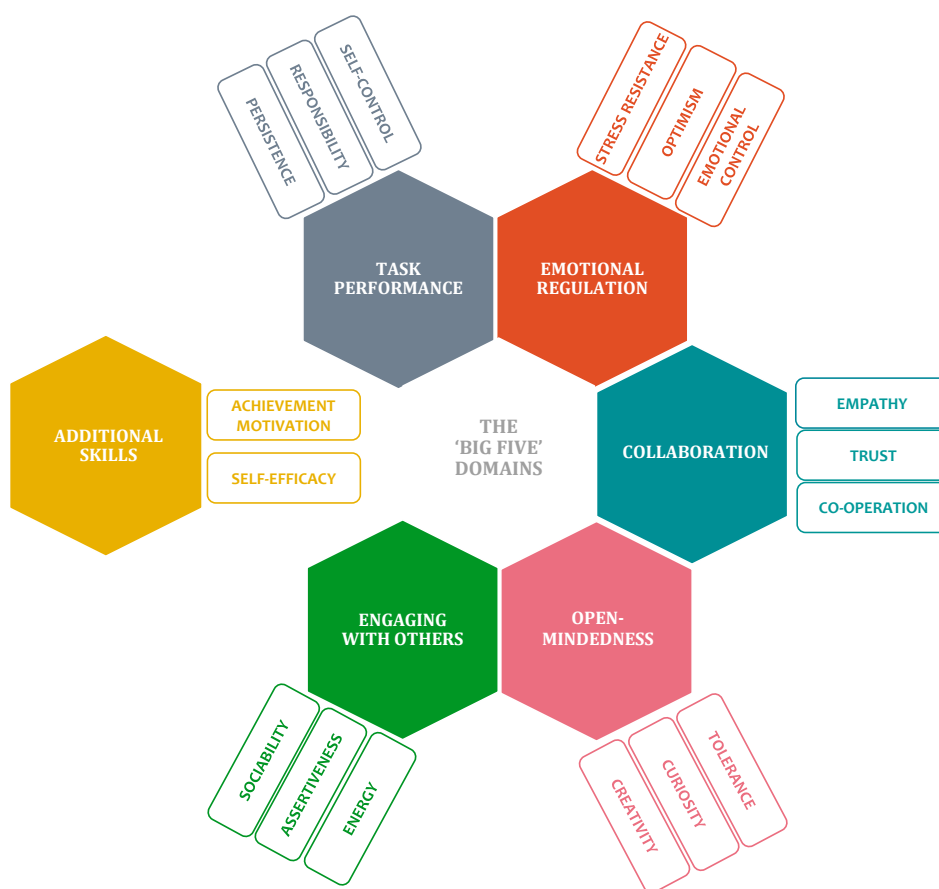
As such, it offers an integrative function, outlining a common, empirically-based framework to a myriad of social and emotional measurable personality characteristics (John, Naumann and Soto, 2008^[287]; John and De Fruyt, 2015^[15]). The Big Five domains account for personality characteristics which are organised hierarchically, with broad, higher-order characteristics that can be split into narrower, lower-order ones. The Big Five characteristics are widely regarded as providing an optimal balance between conceptual breadth, descriptive specificity, and generalisability across cultures, samples and measures (Chernyshenko, Kankaraš and Drasgow, 2018^[23]).

As shown in Annex Figure 5.A.1, each of the five dimensions encompasses a cluster of mutually related social and emotional skills. For example, task performance (*conscientiousness*) includes self-control, responsibility and persistence, which are all qualities that contribute to performing well. Each skill refers to different behavioural expressions that need to be taken into account in order to have a fair and accurate view on the social-emotional skills that matter.

As illustrated by Annex Figure 5.A.1, the Big Five domains of personality traits are:

- *Emotional regulation* represents the degree to which individuals are able to control their emotional responses as well as the quality of their emotional states in general. Persons with high degrees of emotional stability will show more resilience in stressful situations, will be less likely to experience anger, irritation or sudden changes of mood, and will tend to have a more optimistic view of the world and outlook of the future.
- *Conscientiousness* (task performance) refers to the tendency of individuals for self-controlled, organised, and cautiously planned behaviour, as well as of making persistent and dedicated efforts to achieve personal goals.
- *Openness to experience* (open-mindedness) involves the degree to which people are open to intellectual stimulation in general, as reflected in their intellectual curiosity, imagination, creativity, preference for novelty, and also to self-reflection and self-exploration.
- *Extraversion* (engaging with others) represents the tendency to seek the company of others, to initiate and maintain connections, and to feel comfortable and respected in the presence of others. Extraverted individuals are also more likely to show assertiveness in social situations and provide leadership.
- *Agreeableness* (collaboration) refers individuals tendency to cooperate, maintain positive relations with others, minimise interpersonal conflict and show empathy towards others.

Annex Figure 5.A.1. The Big Five Domains of social-emotional development



Note: Classification of social and emotional skills as operationalised in the OECD Study on Social and Emotional Skills (SSES). The SSES examines 15 skills spread across the “Big Five” domains. Two additional skills (achievement motivation and self-efficacy) are also measured using indices calculated from a selection of items that belong to scales of related skills.

Source: (Kankaraš and Suarez-Alvarez, 2019^[289]), “Assessment framework of the OECD Study on Social and Emotional Skills”, *OECD Education Working Papers, No. 207*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/5007adef-en>.

Each personality dimension is made up of traits or skills that have a specific role and can be assessed independently. The assessment framework used by the OECD includes 15 social-emotional competencies to measure these five dimensions of personality (Chernyshenko, Kankaraš and Drasgow, 2018^[23]; Kankaraš and Suarez-Alvarez, 2019^[289]).

Not all personality traits with proven effects on child outcomes fall strictly in this categorisation, however. This is notably the case of individuals’ capacity to question their emotions, attitudes and motivations, an ability that children acquire as they grow up and which involves reflective thinking. Several emotional constructs refer to such human capacity, including the concepts of locus of control, self-confidence, self-esteem, and self-efficacy or having a “growth mind-set”.

Annex 5.B. Overview of data on children's social and emotional well-being

Data availability for adolescence

Annex Table 5.B.1 provides a mapping of the broad spectrum of the social and emotional outcomes covered by internationally available data for adolescents. The data include information on global satisfaction with life as well as satisfaction by life domains such as health, school life, relationships with parents and teachers, and with what children possess or satisfaction with their physical appearance. The information is supplemented by the affects and feelings that adolescents report experiencing more or less frequently under normal circumstances. Another set of data concerns mental health disorders experienced by adolescents. The first subset includes data on neurodevelopmental and psychological disorders that are part of the data collected in the IHME Global Burden of Diseases on the prevalence of each type of disorder, including those identified as particularly relevant to adolescents (e.g. depression & anxiety, eating disorders, self-harm). The other subset consists of data on subjective health complaints available in the HBSC or PISA surveys, both of which allowing a comparison of the prevalence of these disorders according to different socio-demographic characteristics (see Annex Box 5.B.1 for an overview of social-emotional skills in PISA).

Two data sources relate to substance abuse. HBSC provides information on alcohol abuse, and the use of drugs such as cannabis, while the *European School Survey Project on Alcohol and Other Drugs* (ESPAD) provides more detailed information on drug use among 15- and 16-year-olds, including use of new psychoactive substances (i.e. painkillers, tranquillisers, sedatives and anabolic steroids). Only European countries are covered by this survey, which has been repeated every four years since 2003.

Finally, the HBSC and PISA data allow us to track important conduct problems through data on bullying, cyberbullying and the involvement of teenagers in physical fights.

Data on adolescents also cover a wide range of social-emotional skills. The PISA data first provide some information on students' emotional reactions to different school-related situations, including:

- the anxiety or nervousness felt by a student who has to take an exam or to solve a problem;
- students' sense of efficacy, or competence particularly in the face of adversity;
- the feeling a student has when failing to do something;
- students' belief in a growth mind-set, i.e. that someone's ability and intelligence can develop over time.

School-work conscientiousness is the topic of a block of questions in PISA 2018 surveys to assess students' achievement motivation, perseverance and aptitude to work hard to achieve his or her goal, and his or her perception and attitudes towards competition and cooperation.

The quality of interpersonal relationships established at school, in the family and with peers is the subject of a series of data that look at them from different angles. A first set of data from PISA surveys indicates whether students make friends easily, develop a sense of belonging to the school and are liked by other students, or if, instead, they perceive themselves as outsiders or feel lonely; the HBSC asks adolescents about their perception of the support provided by classmates. HBSC data also provide information on whether young adolescents perceive that their friends really try to help them, that they can count on them

when things go wrong, if they had friends with whom they can share their sorrows and joys, and if they can talk to them about their problems.

Another set of questions concern perceived teacher support: PISA data ask students whether they feel listened to, and understood by their teachers, and whether their teacher help them gain confidence; HBSC data provide information on the global perceived level of teacher support.

The quality of the relationship between adolescents and their parents is addressed through various questions. PISA surveys ask students about their perception of their parents' support in school and in gaining self-confidence. In addition, in PISA 2018 parents are asked about whether they are spending time to discuss with their children, and if they are talking about how children do at school, about school work or having discussion about general political and social issues. On the other hand, the HBSC data include information on how easy it is for young adolescents to talk to their mother and father separately about things that really bother them. Young people are also asked also about whether if they perceive that their family really tries to help them, that they can get emotional support from them when they need it, they can talk to their family about problems, and if the family is prepared to help them make decisions.

A novelty of the 2018 wave of PISA surveys in the context of the assessment of global competences was to include some information on adolescents' attitudes towards people having views that they disagree with, as well as their interest in or tolerance of other cultures, and their contact with people from other countries. Students are also asked about their knowledge of major world issues (including climate change, global health (e.g. epidemics), international conflicts, migration, hunger and malnutrition, causes of poverty, and gender equality).

Finally, data from different sources focus on "social" activities which adolescents participate in outside of school. It includes information on whether adolescents participate in domestic work or if they do some kind of paid work such as babysitting or summer jobs. European surveys on living conditions (EU-SILC) also include, in their ad-hoc modules on children, data on whether or not school-aged children can invite friends to play or eat at home, and on their participation in regular leisure activities outside the home.

A few data also exist on adolescents' participation people in voluntary work and their memberships to group organisations, including sports and recreational organisation; art, music or educational organisations; trade unions, political parties; humanitarian or charitable organisations; environmental organisations. Data on voter turnout can also be used, for example, to compare their participation in elections with that of older generations.

International surveys also look at the use of the internet and social media. PISA 2015 includes questions on current internet use, time spent, and age of first use. The HBSC survey asks teenagers about the use of social media, and in its latest wave about any negative experiences related to social media.

Annex Box 5.B.1. Social-emotional skills in PISA surveys

The *Programme for International Student Assessment (PISA)* is a triennial survey – since 2000 – that emphasises the functional skills that 15-year-old students have acquired in reading, mathematics and science literacy as they near the end of compulsory schooling. PISA also includes measures of general or cross-curricular competencies, such as collaborative problem-solving.

In recent years, PISA has broadened its scope by assessing a growing set of social and emotional skills. In particular, the latest PISA cycles include scales on various types of academic self-efficacy (belief in one's ability to successfully complete the task at hand), persistence, intellectual curiosity, meta-cognition, and achievement motivation. In 2015, PISA gathered international evidence on the importance of social and emotional skills, publishing a volume detailing key positive and negative well-being indicators, such as life satisfaction, bullying and anxiety (OECD, 2017^[273]). In *PISA 2015 Results (Volume III): Students' Well-Being*, the positive characteristics that promote healthy development such as interest, engagement, and motivation to achieve were explored. Moreover, for the first time in 2018, PISA assessed students' global competence, providing information on their abilities to examine local, global and intercultural issues, understand and appreciate different perspectives and world views, interact successfully and respectfully with others, and take responsible action towards sustainability and collective well-being (OECD, 2019^[246]).

Annex Table 5.B.1. International data on adolescents' social and emotional well-being

		Country coverage	Age coverage	Data source	Data type	Regular update	Disaggregation
Mental health and life satisfaction	Life satisfaction and affects						
	General and domain-specific satisfaction (e.g. school-life, body image)	Medium	11, 13 and 15 years old	HBSC	Survey	Yes	Yes
	General and domain-specific satisfaction (e.g. health, looks, school life, friends, neighbourhood, what children have, relationships with parents, teachers)	Good	15 years old	PISA 2018	Survey	Yes	Yes
	Affects (e.g. happy, lively, proud, joyful, cheerful, scared, miserable, afraid, sad)	Good	15 years old	PISA 2018	Survey	Yes	Yes
	Neurodevelopmental disorders						
	Autistic spectrum disorders, attention deficit & hyperactivity	Good	10-14 and 15-19 years old	IHME - Global Burden of Disease	Estimates based on survey and register data	Yes	No
	Internalising disorders and other psychological conditions						
	Depression & anxiety, eating disorders, self-harm	Good	10-14 and 15-19 years old	IHME - Global Burden of Disease	Estimates based on survey and register data	Yes	No
	Subjective health complaints (Head, stomach or back ache, trouble falling asleep, feeling dizzy, nervous, low, irritable)	Moderate	11, 13 and 15 years old	HBSC	Survey	Yes	Yes
		Good	15 years old	PISA 2018	Survey	Yes	Yes
	Substance use						
	Alcohol use, drunkenness, smoking, cannabis use	Moderate	11, 13 and 15 years old	HBSC	Survey	Yes	Yes
	Drug use, including new psychoactive substances	Moderate (Europe only)	15-16 years old	ESPAD	Survey	Yes	Yes
	Teenage suicides	Good	15-19 years old	WHO mortality database	Vital statistics	Yes	No
	Conduct disorders						
	Bullying or cyberbullying victimisation	Moderate	11, 13 and 15 years old	HBSC	Survey	Yes	Yes
		Good	15 years old	PISA 2018	Survey	Yes	Yes
Fighting	Moderate	11, 13 and 15 years	HBSC	Survey	Yes	Yes	

		Country coverage	Age coverage	Data source	Data type	Regular update	Disaggregation
			old				
Socio-emotional skills	Emotional regulation / reflective thinking						
	School-work anxiety	Good	15 years old	PISA 2015	Survey	Uncertain	Yes
	Self-efficacy	Good	15 years old	PISA 2018	Survey	Yes	Yes
	Emotion following a failure	Good	15 years old	PISA 2018	Survey	Yes	Yes
	Students with a growth mind-set	Good	15 years old	PISA 2018	Survey	Yes	Yes
	School-work conscientiousness						
	Achievement motivation	Good	15 years old	PISA 2018	Survey	Yes	Yes
	Perseverance	Good	15 years old	PISA 2018	Survey	Yes	Yes
	Attitudes towards competition and cooperation	Good	15 years old	PISA 2018	Survey	Subject to change	Yes
	Relationships, identities, and social attitudes, activities, connections and support	Identity and sense of belonging					
Sense of belonging at school		Good	15 year olds	PISA	Survey	Yes	Yes
Family, school, and social connections, relationships, and support							
Make friends easily / people like me / feelings of loneliness		Good	15 years old	PISA 2003-2015	Survey	Yes	Yes
Class mate support		Moderate	11, 13 and 15 years old	HBSC	Survey	Yes	Yes
Peer support and communication		Moderate	11, 13 and 15 years old	HBSC	Survey	Yes	Yes
Teacher support		Good	15 years old	PISA 2018	Survey	Yes	Yes
		Moderate	11, 13 and 15 years old	HBSC	Survey	Yes	Yes
Parental support in school activities		Good	15 years old	PISA 2018	Survey	Yes	Yes
		Moderate	11, 13 and 15 years old	HBSC	Survey	Yes	Yes
Family communication		Good	15 years old	PISA 2018	Survey	Yes	Yes
Family communication and family support		Moderate	11, 13 and 15 years old	HBSC	Survey	Yes	Yes
Pro-social attitudes and social and civic activities							
Attitudes towards other's views, and different cultures	Good	15 years old	PISA 2018	Survey	Uncertain	Yes	

		Country coverage	Age coverage	Data source	Data type	Regular update	Disaggregation
	Knowledge about global political and social issues	Good	15 years old	PISA 2018	Survey	Uncertain	Yes
	Children who can invite friends at home	Moderate (European countries)	6-15 years old	EU-SILC	Survey	Yes	Yes
	Regular participation in outside leisure activities	Moderate (European countries)	6-15 years old	EU-SILC	Survey	Yes	Yes
	Participation in paid work	Good	15 years old	PISA 2015	Survey	Yes	Yes
	Participation in unpaid work in the home	Good	15 years old	PISA 2015	Survey	Yes	Yes
	Participation in voluntary work	Moderate	15-24 years	World Values Surveys	Survey	Yes	Yes
	Participation in voting	Good	14-24 years old	International Institute for Democracy and Electoral Assistance (IDEA)	Administrative data	Yes	No
Digital activities and behaviours	Use of internet and social media						
	Use of, age of first use of, and time spent on the internet	Good	15 years old	PISA 2015	Survey	Yes	Yes
	Use of social media and negative experience	Moderate	11, 13 and 15 years old	HBSC	Survey	Yes	Yes

Note: "Disaggregation" means that the publicly available data allows for disaggregation by at least basic socio-economic and demographic groups, such as by sex, age, family status, and family income.

Data availability for middle childhood

A much smaller pool of international data exists for children in middle childhood compared to what is available on adolescents (Annex Table 5.B.2). The epidemiological data collected by the *Global Burden of Diseases* allows, as it does for older children, the prevalence of mental health disorders to be monitored. However, data on the social-emotional well-being of children are less rich than those for adolescents and cover a smaller number of countries. The *Children's Worlds Surveys* ask children aged 8, 10 and 12 about their satisfaction with life in general and with particular areas of life. The categorization of life domains considered here is different and more detailed than in the PISA surveys for adolescents. It includes:

- Satisfaction with life as a whole, and with time use and free time, health, the way a child looks and body image, and self-confidence.
- Satisfaction with family life, the home and the things children have
- Satisfaction with the area where children live (including the outdoor environment)
- Satisfaction with people who children are living with, in the local area, and with people in general
- Satisfaction with what may happen later in life and about children's preparation for the future

A few other questions aim to capture emotional well-being, including the sense of safety and security in the main places where children live (in the family, school and neighbourhood), as well as questions about emotions experienced in a recent period. Finally, a final set of questions relates to the quality of interpersonal relationships: first, by asking children whether they feel they are listened to and treated fairly by parents, teachers and adults in general. Children are also asked whether they are treated kindly by their friends or whether they sometimes feel left out. Finally, the subjective quality of interpersonal relationships is assessed by asking the child about the time spent talking, learning or having fun with family and friends respectively.

Annex Table 5.B.2. International data on middle-aged children's social and emotional well-being

		Country coverage	Age coverage	Data source	Data type	Regular update	Disaggregation
Mental health and life satisfaction	Life satisfaction						
	Satisfaction with time use and free time / opportunities / health / way you look / own body / listen by adults / self-confidence / life as a whole	Moderate	8-12 years old	Children's Worlds Surveys	Survey	Uncertain	Yes
	Satisfaction with family life, the home and the things they have	Moderate	8-12 years old	Children's Worlds Surveys	Survey	Uncertain	
	Satisfaction with school life (including children in the class, school marks, things learned, relations with teachers)	Moderate	8-12 years old	Children's Worlds Surveys	Survey	Uncertain	
	Satisfaction with the area they live (including the outdoors)	Moderate	8-12 years old	Children's Worlds Surveys	Survey	Uncertain	
	Satisfaction with people (people who they live with, in the local area, people in general)	Moderate	8-12 years old	Children's Worlds Surveys	Survey	Uncertain	
	Satisfaction with what may happen later in life and preparation for the future	Moderate	8-12 years old	Children's Worlds Surveys	Survey	Uncertain	
	Children's affects						

		Country coverage	Age coverage	Data source	Data type	Regular update	Disaggregation	
	Feel safe at home, at school, in the living area	Moderate	8-12 years old	Children's Worlds Surveys	Survey	Uncertain		
	Worry about family income	Moderate	8-12 years old	Children's Worlds Surveys	Survey	Uncertain		
	Child feelings (happy, relaxed, active, calm, full of energy)	Moderate	8-12 years old	Children's Worlds Surveys	Survey	Uncertain		
Neurodevelopmental disorders								
	Autistic spectrum disorders, attention deficit & hyperactivity	Good		IHME - Global Burden of Disease	Estimates based on survey and register data	Yes	No	
Psychological disorders								
	Depression & anxiety, eating disorders, self-harm	Good		IHME - Global Burden of Disease	Estimates based on survey and register data	Yes	No	
Identity and sense of belonging								
Relationships, identities, and social attitudes, activities, connections and support	Self-esteem and satisfaction with self	Moderate	8-12 years old	Children's Worlds Surveys	Survey	Uncertain	Yes	
	Sense of being liked by others	Moderate	8-12 years old	Children's Worlds Surveys	Survey	Uncertain		
	Sense of belonging at school	Good	9-11 years (4th grade), 13-14 years (8th grade)	TIMMS, PIRLS	Survey	Yes	Yes	
	Family, school, and social connections, relationships, and support							
	Feel listened and/or fairly treated by parents, teachers, adults in general	Moderate	8-12 years old	Children's Worlds Surveys	Survey	Uncertain	Yes	
	Friends are nice	Moderate	8-12 years old	Children's Worlds Surveys	Survey	Uncertain		
Hit or left out by children in the class	Moderate	8-12 years old	Children's Worlds Surveys	Survey	Uncertain			
Time spent talking / having fun / learning together with family	Moderate	8-12 years old	Children's Worlds Surveys	Survey	Uncertain			
Time spent talking / having fun / learning together with friends	Moderate	8-12 years old	Children's Worlds Surveys	Survey	Uncertain			

Note: "Disaggregation" means that the publicly available data allows for disaggregation by at least basic socio-economic and demographic groups, such as by sex, age, family status, and family income.

6. Are children learning and achieving in education?

This chapter reviews the available evidence on children’s cognitive development and educational well-being, and highlights the types of data required to inform the development of sound policies in education and early childhood education and care. It considers key cognitive development and educational outcomes, such as literacy and numeracy skills, self-regulation, and satisfaction and confidence in learning. It examines how children’s activities, behaviours and relationships shape their learning and educational well-being, as well as the effects of children’s family situation and school and early education and care environments. The chapter assesses the available cross-national data available on child cognitive and educational well-being and discusses the way forward, highlighting key data gaps and setting out priorities for data development.

6.1. Introduction and main findings

The purpose of this chapter is to review the available evidence on children’s cognitive development and educational outcomes, and to highlight the types of data that are required to inform the development of sound policies in education and early childhood education and care. The chapter analyses the available cross-national information children’s learning and educational achievements and the key resources and factors influencing child cognitive outcomes. In a few cases, national evidence is used to inform on how future data collection could be improved.

From the very first moments of life, children observe and interact with the world around them. These early impressions drive rapid cognitive development during the early years, a period during which the brain is particularly malleable and most open to learning from experiences. Children learn how to communicate, form their first ideas about words and numbers, and progressively acquire literacy and numeracy skills. The early formation of cognitive skills has long-lasting implications for children’s educational trajectories and achievements as early mastery of skills makes later learning easier, more efficient and more likely to continue (Heckman, 2006^[1]).

Gaps and inequalities in cognitive abilities often widen rather than narrow once children start school. It is important that schools offer a stimulating learning environment and sufficient resources to help every student – not just the most able – achieve their highest potential and ensure that no child is left behind (OECD, 2020^[2]). Peer relations at school have an impact on individual educational achievement and aspirations (Wentzel, 2017^[3]; Wang et al., 2014^[4]). Educational achievements and the skills children develop throughout childhood affect later labour market outcomes, health and also their subjective well-being and social inclusion (OECD, 2020^[5]). As such, it is particularly important to measure children’s learning and skill development from an early age, as well as their views regarding school work and the learning environment.

To guide the development of better policies, policy-makers need high-quality data on a wide range of areas relating to children’s learning, skill development and satisfaction with the learning environment. This includes measures of core foundational competences like literacy and numeracy, transversal skills such as self-regulated learning, problem solving, and critical and creative thinking, and children’s subjective experience at school or in childcare, among other things. It is also important to collect information on the resources that can promote children’s learning and cognitive development at home and in their community and neighbourhood. Data should allow for the identification of delays and inequalities in learning development, and highlight where and when children are at risk of disengaging from education.

The key messages to be taken from this chapter are as follows:

- In contrast to many other areas of child well-being, there is a relatively broad range of cross-national data available on children’s cognitive development and educational achievement. This is especially the case with respect to the traditional core areas of reading, mathematics and science, which, for children in middle-childhood and adolescence, are covered comprehensively through the major international student assessments programmes (i.e. PISA, PIRLS and TIMMS).
- Children’s learning and cognitive development in areas outside reading, mathematics and science are less well covered by cross-national data. There is less data, for instance, on children’s transversal cognitive skills (e.g. problem solving, creative thinking, critical thinking), on their self-regulated learning and “learning to learn” skills (e.g. motivation, planning, self-monitoring, self-reflection), and on their digital skills (e.g. data and digital literacy). There is increasing recognition that these kinds of competences are or will be crucial for children growing up in today’s world.
- There is also relatively little cross-national data on cognitive development in early childhood. Strengthening efforts to collect data on early learning at national and international levels is key, given the large body of evidence underlining that early childhood lays the foundations for cognitive development and educational achievement for the rest of childhood and adult life. The OECD’s

International Early Learning and Child Well-being Study (IELS) is a positive development in this regard. The study collects information on 5-year-old's early learning and well-being. In its first round, it covered three OECD countries: England (United Kingdom), Estonia and the United States.

- The home learning environment provides key resources for fostering children's early cognitive development, above and beyond the inherited genetic endowments (Manu, Barros and Victora, 2019^[6]; Fernald, Marchman and Weisleder, 2013^[7]; Romeo et al., 2018^[8]). However, the family is also where inequalities in learning and cognitive development start to develop from infancy on. It is therefore important to have data on parenting practices regarding children's care and education at different stages of childhood, as well as on how parenting practices vary with families' socio-economic status.
- Children's participation in high quality Early childhood Education and Care (ECEC) services before entering school can help build cognitive skills and school-readiness, especially among children from lower socio-economic backgrounds (van Huizen and Plantenga, 2018^[9]). In this perspective, it is important to further pursue national and cross-national efforts to measure inequalities in participation, the barriers that may explain these inequalities (lack of availability, affordability, lack of information on the supply, lack of awareness about of the benefits for children, cultural barriers, etc.), and to monitor the quality development of ECEC services.
- Over the years, a growing body of information has been developed to assess school performance at different ages. Furthermore, there has been a lot of information collected on children's perceptions of their school environment, attitudes towards school work, relationships with teachers and peers, and perceived support from parents. This improvement in data has required changes in survey questionnaires, sometimes generating inconsistencies between information collected across years. To allow robust monitoring of child learning outcomes, it would be desirable to consolidate the core data set to be repeated across survey waves.

The chapter also points to data gaps that could be filled to improve the understanding of where to prioritise actions, including:

- Data gaps on skill acquisition and learning achievements of highly vulnerable groups of children not covered in general children's surveys, such as victims of maltreatment, children with disabilities, children in alternative care, or homeless children. Data on learning achievements and needs of these groups of children are crucial to greatly improve their educational outcomes.
- Data on children's motivations for learning, educational aspirations and knowledge of education systems and educational tracks, which are key elements in the formation of inequalities in school tracks and career choice. Measuring these aspects from middle childhood onwards is key to prevent school drop outs, provide better guidance regarding school choices, and improve well-being at school.

The chapter begins with an overview over of the central aspects of children's cognitive development and well-being structured around the three stages of childhood: early childhood, middle childhood and adolescence. The subsequent sections review the availability of data and indicators on children's skill development and learning achievement, as well as the resources provided in the home and school environments. Data gaps are discussed in the last section. As the focus of this chapter is set on cognitive well-being, it does not review the literature and data available on socio-emotional well-being, which is instead discussed in Chapter 5.

6.2. An overview of cognitive development and educational attainment

Cognitive development is the process by which human beings acquire, organise, and learn to use knowledge (Gauvain and Richert, 2016^[10]). One aspect is about "what develops", or the content of

knowledge, and focuses on concepts, the mental groupings of similar objects and other entities that play a fundamental role in organizing knowledge of experience. The other aspect of cognitive development refers to “how knowledge develops”, and involves the processes of memory, problem solving, reasoning, and executive function. The learning process also involves other capacities, such as curiosity and interest and pleasure in learning (Becchetti-Bizot, Houzel and Taddei, 2017^[11]; Vincent-Lancrin et al., 2019^[12]).

All cognitive skills have their roots in the early years of life. Much evidence shows that gaps in cognitive progress emerge in early childhood and are remarkably persistent and difficult to close. These early gaps are in fact one of the most important vehicles for socio-economic inequality and low social mobility, often explaining differences in children’s educational trajectories. Children’s capacity to learn from experiences is strong during the early years, due to the high plasticity of the brain, which decreases with age (Knudsen, 2004^[13]; NSCDC, 2016^[14]). Early childhood provides a powerful window of opportunity to correct early skill inequality, and for this very reason early childhood interventions often offer high rates of return (Heckman, 2006^[1]; Hendren and Sprung-Keyser, 2020^[15]; Rosholm et al., 2021^[16]). However, intervening at other points in childhood also holds promise. Adolescence is described as a second window of opportunity as puberty initiates intense learning and brain development, which lead to numerous structural and functional changes to the brain. Adolescence is also “sensitive period” for a brain development and reorganisation occurs, which also can be strongly influenced by experiences and environmental factors that can impact future functioning (Ismail, Fatemi and Johnston, 2017^[17]; Choudhury and Slaby, 2012^[18]; UNICEF, 2017^[19]).

Table 6.1 provides an overview of key aspects of children’s cognitive development and educational well-being. It is divided into four panels, structured in line with the child well-being measurement framework outlined in Chapter 2:

- Panel A highlights key child cognitive development and educational outcomes. This includes the age- (or stage-) appropriate development of cognitive skills and abilities and other skills central to learning, such as early language development and emergent literacy and numeracy for young children and a range of domain-specific and transversal cognitive skills for children in middle childhood and adolescence, as well as non-cognitive skills and competences such as self-regulation/self-regulated learning, confidence in learning and children’s satisfaction with what they learn. Children’s educational progression and attainment is also covered here.
- Panel B focus on child-level drivers and influences of cognitive development and education outcomes. This includes learning activities with parents or caregivers (e.g. shared reading, play) for young children, and parental assistance with and support for learning for older children. It also includes children’s attitudes and behaviours at school (including engagement, motivation, and mind-set), their relationships at school (e.g. with teachers and classmates), and their learning behaviours at home (e.g. homework, reading for leisure). Also relevant here are children’s overarching educational and career aspirations, especially for older children.
- Panel C highlights important environment-level drivers of children’s cognitive development and education outcomes. This includes aspects of the home environment, such as access to educational books and toys and, for older children, study supports, as well as several aspects of the environment that children face in ECEC and at school (e.g. disciplinary climate, class size, classroom cooperation and competition). Parent-teacher relationships and communication between parents and children’s schools and ECEC services (e.g. to discuss child progress) is also covered here.
- Lastly, Panel D covers public policies that can have important effects on children’s cognitive development and education. This includes chiefly policies and regulations relating to ECEC services and compulsory education. But also relevant here are various types of family policy (e.g. family financial supports, family employment-related supports), which can impact children’s

learning through the effects on the family and home environment and the time parents are able to spend with children.

The following sections provide more detail on the different aspects of children's cognitive development and educational progression and attainment.

Table 6.1. Key aspects of children's cognitive development and educational well-being throughout childhood

		Pregnancy and infancy (0- to 2-year-olds)	Early childhood (3- to 5-year-olds)	Middle childhood (6- to 12-year-olds)	Late childhood (12- to 17-year-olds)
Panel A: Key cognitive development and education outcomes					
Cognitive skills and abilities and related learning skills		-	Language, emergent literacy, and emergent numeracy	Domain-specific skills and competences (e.g. reading, mathematics and science literacy), transversal cognitive skills and competences (e.g. problem solving, creative thinking, critical thinking)	
		-	Self-regulation	Metacognitive and self-regulated learning competences (e.g. learning strategies)	
Educational progression and attainment		-	-	Grade progression and repetition	
		-	-	-	Educational attainment
		-	-	-	Adolescents not in education, employment or training (NEET)
Satisfaction and confidence in learning				Satisfaction with learning, subjective confidence in own abilities	
Panel B: Children's activities, behaviours and relationships					
Family activities and relationships	Activities with parents and family	Direct parental involvement in learning (e.g. verbal interactions, shared reading, play)	Direct parental involvement in learning (e.g. early literacy and numeracy activities)	Parental assistance with learning (e.g. helping with homework), parental expectations and support (e.g. discipline, setting routines, discussing school)	
		Out-of-home cultural and learning activities (e.g. library visits, zoo visits)			
Learning activities, behaviours, attitudes, and relationships	School and ECEC activities, attitudes and behaviours	ECEC participation, liking ECEC		School absence and truancy, school engagement, liking school, sense of belonging at school	
	Learning motivation and aspirations	-	-	Motivation (e.g. self-efficacy, presence of mastery orientation and growth mind-set), educational aspirations, career aspirations	
	Child teacher and classmate relationships	-	Child-teacher (or child-staff) relationships, child-classmate relationships (e.g. bullying and being bullied)		
	Home and out-of-school learning activities and behaviours	-	-	Homework, reading for leisure	
Panel C: Children's settings and environments					
Family and home environment	Household material environment	Age-appropriate educational books, toys, and games, etc.			
		-	-	Study supports (computer, desk, own room)	
School and ECEC environment	School and ECEC climate	ECEC climate, including structural quality (e.g. staff-child ratios, staff qualifications) and process quality (e.g. emotional climate, instructional quality)		School climate (e.g. school safety, disciplinary climate, class size, classroom cooperation and competition)	

		Pregnancy and infancy (0- to 2-year-olds)	Early childhood (3- to 5-year-olds)	Middle childhood (6- to 12-year-olds)	Late childhood (12- to 17-year-olds)
	School- and teacher-parent relationships	Parental involvement in school/ECEC service (progress discussion with teacher, participation in school governance)			
Panel D. Public policies					
Family policies	Family financial support policies	Public financial supports (e.g. cash transfers, tax credits)			
	Family employment-related support policies	Statutory leave policies, flexible working arrangement policies			
	Family and parenting support service policies	Parenting support services			
Education policies	ECEC regulations and policies	Public ECEC support and policies to promote availability and affordability		-	-
		Curricula and content, pedagogies, regulations (e.g. staff-child ratios, staff qualification requirements),		-	-
	Education regulations and policies	-	-	Curricula and content, pedagogies, regulations (e.g. class size, staff qualification requirements), teacher and classroom supports and working conditions (e.g. instruction and working hours), education tracking,	
		-	-	Education funding and governance structures	

6.3. Cognitive development and educational progression and attainment

Cognitive development refers to the ways in which children learn to think, reason, and use language. It covers the development of knowledge, skills and abilities in a range of areas, including literacy, speech, and numeracy. Early cognitive development has an immediate impact on children's well-being through their ability to communicate and learn. It also has a long-term impact as it is a very strong predictor of later educational achievement (see e.g. Duncan et al. (2007_[20])), as well as outcomes in other well-being dimensions (see e.g. Ritchie and Bates (2013_[21])). Moreover, different cognitive skill domains are mutually reinforcing, for example, children with strong language development typically develop stronger literacy, and vice versa (OECD, 2020_[5]).

Differences in children's home circumstances are one of the factors behind gaps in cognitive skills that emerge early in life. The high malleability of the brain makes young children very sensitive to external stimuli (Stiles and Jernigan, 2010_[22]). These gaps are remarkably persistent over the course of childhood. For instance, there is evidence in the United Kingdom that literacy skill inequalities develop strongly in early childhood up to the end of the first year of compulsory schooling and then remain relatively stable for most children throughout their school career (Taggart et al., 2015_[23]). The gaps with the lowest performing group of children at age three also tend to widen with age. It is therefore of high importance to monitor children's cognitive development early on, preferably even before they start school when emergent cognitive skills are developing in the absence of formal instruction, in order to prevent mid- and long-term widening of skill formation inequalities.

Early cognitive development

Language development is one of the most fundamental parts of children's early cognitive development. Language is important in enabling both cognitive and social development. Developing language concepts helps build infants' and toddlers' brains and gives them the means to think and develop ideas and express themselves. Babies' and young children's language development is strongly influenced by the language they hear spoken around them and to them. The more babies and young children are exposed to language,

through caregivers talking to and responding to non-verbal and verbal cues, the more opportunities they'll have to learn and practice. Not only does it enrich children's possibilities of communication, self-expression and learning, it also lays foundations for forming connections with peers and caregivers and thus highly important for children's socio-emotional development and well-being (OECD, 2020^[5]).

The development of communication and language in the early months of life follows specific milestones, which can help parents and paediatricians to detect language and speech delays. Typically, children first develop *receptive* abilities that allow them to understand easy gestures, mimic and language while processing the information expressed in a basic way. Over the first year of life, this develops to the ability of understanding gesture-supported commands. Initial *expressive* abilities are limited to crying, but eventually develop to cooing, pointing and babbling before children develop the ability to speak first words around 10 to 15 months of age. After initial slow lexical growth - about 1-2 words per week - children rapidly increase their vocabulary and expressive ability by 1-2 words per day in the "vocabulary spurt" between months 18 and 24. Over the following years children further expand their vocabulary and refine their grammatical skills, which typically culminates in a full acquisition and mastery of all language fundamentals by the time they start school (Feldman, 2019^[24]; McLaughlin, 2011^[25]).

Box 6.1. What do today's children need to know and be able to do?

Education, like other spheres of society, is changing. Globalisation, digitalisation, and the changing world of work, among other trends, mean that the competences today's children need in order to flourish and thrive will differ in important ways from those needed in the past (OECD, 2018^[26]; OECD, 2019^[27]). Traditional core competences such as the ability to understand and use written text (i.e. literacy) and interpret and work with numbers (i.e. numeracy) remain important. Indeed, as emphasised by the OECD's *Learning Framework 2030* – a forward-looking vision for education, and a product of the *OECD Future of Education and Skills 2030* project – both literacy and numeracy still form part of the "core foundations" that all learners need, in part to facilitate further learning (OECD, 2019^[27]). But beyond these traditional competencies, there is increasing recognition that a range of different and sometimes new competences will be needed as the world moves forward. These are often called "21st century competences".

What exactly these 21st century competences look like is subject to ongoing debate among experts and stakeholders. In recent years, various actors, including the OECD, have produced a range of forward-looking competence frameworks outlining the skills, knowledge and abilities needed for the future (e.g. National Research Council (2012^[28]); World Economic Forum (2015^[29]); Scott (2015^[30]); EC (2019^[31]); OECD (2019^[27])). Transversal cognitive competences such as problem solving, critical thinking and creative thinking are often considered core. Self-regulated learning and "learning to learn" competences (e.g. motivation, planning, self-monitoring, self-reflection) are also common, as are social and emotional skills (e.g. collaboration, open-mindedness, task performance; see also Chapter 5 in this report), and a range of digital competences (e.g. data literacy, media literacy, digital content creation). Several frameworks also emphasise the importance of competences relating to citizenship and social responsibility (e.g. social, cultural, and environmental awareness, acting responsibly) (World Economic Forum, 2015^[29]; EC, 2019^[31]; Scott, 2015^[30]). In a similar vein, the *OECD's Learning Framework 2030* stresses the centrality of "transformative competencies" – that is, competences that are important for contributing to society, such as taking responsibility, reconciling tensions, and creating new value (OECD, 2019^[27]).

Not all of these competences need necessarily be learned or mastered in school. Many 21st century competence frameworks emphasise the importance of lifelong learning and the development of competences through formal, non-formal and informal learning in different environments, including in

the family, in the community and, later in life, in the workplace (EC, 2019^[31]). Nonetheless, formal childhood learning both in ECEC and in school can and will continue to play a central role.

Children that fall behind in meeting these key milestones are at risk of adverse cognitive development and compromised academic achievement. For example, children suffering from language impairment in kindergarten are at highly elevated risk of reading disabilities and overall worse reading outcomes in second and fourth grade of elementary school (Catts et al., 2002^[32]). For those primary school age children who suffer from lasting speech and language problems, many also have poor writing skills, in particular punctuation and spelling (Bishop and Clarkson, 2003^[33]). In addition to academic scores, early language problems can negatively affect psycho-social outcomes (Snowling et al., 2006^[34]) and increase the risk for mental health disorders (Law et al., 2009^[35]).

Healthy speech and language development depends on a variety of genetic and environmental factors. For example, genetic variations influence the number of words children can speak at 15 to 18 months of age (St Pourcain et al., 2014^[36]). On the other hand, household socio-economic status also play a critical role (Letourneau et al., 2011^[37]). Resulting from compounding evidence, a lively debate on children language gap has evolved in academia and the public alike, also focussing on the level and quality of parent-child interactions in the household (Box 6.2). Children typically develop emergent literacy through interactions with parents and caregivers (Whitehurst and Lonigan, 1998^[38]). Rather than a concept of reading readiness, emergent literacy comprises a continuum of skills, among others, awareness of print and phonology as well as knowledge of syntax and verbal processing, all of which may develop well before receiving formal instruction (Byrnes and Wasik, 2019^[39]). While acquiring first concepts of verbal language, children also develop ideas about counting, numbers and their relations to each other (Nelissen, 2018^[40]).

Box 6.2. The Language Gap Debate

Early language development is one of the greatest predictor's of a child's future literacy skills (Heidlage et al., 2019^[41]). Delays in language development can have adverse (and long-term) effects on children, especially for difficulties with reading comprehension, phonics, spelling, and writing (Heidlage et al., 2019^[41]).

Early language development is a complex and sometimes hotly debated issue within early childhood development. There are different ways to assess language development in the early years and to measure the gap between children from diverse family backgrounds. This matters to identify the types of interactions that are necessary for proper word exposure for children.

The "30-Million-Word Gap" was one of the earliest child language development studies investigating how differences in families' socio-economic status (SES) affected children's language and vocabulary development at home (Hart and Risley, 1995^[42]). Although one of the most cited language development studies, it was later subject to much criticism because of the ways the researchers collected their sample data and for overestimating the estimated word gap. Researchers monitored 42 families with young children who were aged between seven and nine months when the study began. The socio-economic background of families included those who were affluent, working in professional jobs, middle-income and working class families, and families on welfare. Over 2.5 year period, researchers went into households to record "samples" of language interactions and conversations. The results were extrapolated to reflect the vocabulary gap by four years old, showed that in words simply heard at home, there existed an estimated average gap of 30 million words between the children from the wealthiest and poorest families (Hart and Risley, 1995^[42]). The study emphasized the role of the family

environment, finding that 86 to 98 percent of the words recorded in each child's vocabulary were heard parents' own recorded vocabulary.

In more recent decades, further research has built a picture of the important role the home environment plays in early language development. Studies found that social interactions are more beneficial for toddlers' language learning over-passive listening, regardless of the amount of words children are exposed to (Roseberry, Hirsh-Pasek and Golinkoff, 2014^[43]). Children who have more conversational-based interactions at home have greater brain activation of the Broca's area, which is the part of the brain associated with speech production, language processing and comprehension (Romeo et al., 2018^[8]).

The key determinants of a child's early language development are parent's education level, household income and the quality of conversations taking place in the home. Low-income parents tend to have lower levels of education, which affects parents' knowledge and parenting practices surrounding child development (Rowe, 2008^[44]). By contrast, parents with higher SES were found to use a larger variety of words and longer sentences when communicating with their children. The relation between socioeconomic status and child-directed speech being largely mediated by parental knowledge of child development (Rowe, 2008^[44]). A number of other factors also contribute to shape verbal interactions with children such as the availability of free time when children are awake.

There are ways parents can improve their communication with young children to benefit their language and cognitive development. For example, services supporting parents' language teaching can help close the gap in language development, provided that they adjust to the needs culturally different communities of families. To specifically help with language development and deficiencies in certain households, interventions should: provide parents with training on how and how often to teach words and coordinate children's exposure to vocabulary across home and care contexts (Hindman, Wasik and Snell, 2016^[45]).

Delays in emerging literacy can often persist and impair literacy development throughout school and later life. For example, emerging literacy concepts measured at school-entry, kindergarten or earlier are linked to later literacy outcomes in elementary school (Duncan et al., 2007^[20]; Claessens, 2009^[46]; Shanahan and Lonigan, 2010^[47]). In addition, cognitive ability in reading and math measured in kindergarten is also highly correlated with later adulthood earnings, college attendance, home ownership, and retirement savings (Chetty et al., 2011^[48]). As such, alphabet knowledge, phonological awareness, rapid naming tasks (e.g. digits or colours), phonological memory and the ability to write the own name are positively influencing conventional literacy outcomes, such as decoding, reading comprehension and spelling later on (Shanahan and Lonigan, 2010^[47]). Similarly, early mathematical knowledge in kindergarten, in particular number competencies and developmental number sense, is strongly related to mathematical abilities over primary school (Jordan et al., 2009^[49]; 2007^[50]). In summary, gaps in emergent literacy and numeracy may translate into significant gaps in conventional reading and math literacy outcomes throughout school and later life, but they also impact each other and the outcomes on a wider range of skill domains, including working memory (OECD, 2020^[5]).

The abilities of abstract thinking and reasoning, which are the precursors of scientific literacy, is often already developing in children even before entering school (Becchetti-Bizot, Houzel and Taddei, 2017^[11]). An introduction to scientific reasoning in the pre-school years provides important opportunities for further evidence-based learning and discovery of their surrounding natural world (Gropen et al., 2017^[51]). However, science teaching is rare in the early years and in the primary school classroom, in part because many teachers think children are not developmentally ready to formally learn about scientific approaches and concepts (Whittaker et al., 2020^[52]).

Cognitive development in middle childhood and adolescence, and educational progression and attainment

Care and educational facilities can have a substantial impact on children's cognitive development, academic achievement and other long-term outcomes. When children enter school, differences in cognitive abilities, such as those often seen along socio-economic lines, can persist. On top of that, differences in reading literacy at school entry, in particular in vocabulary and phonological awareness, can even widen the gap in literacy outcomes. This not only impacts academic performance, but can also affect immediate well-being and mental health outcomes (Clark and Teravainen-Goff, 2018^[53]). At the same time, children with impaired literacy development also engage less in activities that may enhance reading literacy further, such as reading (see e.g. Horowitz-Kraus and Hutton (2018^[54])). These patterns last throughout childhood and affect adolescents similarly. However, even though adolescents and older children spend increasing amounts of time in non-traditional reading practices, such as texting, it is only traditional reading (e.g. books) that is associated with better literacy (Zebroff and Kaufman, 2017^[55]).

Throughout middle childhood and adolescence, gaps between children with better reading literacy (i.e. those that are more likely to read in their free time) and those with delayed literacy often widen. This feedback loop puts children from disadvantaged backgrounds at risk of being left behind even more in the long-run, than what socio-economic factors explain at school entry (Buckingham, Wheldall and Beaman-Wheldall, 2013^[56]; Sullivan and Brown, 2015^[57]). However, good school environments, in particular those with sufficient resources for remedial help, can help children with language problems in early childhood to become competent readers at the end of primary school (Parsons et al., 2011^[58]). Nevertheless, even though school environments and formal learning offer the possibilities for children to catch up on deficiencies in numeracy, the achievement gap between those that start school with well-developed emergent numeracy and those without remains persistent (Silva et al., 2008^[59]).

Impairments and gaps in literacy development have been linked to a wide range of outcomes later in life, including labour market outcomes, mental health outcomes, and life satisfaction (Law et al., 2009^[35]; Crawford and Cribb, 2015^[60]; Flèche, Lekfuangfu and Clark, 2017^[61]). As such, progress in reading literacy during the early school years may have meaningful effects on later socio-economic status, and may be a crucial factor limiting social mobility (Ritchie and Bates, 2013^[21]). Numeracy skills in the early school years also have strong links to later socio-economic status (Ritchie and Bates, 2013^[21]). Schoon et al. (Schoon et al., 2015^[62]), reviewing a number of longitudinal studies, find considerable evidence linking both verbal and numerical skills in the early school years to later outcomes in several areas – including educational attainment, adult socio-economic status, income, and health behaviours – even after other important factors are controlled for.

During the course of their schooling, some children are subject to grade repetition when they do not meet the criteria to progress on to the next school grade. This practice is not found in all OECD countries, with evidence from PISA 2009 suggesting that it is only applied in half. Whether this practice is to children's benefit or not is subject to some academic debate (Ikeda and García, 2014^[63]). Findings on the effect of grade repetition on academic performance and social and emotional development are inconsistent. The practice may help improve children's academic performance through the repetition of concepts that they have not yet mastered and through minimising the risk of them falling even further behind had they progressed onwards. The positive effect on school grades may only be short term, however. There is also no conclusive evidence on whether grade retention leads to higher graduation rates (Mahjoub, 2017^[64]; Schwerdt, West and Winters, 2017^[65]). In particular, some studies highlight negative consequences for later academic achievement, concentrated in primary school grade retention (Ikeda and García, 2014^[63]; Diris, 2017^[66]). Academic motivation may suffer as students who already have low learning motivation and confidence may feel discouraged (Kretschmann et al., 2019^[67]). Additionally, children's well-being typically suffers substantially (Rathmann, Loter and Vockert, 2020^[68]).

In terms of educational attainment, it is also important to measure graduation and dropout rates of compulsory schooling. On average, early school leavers fare substantially worse than those who finished secondary school, in areas of earnings, health status, and life satisfaction (Messacar and Oreopoulos, 2013^[69]). The transition from compulsory education involves adolescents making the choice of either continuing with upper secondary education or engaging in the labour market. In the OECD, high shares of young people aged between 15 and 24 years of age are not in employment, education nor training (NEET), during the time in life that is critically important for establishing future educational and labour market careers; not being in education or employment during adolescence is associated with lower educational aspirations and career prospects and adverse mental outcomes in later life (Gutiérrez-García et al., 2017^[70]).

Finally, how educational attainment is perceived can take very different forms, depending on group socio-economic status and the country. For some groups, proceeding to do a Bachelor's degree at third level will be perceived as an achievement, while for others the goal posts are set higher and only graduating with honours, or being able to access a selective track, will be regarded as good enough. For example, in France, the “massification” of education, illustrated by the fact that 80 percent of a generation born each year now has a baccalaureate, has led to greater competition for the top grades. However, not all families have the information and networks to access prestigious programmes and the best job opportunities (Dubet and Duru-Bellat, 2019^[71]). While the proportion of young people reaching a tertiary degree has increased, grade inequalities within each level of education remain high. The information system on educational attainment does not fully reflect the inequalities that exist across the various education streams and training programs (Dubet and Duru-Bellat, 2019^[71]).

6.4. Key influences on children's cognitive development and education outcomes

Children's educational motivations and aspirations

Children's educational motivations and aspirations play an important role in academic outcomes and achievement. Children's motivation and achievement values are linked to academic performance (Meyer et al., 2009^[72]; Özen, 2017^[73]), and students with low or no motivation are found to perform significantly worse than highly motivated peers (Walkey et al., 2013^[74]). In addition, students who believe that ability is not fixed and is something that can be improved (i.e. students with a growth mind-set) have higher academic achievement across all socioeconomic strata (Claro, Paunesku and Dweck, 2016^[75]).

Several variables of children's and adolescent's environment have a particular influence on educational aspirations. In particular, children of lower socio-economic status have greater aspirations regarding academic achievement when they have a better home learning environment, parents who are more involved in their school life and hold higher expectations regarding academic achievement. Higher levels of peer support also exert a positive influence (Berzin, 2010^[76]).

Children's educational aspirations are susceptible to diminishing with age as children's understanding grows about what is possible and the constraints imposed by previous choices and achievements (Gutman and Akerman, 2008^[77]). Kao and Tienda (1998^[78]) note that younger children are more idealistic in the aspirations that they hold before becoming more aware as they get older about the barriers against them in the educational and academic system. This is particular evident among children from lower socio-economic backgrounds who are more likely to face multiple barriers to their educational success. As a general rule, the educational aspirations of younger low-income children are higher than those of older low-income children (Berzin, 2010^[76]). Gender stereotypes also influence the formation of educational and career aspirations. At the same time, parents adjust their expectations to what they think are their children's abilities and the performance required by the educational system. As a result, parental expectations often decline as children age, especially among lower-income households, and this is informed by changes in

perceptions over household financial constraints, children's abilities and their more or less informed knowledge of educational opportunities (Gutman and Akerman, 2008^[77]). Such a big shift in aspiration among children and parents highlights that measuring the development of educational aspirations between middle-childhood and adolescence could help better understand student and parental perceptions of barriers and opportunities in the educational system.

Children's educational attitudes and behaviours

In addition to children's educational aspirations, their attitudes toward education and their behaviour in the classroom also matter for academic achievement. A particularly salient sign of student motivation can be truancy. Regular truancy has a wide range of negative consequences, especially on academic performance and achievement (Aucejo and Romano, 2016^[79]; Smerillo et al., 2018^[80]). In addition, chronic absences are more concentrated among already socioeconomically disadvantaged children (Gershenson, Jackowitz and Brannegan, 2017^[81]). While school absence in itself has implications for academic achievement and school outcomes, the reasons for these, including authorised and unauthorised absences, matter as well (Hancock, Gottfried and Zubrick, 2018^[82]). The effects of absenteeism are also not only concentrated among chronically absent students themselves, but these behaviours affect the classroom climate through disruptions and peer resentment as well (Wilson et al., 2008^[83]).

Aside from learning in the classroom, children also engage in educational activities outside of school, in particular homework activities. In general, the time spent on homework is related to better academic performance (OECD, 2014^[84]; Scheerens, 2014^[85]). While this may be related to student engagement, homework helps to consolidate concepts that were previously introduced and learned in school (Guthrie and Klauda, 2014^[86]). Homework in primary school might not necessarily be related to academic achievement, which potentially indicates that format and design of assigned tasks are not optimal for young students (Jerrim, Lopez-Agudo and Marcenaro-Gutierrez, 2020^[87]).

School engagement, expressed through children's psychological and behavioural engagement, is also linked to academic achievement and other life outcomes. Students with lower engagement are more likely to have lower school grades and to drop out of school early, but are also more prone to delinquency, depression and substance misuse over time (Dotterer and Lowe, 2010^[88]; Li and Lerner, 2011^[89]; Wang and Fredricks, 2014^[90]). Two of the main contributing factors to low psychological and behavioural engagement with school are low levels of teacher- and parent support. This highlights how environmental factors are a critical force for shaping children's and adolescent's school engagement (Fall and Roberts, 2012^[91]).

Family and home environment

A large body of literature highlights the association between household income and socio-economic status and children's family on academic achievement (see e.g. Blanden and Gregg (2008^[92]) or Akee et al. (2010^[93])) and overall cognitive development (see e.g. Letourneau et al. (2011^[37]) or Macours, Schady and Vakis (2012^[94])). At as young as 18 months old, children in families of low socio-economic status show significant differences in vocabulary and language processing efficiency to children from families of high socio-economic status (Fernald, Marchman and Weisleder, 2013^[7]). In terms of early literacy development, many of these gaps arising along socio-economic lines may be explained by more stimulating home literacy environments, increased investment in educational resources and a higher parental involvement in literacy-enhancing activities for families of higher socioeconomic status (Kluczniok et al., 2013^[95]; Neumann, 2016^[96]; Kaushal, Magnuson and Waldfogel, 2011^[97]).

The impact of growing up in lower socio-economic -status households on language seems to be particularly strong for boys (Barbu et al., 2015^[98]; Zambrana, Ystrom and Pons, 2012^[99]). The reasons behind these gender differences are not fully explained. Parents' talkativeness may matter, as parents have been found

to speak more to girls than to boys during infancy and toddlerhood (Leaper, Anderson and Sanders, 1998_[100]; Leaper, 2002_[101]). More broadly, it is argued that parents from lower SES backgrounds are both more concerned about their children conforming to societal expectations and are more directive and less conversational than parents from higher SES backgrounds, with both potentially impact on gender language socialisation (Bornstein, 2015_[102]). Differences in the socio-emotional responsiveness of boys and girls – the latter showing earlier and higher social responsiveness – are also seen as a potential source of sex differences in language development (Blakemore, Berenbaum and Liben, 2013_[103]). Biological factors may also play a role. High levels of testosterone, for instance, appears to be a risk factor in delaying boys' language acquisition (Whitehouse et al., 2012_[104]), with effects mediated by children's socio-emotional engagement that also depends on children's environment (Farrant et al., 2012_[105]). Overall, complex interactions between biological, environmental and behavioural factors seem to drive gender differences in language development in the early years.

The home literacy and numeracy environment (HLE & HNE) are particularly important factors enhancing children's literacy and numeracy development early in life (Melhuish et al., 2008_[106]). As such, educational resources as well as the perceived support from caregivers are critical. For example, the HLE in terms of access to age-appropriate educational resources, such as books and toys, can stimulate early literacy development, in particular those that are subject to weak early language achievements (Law et al., 2018_[107]; Manu, Barros and Victora, 2019_[6]). In addition, a more stimulating HNE is linked to stronger emergent numeracy as well as longer-term development of mathematical abilities (Niklas and Schneider, 2014_[108]).

Parental interactions and involvement in learning

Related to the home environment, the time and activities that children share with parents can be strongly influence development. One example is language development and the important role of language rich parent-child interactions and shared reading (i.e. parents reading to children) (see Box 6.2). Children show higher levels of emergent literacy scores when parents frequently read to them as well when the households has more children's books (OECD, 2020_[5]). Field experiments suggest that that there are significant inequalities in information and awareness of the beneficial effects of shared reading between families. Programmes that help fill this information gap and guide families towards good practices can have beneficial effects on language development in early childhood, especially for children from disadvantaged families (Barone and Chambouleyron, 2019_[109]; Barone, Fougère and Pin, 2020_[110]). The underlying process of this can potentially be attributed to higher levels of brain white matter integrity for children in households with good literacy and learning environment which, in turn, is associated with better language development and emergent literacy as well as other cognitive outcomes before school (Hutton et al., 2020_[111]).

Much evidence links parental involvement and support, in terms of parents' participation in children's learning processes and experiences of higher academic achievement. Parental involvement is important for at all stages of a child's life for their academic success, but its nature changes as children mature and make the transition into adulthood (Boonk et al., 2018_[112]). For adolescents, parental expectations regarding educational outcomes and their capacity to be a loving and supportive carer who can maintain sufficient discipline in the household are strongly associated with academic achievement (Pinquart and Ebeling, 2020_[113]; Jeynes, 2007_[114]; Ulferts, 2020_[115]). In contrast, with younger children parental involvement is more direct, for example, the shared reading of books or educational materials as well as learning together. As emphasized in Chapter 5, parental behaviours, such as their warmth and control, are also associated with a range of socio-emotional outcomes. However, while parental expectations about children's and adolescents education generally have positive effects on actual academic achievement, stronger discrepancies between parents and children along these lines can potentially have negative effects. In particular, the level of actual and perceived discrepancies are negatively linked to academic

outcomes, as well as adolescent life satisfaction and depression (Ulferts, 2020^[115]; Wang and Benner, 2014^[116]).

The level of public spending on education matters when it comes to improving educational outcomes (see below). However, private household spending on children's education is another big factor. Private household spending includes that on educational materials and private tutoring, which is for example widely used in Korea and Japan. However, the literature is inconclusive on the effects of the latter on student achievements (Bray, 2014^[117]). For example, evidence from Germany shows that, while both parents and students stated improvements in mathematic abilities after a course of private tutoring between grades seven and eight, there was no significant effect on actual educational outcomes (Guill and Bos, 2014^[118]). On the other hand, Lee (2013^[119]) suggests that while private tutoring can increase the achievement gap between high and low performing students in middle-school, it is also a tool to narrow the gap in high-school. Kang (2007^[120]) suggests that such positive effects are modest, but in the same range as public expenditures on education.

School and ECEC environment

As the central spaces where children learn, pre-school and school environments have an essential influence on the cognitive development and academic achievement of students throughout their academic trajectory. For children, the first years of life after birth are marked by considerable variations in childcare settings, depending on social norms and on how parental leave entitlements fit with the provision of care and education services (Thévenon, 2011^[121]; Adema, Clarke and Thévenon, 2020^[122]). Formal Early Childhood Education and Care (ECEC) is often children's first experience of care outside of the home setting. As such, it can be an important factor that can generate long-term improvements in cognitive development and other outcomes such as school-readiness. Child outcomes may also be indirectly affected if access to formal care services has positive spill over effects into the family environment and improves family functioning by, for example, enabling parents (particularly mothers) to better balance work and family roles (Bianchi and Milkie, 2010^[123]), thereby reducing parental stress, and improving the quality of parent-child interactions and time spent together (Hsin and Felfe, 2014^[124]).

On the whole, the evidence on the effects of participation in early childhood care and education services on children's cognitive development and academic achievement is quite mixed, though the evidence is more promising for children from lower socio-economic status families (Burger, 2010^[125]; van Huizen and Plantenga, 2018^[9]). The heterogeneity of the evidence may, in part, reflect differences in programs and services characteristics (including quality and timing thereof), analytic methods (identification strategies), counterfactual conditions, and in how developmental outcomes are defined and measured (Shager et al., 2013^[126]; van Huizen and Plantenga, 2018^[9]). Nevertheless, children's participation in good-quality ECEC services is found to have a positive effect on young children's verbal and language skills at school entry, sometimes with lasting effects on children's attainment, progress and social-behavioural development over the school years (Taggart et al., 2015^[23]; van Huizen and Plantenga, 2018^[9]; Berger, Panico and Solaz, 2020^[127]).

The participation of young children in high-quality ECEC services can help improve outcomes for socio-economically disadvantaged children, children with special needs, and children from diverse social, cultural and linguistic backgrounds. For example, in the United Kingdom, participation in ECEC services before the age of three has been found to enable children from low socio-economic backgrounds to achieve the minimum reading level required at school by the age of seven (Taggart et al., 2015^[23]). In Norway, the steep increase in the participation in high quality ECEC after the 1975 reform was also found to have significant positive effects on long-term educational achievement and young adult labour market status as well as in reducing welfare dependency (Havnes and Mogstad, 2011^[128]).

The provision of ECEC services has the potential to reduce the socio-economic inequalities in cognitive development and educational achievement that emerge early in children's lives. However, at present,

ECEC services in many countries do not seem to fulfil this goal. Participation in ECEC is often not evenly distributed across social groups. Children with migrant backgrounds, children from low-income households, and children from non-native speaking families are all less likely to attend ECEC than children with non-migrant backgrounds, children from higher-income households, or children from native-speaking families (OECD, 2019_[129]). On average across European OECD countries, children from low-income families are about 1.5 times less likely than others to participate in childcare before the age of three (Adema, Clarke and Thévenon, 2016_[130]; OECD, 2020_[131]). ECEC costs may play a role (see Chapter 3), as also might the availability, quality, and convenience of services (OECD, 2020_[131]; OECD, 2019_[129]). But cultural preferences and values may also contribute to differences in participation in ECEC across groups, too (OECD, 2019_[129]). In this respect, it is important that ECEC services are adaptable and can respond to the needs of children from disadvantaged and diverse backgrounds, such as through their activities and in their practices.

School climate and quality is also central for children in compulsory education. Schools and their teachers are important not only for children's academic learning and cognitive outcomes, but also for a range of socio-emotional outcomes, including motivation, interest, and educational aspirations and ambitions (OECD, 2021_[132]). A good school environment make students feel physically and emotionally safe. It fosters strong and supportive relationships between students and teachers, and among students themselves. The school environment and the student's perceptions of it are positively linked to school engagement and classroom participation, which in turn positively impacts academic achievement (Wang and Holcombe, 2010_[133]; Reyes et al., 2012_[134]). A sufficiently stimulating school environment might even help mitigate the negative impact of lower socio-economic status on academic achievement (Berkowitz et al., 2017_[135]).

There are a number of factors that make for a strong and positive school environment (OECD, 2020_[2]; Wang and Degol, 2015_[136]). These include, among other things, teachers' classroom practices (e.g. classroom management, pacing and clarity of instruction, providing feedback), classroom characteristics (e.g. student composition), school culture (e.g. student-teacher relations, academic pressure, parental and community involvement) and school leadership (e.g. instructional leadership) (OECD, 2021_[132]). Teachers' use of working time (e.g. task management and the allocation of non-teaching time) and their well-being and job satisfaction may also be important for children's learning outcomes (OECD, 2021_[132]).

One important feature of the school environment is classroom size. In larger classes, teachers have less time to devote to each individual student and with more students, disruptions of the class are more likely. Disruptive behaviours in the classroom (e.g. untimely talking/laughing/crying, snoring in class, yelling inside or outside of the classroom, unyielding argument or debate) have consistently been associated with lower academic achievement (OECD, 2020_[2]; Ning et al., 2015_[137]). Classrooms with lower levels of disruptive behaviour – that is, with low levels of noise and disorder – help students to better concentrate and the teachers to devote more time to focus on the curriculum (Mostafa, Echazarra and Guillou, 2018_[138]). A large body of research has investigated the associations between class size and academic achievement suggest that class size has more of an impact on academic attainment for children who are socioeconomically disadvantaged, including children with a migrant background (Schanzenbach, 2020_[139]). While effects of smaller classes on test scores are fairly well established, the debate on the size of long-term effects on wages after graduation is still ongoing. Some find strong effects on later wages that even make up for the substantial costs of class-size reductions (e.g. Fredriksson, Öckert and Oosterbeek (2013_[140])), while others find no significant effects on later income (e.g. Leuven and Løkken (2020_[141])).

In relation to the potential importance of class size, children's educational achievement appears also to be influenced by the resources that local and national governments spend on the schooling system (Jackson, 2018_[142]; OECD, 2018_[143]). For example, school finance reforms that removed the funding disparities between U.S. school have resulted in large increases in educational achievement across disadvantaged schools, yet the effects do not address within-school gaps in educational outcomes (Lafortune, Rothstein and Schanzenbach, 2018_[144]; Jackson, Johnson and Persico, 2016_[145]). Further, within schools specific

funding mechanisms can reduce the gap in performance across students. For example, a textbook subsidy for students that fell below a certain threshold of academic performance, as low as approximately USD 100, significantly raised the average test scores of these students (Holden, 2016_[146]). Reducing inequalities in students access to school resources also requires a responsive governance of school networks that involves effective steering and co-ordination and cross-regional alignment educational levels, sectors and programmes to facilitate students transition across educational programmes and tracks (OECD, 2018_[143]).

The classroom itself, as the central space where children learn, is of high importance. For example, co-operative student environments where students support each other lead to better relationships inside of the classroom and increased academic achievement (Roseth, Johnson and Johnson, 2008_[147]). This is in part the case as these classrooms are more conducive to learning and cognitive development (Jennings and Greenberg, 2009_[148]). In addition to achievement, co-operative learning environments also positively impact attitudes of students in the classroom (Kyndt et al., 2013_[149]). However, healthy competition among students, especially in co-operative environments, can also be an important contributor to academic success as it can enhance motivation and under clearly specific goal structures (Madrid, Canas and Ortega-Medina, 2007_[150]; OECD, 2020_[2]). Especially, inter-team competitions which combine co-operative behaviour within teams and competitive behaviour across teams, can be even more successful for children's performance than purely co-operative environments (Morschheuser, Hamari and Maedche, 2019_[151]).

Related to co-operative and competitive environments in the classroom, peer and social connections in school are also important. For example, children that who enjoy positive relations with their peers on average are performing better at school (Wentzel, 2017_[3]) (see Chapter 5 for a detailed discussion of socio-emotional skills). In contrast, negative social school environments, in particular peer victimization, are related to lower academic performance (Wang et al., 2014_[4]). Related to social and peer connections, as well as the school environment is the sense of belonging at school, which refers to a student's feelings of being accepted, respected and supported in the school environment (OECD, 2020_[2]). Students that feel a sense of belonging at school show better academic outcomes, a higher school-related motivation and report also better self-esteem (Slaten et al., 2015_[152]; Wang and Holcombe, 2010_[133]; OECD, 2020_[2]).

Educational tracking systems can have substantial impact on educational inequalities. The practice differs substantially between countries. While some countries place students into ability-related schools or programmes as early as age 10, others keep students of different abilities in the same tracks. While these tracking efforts aim to provide each student with learning environments that are adequate for their ability, these positive effects typically exist for high achieving students, lower achieving students suffer from negative effects, potentially driven by worse school and peer environments in lower track schools. Overall, effects of tracking appear to be negative for student achievement across the population of pupils, especially early tracking that separates students according to ability after only a few years of primary school (Hanushek and Wößmann, 2006_[153]; Lavrijsen and Nicaise, 2016_[154]).

6.5. Overview of data availability

Obtaining internationally comparable data on cognitive abilities and educational achievement can be complicated as achievement tests, ability measurements and definitions often widely differ between countries. However, large scale efforts of implementing regular international student assessments have offered possibilities to study differences in cognitive outcomes and educational performance across a wide range of countries. As such, high-quality data on cognitive abilities and educational achievement can primarily be obtained from international student assessments, such as the *OECD's Programme for International Student Assessment* (PISA) or the *Progress in International Reading Literacy Study* (PIRLS) and the *Trends in Mathematics and Science Study* (TIMSS) from the International Association for the Evaluation of Educational Achievement (IEA).

Importantly, these assessments collect a wide range of background information that helps to identify inequalities in children’s environments and early household conditions. This covers not only the socio-economic family background, but also the presence of educational resources at home, the level of parental support and the school climate. In this regard, PISA, PIRLS and TIMSS can shed light on children’s achievements, and uncover underlying conditions that may stimulate or inhibit successful cognitive development.

The remainder of this section reviews the availability of information in each of the dimensions of children’s cognitive well-being identified above. Table 6.2 presents a rough mapping of the data availability, with more detailed tables in the Annex.

Table 6.2. Overview of available data sources

		Country coverage	Age coverage	Main Data source	Data type	Regular update	Disaggregation
Cognitive development and educational progression and attainment	Early cognitive development	Poor	Poor	IELS, MELQO	Survey	Uncertain	Yes
	Cognitive development in middle childhood and adolescence	Good	Good	PISA, PIRLS, TIMSS	Survey	Yes	Yes
	Educational progression and attainment	Good	Medium	PISA	Survey	Yes	Yes
		Good	Good	OECD Education Database	Database	Yes	Partial
Education attitudes, behaviours and aspirations	Education aspirations	Good	Medium	PISA	Survey	Yes	Yes
	Education attitudes and behaviours, and home learning behaviours	Good	Good	PISA, PIRLS	Survey	Yes	Yes
Family and home environment		Good	Good	PISA, PIRLS	Survey	Yes	Yes
Parental interactions and involvement in learning		Good	Good	PISA, PIRLS, TIMSS	Survey	Yes	Yes
School environment and relationships		Good	Good	PISA, PIRLS, TIMSS	Survey	Yes	Yes

Note: A set of more detailed tables can be found in the Annex. “Disaggregation” means that the publicly available data allows for disaggregation by at least basic socio-economic and demographic groups, such as by sex, age, family status, and family income.

Data on cognitive development and educational attainment

As shown in Annex 6.A, cross-national data on early learning and cognitive achievements, including emergent literacy and numeracy, are very rare and generally are not presented in a coherent international framework comparing more than just a few OECD countries. One of the few evaluations, the *OECD International Early Learning and Child Well-Being Study* (IELS) is available only for England (United Kingdom), Estonia and the United States. The IELS measures children’s development and learning across key indicators at five years of age, including emergent literacy and emergent numeracy, self-regulation, and social-emotional skills (OECD, 2020^[5]). While the study measures important aspects of early cognitive development, its country reach is not (yet) wide enough for it to be used for full international comparison. It is expected that more countries will be covered in future survey rounds.

Another evaluation study on young children is the Measuring Early Learning and Outcomes (MELQO) project, which ran in 2014 as a joint initiative between UNESCO, the World Bank, the Brookings Institution’s Centre for Universal Education, and UNICEF. The project measures children’s development and learning

at the start of primary school (i.e. between four and six years of age). The measurement includes literacy and numeracy outcomes and outcomes in a few other domains. However, as its main focus is children in middle- and low-income countries, participation by OECD countries is small and only includes Colombia to date.

In many countries, children's school-readiness is examined before entering school, either as part of pre-primary education or through specific pre-school exams. For example, in Sweden, the cognitive development of children in compulsory pre-school classes in the year before starting primary school is evaluated using nationally standardized survey materials. This evaluation examines whether children's cognitive abilities are sufficient to meet the requirement for Swedish (i.e. the language of school instruction) and math classes in the first years of primary school (Skolverket, 2020^[155]). Other examples include Australia's *Australian Early Development Census* (AEDC) – a teacher-completed assessment of children in the first year of full-time school, conducted every three years, covering children's physical health, learning and cognitive development, and socio-emotional skills (AEDC, 2019^[156]) – and England's (United Kingdom) *Early Years Foundation Stage Profile* (EYFSP) statutory assessment – also a teacher-completed assessment, conducted at the end of pre-primary education, covering children's physical development and personal, social and emotional development, as well as early cognitive development (DfE, 2019^[157]). In future, these kinds of data, if sufficiently streamlined across countries, may be useful for building indicators on the state of children's cognitive abilities upon school-entry. However, as discussed above, many gaps in cognitive development exist already before children enter school. Thus, even if a large scale synthesis of pre-school exam data could give a good picture of gaps existing for young children starting school do, evaluations at an even earlier point would still be necessary to identify children at risk as these children need to be reached much earlier.

In some countries, children are evaluated upon school entry in order to give teachers a baseline understanding of their cognitive abilities in order to better align teaching and supports to the needs of students. In France, for example, short nationally-standardised examinations are administered in the first and second grade of primary school to measure children's French and math skills. The French Ministry of Education publishes statistics based on these results (DEPP, 2019^[158]). Some countries also perform regular national test that examine all students at different ages and across various subject areas. Denmark, for example, has national tests that measures academic performance for children as young as the 2nd grade until they graduated from the 8th grade. These tests cover reading, mathematics, English, and a range of science topics and the resulting data is of high quality (Nandrup and Beuchert-Pedersen, 2017^[159]). However, using such data for an evidence-informed framework with comparable data requires test scores being harmonised across countries. Moreover, only a number of countries use systematic testing systems on students.

Data on reading, mathematics and science literacy for representative samples of fourth graders is available in PIRLS and TIMSS. In specific cases literacy is measured among fifth graders in order to better match achievement levels across participating countries, in particular when school enrolment begins at a younger age (e.g. in New Zealand and the United Kingdom). While TIMSS also measures children's abilities towards the end of compulsory school (8th grade), PISA offers more details on the children's background and the school and home environment. As mentioned below, PISA also offers a better country coverage.

At five year intervals, PIRLS measures reading literacy achievements for children, currently in 58 countries, 32 of which are OECD members. The latest study was implemented in 2016, with the next evaluation planned for 2021. PIRLS evaluates two separate dimensions of literacy: the purposes of reading and the process of comprehension. The purposes of reading dimension contains domains measuring literacy experience, and the acquisition and use of information. The reading comprehension dimension covers information retrieval, the ability to make straightforward inference, interpretation and integration of information, as well as the evaluation and critique of textual content (IEA, 2015^[160]).

TIMSS, on the other hand, measures mathematics and science abilities in 60 countries, 28 of which are OECD members. The latest study was implemented in 2019, with the data and results publicly available in late 2020. Math and science abilities are examined around both content and cognitive dimensions. The content dimensions specify the content matter which is assessed, including numbers, measurements and geometry, and data for math literacy as well as life science, physical science, and earth science for science literacy. The cognitive dimension for both areas measures thinking processes: knowing, applying and reasoning (IEA, 2017^[161]).

Both PIRLS and TIMSS collect a wider range of parent-reported information on children's home environment, including educational resources (e.g. number of children's books, or presence of a computer). Similarly, there is information on whether parents engaged in early literacy and numeracy activities, such as reading books, counting things or playing with alphabet or number-related toys, as well as data on literacy and numeracy ability at school start. As a result, these surveys may also be used to understand reading, mathematics and science literacy along differences in children's home environments. However, while both surveys contain parental educational backgrounds, there is no comprehensive index of the household's socio-economic status. This information would be useful for a more comprehensive mapping of inequalities in children's academic achievement.

For adolescents, the OECD's Programme for International Student Assessment (PISA) study provides a rich source of comparable data on skills and abilities at age 15. The study is implemented every three years in all OECD member countries using nationally representative samples of 15-year-old students. It was first ran in 2000, with the latest results being for 2018. Each round of PISA contains assessments in reading, mathematics, and science literacy (Box 6.3), as well as an additional assessment in what PISA calls an "innovative domain" – usually one-off assessments, run on an ad-hoc basis, on aspects or areas not covered by the regular assessments. These innovative assessments often focus on transversal competences (e.g. problem solving), although in some rounds they concentrate on areas complimentary to one of the three regular assessments (e.g. attitudes towards science).

In addition to its detailed assessment data, the PISA study also collects a range of important background information on students, their home life, and their school environment, among other things. This data is valuable in and of itself, but also allows for the disaggregation of assessment results by, for example, socio-economic background and the home environment, including the presence of educational resources.

Box 6.3. Student literacy assessment in PISA surveys

The definition of literacy concepts in PISA has evolved over the years to reflect societal and cultural changes. The most recent implementation defined **reading literacy** as “an individual’s capacity to understand, use, evaluate, reflect on and engage with texts in order to achieve one’s goals, develop one’s knowledge and potential, and participate in society”. This literacy definition is organised and measured across two main processes, which are text processing and task management, each containing a number of sub-processes. In text processing, for example, the main focus is on reading fluency, involving processes around information retrieval, understanding, and evaluating and reflecting (OECD, 2019^[162]).

In the 2018 edition of PISA, **mathematical literacy** is defined as “an individual’s capacity to formulate, employ and interpret mathematics in a variety of contexts. It includes reasoning mathematically and using mathematical concepts, procedures, facts and tools to describe, explain and predict phenomena.” It measures three different processes: formulating situations mathematically, employing mathematical concepts, and interpreting and evaluating mathematical outcomes.

Science literacy is defined as “the ability to engage with science-related issues, and with the ideas of science, as a reflective citizen. A scientifically literate person is willing to engage in reasoned discourse about science and technology, which requires the competencies to explain phenomena scientifically, evaluate and design scientific enquiry, and interpret data and evidence scientifically”. This contains three domains: explaining phenomena scientifically, evaluating and designing scientific enquiry, and interpreting data and evidence scientifically (OECD, 2019^[162]).

Even though international student assessments are particularly useful in identifying differences in student achievements across countries, there are potential problems arising from their administration in different languages. Specific language idiosyncrasies may place different cognitive demands on students which can undermine the fairness of evaluations as well as miss the conceptual domains that are being targeted in each test (El Masri, Baird and Graesser, 2016^[163]). Nevertheless, both OECD and IEA (which administers TIMSS and PIRLS) make considerable efforts to ensure that the tests are as comparable as far as it is possible across countries and the varying school systems.

In terms of sampling, the methods used can sometimes misrepresent the overall student population and as a result lead to biased estimates of a countries student achievement and their evolution (Girardin, Lequesne and Thévenon, 2019^[164]). This is of particularly importance for PISA, TIMSS and PIRLS, as they all use sampling methods and do not assess the whole student population country. However, there is potential for this to be corrected for by applying post-stratification methods (Freitas et al., 2016^[165]).

When measuring student performance at different ages, and in particular when using two different representative tests, it is critical to identify the level of comparability between central frameworks, concepts and methodologies. The aforementioned tests measure academic performance at different ages. In the case of PIRLS & TIMSS at 10 years old and of PISA at aged 15 years old. As such, it is desirable to have a substantial degree of overlap between the tests in order to ensure that the resulting indicators represents similar domains of reading, math and science literacy across ages (Box 6.4).

There is a fairly good mapping of educational attainment in adolescence across the OECD. Data on educational attainment are available through the *OECD Education Database* and *OECD Education at a Glance*, and include, for example, the share of adolescents in secondary education and upper secondary school graduation rates. This data also inform on the share of adolescents leaving school early and not completing their formal education. The OECD also has data on the share of adolescents not in employment, education or training (NEET). In PISA, adolescents are also asked whether they repeated

any grades (as well as at which grade level). This data can be used to identify grade repetition rates in both primary and secondary school.

Box 6.4. Comparability of PISA with PIRLS and TIMSS

Reading (PISA & PIRLS)

Both PISA and PIRLS are sampling-based tests that measure students' reading literacy at different ages. PISA samples lower secondary school students aged between 15 years and 3 months and 16 years and 2 months old, selecting at random a specific number in 8th, 9th and 10th grade. PIRLS also samples lower secondary schools as well as students in the 4th grade (i.e. 9-10 year olds).

A central question is to which degree both studies are comparable, given their somewhat different designs and methodologies. As PISA is age-based and the PIRLS study is grade-based, this results in differences in the distribution of pupils across grades and ages. To increase consistency between ability measures, differences in the average age of the students, as well as the gender composition of the sampled student population should be adjusted for (Jakubowski and Pokropek, 2015^[166]; Rindermann, 2007^[167]; Jakubowski, 2010^[168]).

Many of the tests design and objectives between PISA and PIRLS are rather similar. For example, both define reading literacy in comparable way and the measured cognitive processes are overlapping (retrieving, interpreting, reflecting and evaluating). In addition, the psychometric prosperities of the two test items are remarkably similar (Grisay, Gonzalez and Monseur, 2009^[169]). However, small differences in the test items for PISA and PIRLS remain. In order to correct for these potential biases in comparison across tests and countries, Jakubowski and Pokropek (2015^[166]) propose adjusted standard errors that account for item-linkage problems.

Mathematics and Science (PISA & TIMSS)

In terms of sampling, TIMSS uses a similar approach to PIRLS, but it also tests 8th graders (i.e. 13-14 year olds). For this reason, less effort has been made to utilise both PISA and TIMSS in the evaluation of student's achievement progress; most math and science progress studies compare both 4th and 8th graders of TIMSS (see e.g. Hanushek and Wößmann (2006^[153])). This removes potential problems of mapping items between the two different test methodologies.

In addition, existing research on PISA and TIMSS comparability generally only analyses the differences in methodologies between PISA and TIMSS 8th grade evaluations, highlighting the situation and phenomena based approach of PISA and the school curriculum focus on TIMSS but not evaluating the usefulness of both tests for student progress (Kell and Kell, 2014^[170]). To date, only a few researchers have utilised both PISA 15-year olds and TIMSS 4th graders (see e.g. Ruhose and Schwerdt (2016^[171])).

Utilising both PISA and TIMSS in the analysis of math and science achievement at the two different stages requires more effort at examining the overlap of concepts and potential corrections that could make more tests more comparable. It is also likely that age- and gender corrections, similar as those proposed for PIRLS, would improve the comparability between both test frameworks.

Data on education attitudes, behaviours and aspirations

PISA provides substantial information on children's educational attitudes, behaviours and aspirations (see Annex Table 6.A.2 in Annex 6.A). For instance, PISA has information on the children's own expectations regarding their educational achievement, broken down by different International Standard Classification of

Education (ISCED) qualification levels. As similar information is missing from PIRLS and TIMSS data, it is not possible to infer how the educational aspirations of children evolve between middle childhood and adolescence.

Earlier PISA rounds contained questions asking students the degree to which they agreed with statements like “I want top grades in most or all of my courses”, “I want to be able to select from among the best opportunities available when I graduate” or “I want to be one of the best students in my class”. The latest PISA round in 2018 did not contain these survey items, suggesting that this type of information may no longer be collected in the future. However, PISA 2018 did contain new measures that, for the first time, looked to capture the presence and strength of a “growth mind-set”, that is, the belief that one’s own skills and abilities are malleable, as opposed to innate.

Both PISA and PIRLS contain information on student’s education-related behaviour such as the frequency of students’ absence from lessons. PIRLS only records the frequency of school absenteeism, but PISA additionally inquires whether children just skipped some classes or they arrived late to school. However, there is no information to indicate whether these absences are authorised or unauthorised. Some national sources are useful to supplement this data. For example, England (United Kingdom) collects information annual on absenteeism rates which is broken down by reason, while the Danish Ministry of Education publishes similar data, further broken down by different school levels.

PISA also contains information on children’s learning behaviours at home, especially concerning homework and studying outside of school hours. For example, adolescents are asked how many hours and minutes they spent studying before and after school on the most recent day they attended school. PIRLS only has teacher-reported data on how much homework is typically assigned, meaning that data on the share of children who are doing or not doing their assigned homework is missing.

Students’ attitudes toward school and learning activities are also included in PISA and PIRLS. In PIRLS, 4th graders rate their engagement with reading activities in school and report how much they enjoy reading for fun outside of school. PISA also asks adolescents how much they read for fun and to which degree they enjoy reading. However, PISA additionally asks adolescents to break down their reading activities into specific sources (e.g. newspapers, novels or comic books), and how often they read on paper versus on digital devices, and how much time they spend reading emails, text messages, emails and online news.

Data on the family and home environment, the school environment, and parental involvement in learning

As shown in Annex Table 6.A.3 in Annex 6.A, both PISA and PIRLS and TIMSS contain a wide range of items on students’ learning environment, self-reported by students and reported by parents, teachers and school principals. Both sources provide data on the home environment. In PIRLS and TIMSS, fourth graders are asked about the number of books at home and the presence of educational supports (e.g. own bedroom, home computer), while parents are asked how many books children have. Unfortunately, there is an absence of any information being collected on whether the household owns any specific items that would contribute to the HNE. In PISA, adolescents provide information on whether a range of educational supports and resources are present in their home (e.g. desk, a quiet place to study, home computer, and internet connection), as well as the number of books in the household. Again, there is no differentiation made between books and resources that stimulate the HNE or HLE.

In terms of parental involvement and interactions with children, information is gathered in PISA and, to a lesser extent in PIRLS and TIMSS. PISA data contains parent-reported information on parents’ interactions with the adolescents (e.g. discussing school life, helping with homework, talking about books or politics). In addition, there are multiple items that inquire about the level of parental direct involvement with the adolescent’s school community (e.g. discussing children’s progress with a teacher, participation in local school government). Both, parents and children also report on how supportive parents are of the children’s

efforts at school. In contrast, PIRLS does not provide such information. Despite the potential of recall bias, both PISA, and PIRLS and TIMSS provide parent-reports on early literacy and numeracy enhancing activities that parents engaged in with children such as reading books, telling stories, and playing word or counting games at home: in first grade (PISA), or before starting primary school (PIRLS and TIMSS).

PISA contains information on parents' expectations of children's educational achievement, indicated by level of educational qualifications, as well as similar information on children's own expectations. This information makes it possible to identify parental aspirations for their children, and potential divergences in children's own expectations with those of parents. Neither PIRLS nor TIMSS contain this type of information on younger children. Furthermore, OECD reports private spending by parents on education, including expenditure on textbooks and private tutoring (OECD, 2020^[172]).

In terms of the school and classroom environment, again PISA and PIRLS are rich sources of information and data. In PIRLS and TIMSS, school safety and the disciplinary climate for fourth and eighth graders are reported by children's teachers. This includes information on the safety of the neighbourhood where the school is located, whether children show respect for teachers and school property, and whether students conduct themselves in an orderly manner. At the same time, school principals report to which degree they feel that truancy, vandalism, theft, cheating and classroom disturbances, among other things, are problems within the school. PISA contains an index of the schools disciplinary climate. This is based on student's reports, taking into account factors like how often students do not listen to teachers and how much noise and behavioural disturbances order are present during class time. PISA also often collects self-reported data from students on perceptions of teacher support and how fairly they are believe they are treated.

At the same time PISA reports data on children's perceptions on cooperation and competition when it comes to learning. Children are asked how much as individuals they value cooperation and competition, and how much cooperation and competition are valued in their school. In addition, PISA and PIRLS contain information on student's sense of belonging at school. Students also report on bullying and peer victimization, for example, whether other children spread lies about somebody else, and whether there are incidences are name-calling, physical violence, and of rumours being spread around. Both PISA and PIRLS collect information on (average) class sizes, as reported by either teachers or school principals.

The OECD collects data on educational spending, disaggregated by level (i.e. primary school and secondary school). This data makes it possible to build indicators on school spending across OECD. But data on ECEC spending on pre-school children is much more difficult to obtain, as the fiscal responsibilities are often shared between ministries (e.g. education or social affairs) and local governments utilise a variety of different funding streams to finance its spending. Some ECEC spending comes from non-earmarked grants, which makes it hard to estimate the exact share spent on childcare services. Overall, these estimates lack information on spending across different school districts and whether countries target specific funding programs at disadvantaged and low-performing students.

6.6. The way forward

The discussion in this chapter has shown that, compared to several other areas of child well-being, there is a relatively broad range of cross-national data available on children's cognitive development and educational achievement. This is especially the case with respect to the traditional core areas of reading, mathematics and science, which are covered comprehensively through the major international assessments (PISA, PIRLS and TIMSS). In addition, these international assessments provide a range of useful background information on children's learning environment, which can be used to construct indicators or disaggregated data to show potential inequalities in educational achievement and cognitive abilities.

There are, however, still important gaps. One lies in the general lack of comparable cross-national data on young children's learning. Strengthening policies to enhance children's learning and skill development requires information on the key competences children need to develop from infancy on to both magnify learning capacities and to maintain them if they experience adversity later in childhood (i.e. a better assessment of protective factors behind learning capacities is needed). However, a shortcoming of international educational assessment frameworks is that they only measure children's achievements at two stages of childhood: middle childhood and adolescence. Efforts to collect for data on younger children could be strengthened.

A second key gap lies in the scope of the competences covered by available cross-national data. While the information on reading, mathematics and science literacy provided by the major international assessments is hugely valuable and informative, these are not the only aspects of children's learning relevant for well-being. As discussed earlier in Box 6.1, there is increasing recognition that children need a number of other cognitive and non-cognitive competences outside the traditional core areas, including critical and creative thinking and self-regulated learning. At present, these kinds of competences are covered irregularly or not at all by the available cross-national data.

Strengthen efforts to track early cognitive development

Early language development is the precursor of communication abilities, both in speech and written form. It lays the foundation for emergent literacy and numeracy development, which are important precursors of cognitive ability gaps throughout school and later life. While typically such gaps widen further as children progress through school, early measurement of cognitive delays can pave the way for interventions that can potentially close these emerging gaps (Heckman, 2006^[11]). Therefore, it is critically important to measure potential inequalities in early cognitive development, including in language development (Schoon et al., 2015^[62]; Shuey and Kankaras, 2018^[173]). In contrast to other emergent cognitive abilities, language development follows very clear and well established milestones beginning in the very first months of life (Feldman, 2019^[24]; McLaughlin, 2011^[25]). However, it is important to understand that early development is highly diverse and it should not be measured too early, as it risks natural heterogeneity across children's development being misidentified as a cognitive delay. The appropriate age to start measuring the attainment of milestones may be around age three or a few months later (Schoon et al., 2015^[62]).

While no sufficient internationally data source measuring the state of language acquisition currently exists, data on emergent literacy and numeracy is sparse. For example, the International Early Learning and Child Well-Being Study (IELS) provides some data on early cognitive skills, yet the study is limited to information on three countries only: England (United Kingdom), Estonia and the United States. The Measuring Early Learning and Outcomes (MELQO) project offers some data for low- and middle-income countries, and covers one OECD member country, Colombia. It is necessary to expand current assessment efforts to improve the measurement of emergent literacy and numeracy. For instance, a greater country coverage in the IELS could give a better understanding of where gaps in emergent cognitive development exist, and on which domains and sub-populations interventions may be most promising. Alternatively, as many countries employ school-readiness examinations, potential avenues for the future collection of administrative data could contain data on school readiness examinations, much as could also be done for data on health and cognition checks. Though this would give a more comprehensive picture of gaps in children's cognitive abilities before entering school, it still misses the earlier years of cognitive development.

Another possibility to collect information on emerging languages and numeracy competences is to rely on care and education and health checks settings. Babies and toddlers are subject to routine health and developmental examinations that measure physical and cognitive development, eventually culminating in school-readiness examinations which determine whether the child is fit for the formal education system. As some countries already routinely record their citizen's interactions with the health system in

administrative datasets, the type of information recorded could potentially be extended to include measures of attainment of key language development milestones for infants and toddlers. The timing of these milestones are typically similar across contexts, which could make it to source such information from future administrative data collections.

Improve the range and consistency of skills and competences covered by cross-national education and learning data

While cross-national data on the skills and competences of children in middle childhood and adolescence has improved considerably in recent decades – thanks in large part to TIMMS, PIRLS and PISA – there are still important gaps in and limits to what is currently measured. As outlined in Box 6.1, there is increasing recognition that, in addition to reading, mathematics and science skills, today’s children need a range of further competences to flourish and thrive. These competences stretch from transversal cognitive skills such as problem solving, critical thinking and creative thinking, to meta-cognitive skills, socio-emotional skills (see Chapter 5), and digital skills, among other things.

Through its “innovative domain”, the OECD’s PISA study has collected valuable but limited cross-national information on certain transversal skills. Previous rounds have assessed student’s problem solving (2003), creative problem solving (2012) and collaborative problem solving (2015), for example, while PISA 2022 will run an assessment on creative thinking. PISA 2018 also contains some questions on children’s learning strategies. However, so far, this information has been collected irregularly on an ad-hoc basis, which reduces its usefulness for well-being monitoring. It also comes with the limitation that PISA covers 15-year-old students, only.

There is a general need to widen coverage and assess more consistently a broader range of children’s skills and competences outside the traditional big three areas of reading, mathematics and science. This includes a better and more regular assessment of children’s transversal cognitive skills, of self-regulated learning and “learning to learn” skills (e.g. motivation, planning, self-monitoring, self-reflection), and of digital skills (e.g. data and digital literacy). As discussed in Chapter 5, there is also a need for better comparable data on children’s socio-emotional skills more generally. As and where relevant, this kinds of assessments should also be extended in age-appropriate ways to children in early and middle childhood.

Improve the tracking of vulnerable children

Another important limitation of data is that there is no regular and comparable data on learning outcomes of highly vulnerable groups of children, such as children who are homeless or transient, children living in out-of-care, children experiencing maltreatment at home, children with physical disabilities as well as for children who are out of school and those growing up in extreme poverty. Not much is known about their achievements and the obstacle to learning they face, but the existing evidence highlight the high risks of lower intellectual functioning and educational achievement (Parks, Stevens and Spence, 2007^[174]; Fry, Langley and Shelton, 2017^[175]; Geoffroy et al., 2016^[176]).

While it is not uncommon for children to experience minor delays in their cognitive development or in the acquisition of concepts, some children have special education needs (SEN) and experience significant difficulties in keeping up with the speed of learning in the classroom and require additional learning supports from teachers and caregivers. These learning difficulties and disabilities span from functional disabilities to intellectual disabilities, behavioural difficulties, and can involve children having limited knowledge of the instruction and test language. These children are among the most vulnerable in the classroom, therefore it is important to measure not only their cognitive development and educational achievement but also their behaviours and attitudes.

To date there has been little effort made to integrate specific measures for SEN students into PISA, PIRLS or TIMSS (Schuelka, 2013^[177]). For example, PIRLS actively excludes those students with functional and

intellectual disabilities as well as non-native speakers, unless their teachers deem them fully capable of participating in the test. Though PISA typically includes a small share of students with SEN, many schools that primarily serve SEN students as well as a sizeable share of SEN students within regular schools are excluded. In addition, the final results of PISA do not offer any indicators specifically on SEN students, meaning that their cognitive development and educational outcomes stay invisible to policy makers (LeRoy et al., 2019^[178]).

The long-term strategy of PISA's (until 2024) seeks "ways to widen access of PISA for students with disabilities and other special education needs". This has resulted in a recent special education needs feasibility study among SEN students in Canada, Dubai (United Arab Emirates), the Netherlands, Scotland (United Kingdom) and Spain, with the aim of identifying key priorities to make PISA more inclusive. The study found that while most PISA items are at the minimum partially accessible to SEN children, the item pool could be restricted and the layout simplified to ease access. Furthermore guidelines for human assistance and accessibility training could better prepare children and educators prior to assessment (OECD, 2018^[179]). Future PISA implementations may offer the possibility to ascertain a more comprehensive picture of SEN students, particularly if indicators are developed that make use of an extended SEN sample. Simultaneously, it would be beneficial if PIRLS and TIMSS would undertake similar efforts to ease accessibility for SEN populations and subsequently present data on their cognitive abilities in fourth grade.

Measure educational motivations from middle childhood

An important factor linked to children's educational outcomes and educational achievement are their motivation to learn, mastery orientation and educational aspirations. Educational aspirations are typically formed in early life, but are reactive to experiences, both inside and outside of the school system. They are highly influenced by children's motivations to learn and by the existence of mastery goals where students focus on mastery of a task and have the desire to acquire new skills (Hsieh, 2011^[180]). Children's awareness about educational tracks and opportunities is also key to foster their motivation to learn and help them form educational aspiration.

Measuring the development of children's educational aspirations is important for policy makers to assess the need to develop guidance and help families navigate in the educational system. There are not sufficient data on the educational aspirations of younger children, although one thing understood is that younger children are typically more idealistic in their aspirations, with lower exposure to educational systems barriers being one of the reasons for. A high share of children hold high aspirations early in their academic trajectory but this has dropped significantly by the end of compulsory schooling. For some children, this drop in aspirations may signal disappointment, loss of motivation, a lack of support at school or in the family or a disengagement from school work. A better understanding of the factors driving change in educational aspirations is needed to develop adequate policy responses.

Currently, internationally comparable data on educational aspirations is only available for adolescents through the PISA survey. Neither PIRLS nor TIMSS inquires about the educational and occupational aspirations of students. Measuring the aspirations of children at the stage of middle childhood would help view that helping children fulfil their educational expectations is a key policy challenge.

In conclusion, compared to other areas of children's well-being, there is currently a relatively good range of available cross-national data on children's cognitive development and educational well-being. This is especially the case for children in middle childhood and adolescence, and especially with respect to their abilities in reading, mathematics and science. However, there is a strong need to develop data on early cognitive development, early educational aspirations, and the situation of the most vulnerable children. There is also a need to widen the range of skills and competences covered for children of all ages. To some extent, it may be possible to close some of these gaps expanding smaller cross-country studies across OECD countries, or by utilising and streamlining data collection in early health and development

assessments and school-readiness examinations. Other gaps, however, will require more extensive data collection efforts.

References

- Adema, W., C. Clarke and O. Thévenon (2020), “Family Policies and Family Outcomes in OECD Countries”, in Nieuwenhuis, R. and W. Van Lancker (eds.), *The Palgrave Handbook of Family Policy*, Palgrave Macmillan, Cham., https://doi.org/10.1007/978-3-030-54618-2_9. [122]
- Adema, W., C. Clarke and O. Thévenon (2016), *Who Uses Childcare? Background brief on inequalities in the use of formal early childhood education and care (ECEC) among very young children*, https://www.oecd.org/els/family/Who_uses_childcare-Backgrounder_inequalities_formal_ECEC.pdf. [130]
- AEDC (2019), *Australian Early Development Census*, <https://www.aedc.gov.au/> (accessed on 16 May 2021). [156]
- Akee, R. et al. (2010), “Parents’ incomes and children’s outcomes: A quasi-experiment using transfer payments from casino profits”, *American Economic Journal: Applied Economics*, Vol. 2/1, pp. 86-115, <http://dx.doi.org/10.1257/app.2.1.86>. [93]
- Aucejo, E. and T. Romano (2016), “Assessing the effect of school days and absences on test score performance”, *Economics of Education Review*, Vol. 55, pp. 70-87, <https://doi.org/10.1016/j.econedurev.2016.08.007>. [79]
- Barbu, S. et al. (2015), “Sex differences in language across early childhood: Family socioeconomic status does not impact boys and girls equally”, *Frontiers in Psychology*, Vol. 6/1874, <https://doi.org/10.3389/fpsyg.2015.01874>. [98]
- Barone, C. and E. Chambouleyron (2019), “Shared Book Reading Interventions and Children’s Skills A Meta-Analysis of Randomised Controlled Trials”, *LIEPP Working Papers*, No. 98, Sciences Po, Paris, <http://www.sciencespo.fr/liepp> (accessed on 11 December 2020). [109]
- Barone, C., D. Fougère and C. Pin (2020), “Social Origins, Shared Book Reading, and Language Skills in Early Childhood: Evidence from an Information Experiment”, *European Sociological Review*, Vol. 37/1, pp. 18-31, <http://dx.doi.org/10.1093/esr/jcaa036>. [110]
- Becchetti-Bizot, C., G. Houzel and F. Taddei (2017), *Vers une société apprenante : Rapport sur la recherche et développement de l’éducation tout au long de la vie*, Ministère de l’Education Nationale, de la Jeunesse et des Sports, <https://www.education.gouv.fr/vers-une-societe-apprenante-rapport-sur-la-recherche-et-developpement-de-l-education-tout-au-long-de-5843> (accessed on 21 January 2021). [111]
- Berger, L., L. Panico and A. Solaz (2020), “The Impact of Center-Based Childcare Attendance on Early Child Development: Evidence from the French Elfe Cohort”, *Documents de travail*, No. 254, INED, Paris, <https://www.ined.fr/fr/publications/editions/document-travail/the-impact-of-center-based-childcare-attendance-on-early-child-development-Aevidence-from-the-french-elfe-cohort/> (accessed on 12 December 2020). [127]
- Berkowitz, R. et al. (2017), “A research synthesis of the associations between socioeconomic background, inequality, school climate, and academic achievement”, *Review of Educational Research*, Vol. 87/2, pp. 425-469, <https://doi.org/10.3102%2F0034654316669821>. [135]

- Berzin, S. (2010), "Educational aspirations among low-income youths: Examining multiple conceptual models", *Children & Schools*, Vol. 32/2, pp. 112-124, <https://doi.org/10.1093/cs/32.2.112>. [76]
- Bianchi, S. and M. Milkie (2010), *Work and family research in the first decade of the 21st century*, John Wiley & Sons, Ltd, <http://dx.doi.org/10.1111/j.1741-3737.2010.00726.x>. [123]
- Bishop, D. and B. Clarkson (2003), "Written language as a window in to residual language deficits: A study of children with persistent and residual speech and language impairments", *Cortex*, Vol. 39/2, pp. 215-237, [https://doi.org/10.1016/s0010-9452\(08\)70106-0](https://doi.org/10.1016/s0010-9452(08)70106-0). [33]
- Blakemore, J., S. Berenbaum and L. Liben (2013), *Gender Development*, Psychology Press, New York, <http://dx.doi.org/10.4324/9780203889756>. [103]
- Blanden, J. and P. Gregg (2008), "Family income and educational attainment: A review of approaches and evidence for Britain", *Oxford Review of Economic Policy*, Vol. 20/2, pp. 245-263, <https://doi.org/10.1093/oxrep/grh014>. [92]
- Boonk, L. et al. (2018), "A review of the relationship between parental involvement indicators and academic achievement", *Educational Research Review*, Vol. 24, pp. 10-30, <https://doi.org/10.1016/j.edurev.2018.02.001>. [112]
- Bornstein, M. (2015), "Children's parents", in Lerner, R., M. Bornstein and T. Leventhal (eds.), *Handbook of Child Psychology and Developmental Science: Ecological Settings and Processes*, John Wiley and Sons, <https://onlinelibrary.wiley.com/doi/full/10.1002/9781118963418.childpsy403>. [102]
- Bray, M. (2014), "The impact of shadow education on student academic achievement: Why the research is inconclusive and what can be done about it.", *Asia Pacific Education Review*, Vol. 15/3, pp. 381-389, <https://doi.org/10.1007/s12564-014-9326-9>. [117]
- Buckingham, J., K. Wheldall and R. Beaman-Wheldall (2013), "Why poor children are more likely to become poor readers: The school years.", *Australian Journal of Education*, Vol. 57/3, pp. 190-213, <https://doi.org/10.1177%2F0004944113495500>. [56]
- Burger, K. (2010), "How does early childhood care and education affect cognitive development? An international review of the effects of early interventions for children from different social backgrounds", *Early Childhood Research Quarterly*, Vol. 25/2, pp. 140-165, <http://dx.doi.org/10.1016/j.ecresq.2009.11.001>. [125]
- Byrnes, J. and B. Wasik (2019), *Language and Literacy Development, Second Edition - What Educators Need to Know*, Guilford Publications, New York, <https://www.guilford.com/books/Language-and-Literacy-Development/Byrnes-Wasik/9781462540044>. [39]
- Catts, H. et al. (2002), "A longitudinal investigation of reading outcomes in children with language impairments", *Journal of Speech, Language, and Hearing Research*, Vol. 45/6, pp. 1142-1157, [https://doi.org/10.1044/1092-4388\(2002/093\)](https://doi.org/10.1044/1092-4388(2002/093)). [32]
- Chetty, R. et al. (2011), "How does your kindergarten classroom affect your earnings? Evidence from Project STAR.", *The Quarterly Journal of Economics*, Vol. 126/4, pp. 1593-1660, <https://doi.org/10.1093/qje/qjr041>. [48]

- Choudhury, S. and J. Slaby (2012), *Critical Neuroscience: A Handbook of the Social and Cultural Contexts of Neuroscience*, Wiley-Blackwell, <https://www.wiley.com/en-us/Critical+Neuroscience%3A+A+Handbook+of+the+Social+and+Cultural+Contexts+of+Neuroscience-p-9781444333282> (accessed on 17 January 2020). [18]
- Claessens, A. (2009), “Kindergarten skills and fifth-grade achievement: Evidence from the ECLS-K”, *Economics of Education Review*, Vol. 28/4, pp. 415-427, <https://doi.org/10.1016/j.econedurev.2008.09.003>. [46]
- Clark, C. and A. Teravainen-Goff (2018), *Mental Wellbeing, Reading and Writing: How Children and Young People’s Mental Wellbeing Is Related to Their Reading and Writing Experiences.*, https://cdn.literacytrust.org.uk/media/documents/Mental_wellbeing_reading_and_writing_2017-18_-_FINAL2_qTxyxvg.pdf. [53]
- Claro, S., D. Paunesku and C. Dweck (2016), “Growth mindset tempers the effects of poverty on academic achievement”, *National Academy of Sciences*, Vol. 113/31, pp. 8664-8668, <https://doi.org/10.1073/pnas.1608207113>. [75]
- Crawford, C. and J. Cribb (2015), “The link between childhood reading skills and adult outcomes: Analysis of a cohort of British children”, *IFS Briefing Note BN169*, The Institute for Fiscal Studies, <https://www.ifs.org.uk/uploads/publications/bns/BN169.pdf>. [60]
- DEPP (2019), “Evaluations 2019 - Repères CP, CE1 : Premiers résultats”, *Document de travail 2019-E03*, Direction de l’Évaluation, de la Prospective et de la Performance, Ministère de l’Éducation Nationale et de la Jeunesse, France, https://cache.media.education.gouv.fr/file/doctrav2019/05/6/dt2019e03_1198056.pdf. [158]
- DfE (2019), *Early years foundation stage profile results: 2018 to 2019*, Department for Education, <https://www.gov.uk/government/statistics/early-years-foundation-stage-profile-results-2018-to-2019> (accessed on 15 May 2021). [157]
- Diris, R. (2017), “Don’t Hold Back? The Effect of Grade Retention on Student Achievement.”, *Education Finance and Policy*, Vol. 12/3, pp. 312-341, https://doi.org/10.1162/EDFP_a_00203. [66]
- Dotterer, A. and K. Lowe (2010), “Classroom context, school engagement, and academic achievement in early adolescence.”, *Journal of Youth & Adolescence*, Vol. 40/12, pp. 1649-1660, <http://dx.doi.org/10.1007/s10964-011-9647-5>. [88]
- Dubet, F. and M. Duru-Bellat (2019), *L’École peut-elle sauver la démocratie ?*, Editions Seuil, <https://www.seuil.com/ouvrage/l-ecole-peut-elle-sauver-la-democratie-francois-dubet/9782021459708> (accessed on 11 December 2020). [71]
- Duncan, G. (ed.) (2011), *How is family income related to investments in children’s learning?*, Russel Sage Foundation, New York, <http://eprints.lse.ac.uk/43855/>. [97]
- Duncan, G. et al. (2007), “School readiness and later achievement”, *Developmental Psychology*, Vol. 43/6, pp. 1428-1446, <https://doi.apa.org/doi/10.1037/0012-1649.43.6.1428>. [20]
- EC (2019), *Key competences for lifelong learning*, Publications Office of the EU, Luxembourg, <https://op.europa.eu/en/publication-detail/-/publication/297a33c8-a1f3-11e9-9d01-01aa75ed71a1/language-en> (accessed on 5 May 2021). [31]

- El Masri, Y., J. Baird and A. Graesser (2016), "Language effects in international testing: The case of PISA 2006 science items.", *Assessment in Education: Principles, Policy & Practice*, Vol. 23/4, pp. 427-455, <https://doi.org/10.1080/0969594X.2016.1218323>. [163]
- Fall, A. and G. Roberts (2012), "High school dropouts: Interactions between social context, self-perceptions, school engagement, and student dropout.", *Journal of Adolescence*, Vol. 35/4, pp. 787-798, <https://doi.org/10.1016/j.adolescence.2011.11.004>. [91]
- Farrant, B. et al. (2012), "Fetal Testosterone, Socio-Emotional Engagement and Language Development", *Infant and Child Development*, Vol. 22/2, pp. 119-132, <http://dx.doi.org/10.1002/icd.1771>. [105]
- Feldman, H. (2019), "How Young Children Learn Language and Speech", *Pediatrics in Review*, Vol. 40/8, pp. 398-411, <https://doi.org/10.1542/pir.2017-0325>. [24]
- Fernald, A., V. Marchman and A. Weisleder (2013), "SES differences in language processing skill and vocabulary are evident at 18 months", *Developmental Science*, Vol. 16/2, pp. 234-248, <http://dx.doi.org/10.1111/desc.12019>. [7]
- Flèche, S., W. Lekfuangfu and A. Clark (2017), "The long-lasting effects of family and childhood on adult wellbeing: Evidence from British cohort data", *Journal of Economic Behavior & Organization*, Vol. 181, pp. 290-311, <https://doi.org/10.1016/j.jebo.2018.09.018>. [61]
- Fredriksson, P., B. Öckert and H. Oosterbeek (2013), "Long-term effects of class size.", *Quarterly Journal of Economics*, Vol. 128/1, pp. 249-285, <https://doi.org/10.1093/qje/qjs048>. [140]
- Freitas, P. et al. (2016), "Correcting for sample problems in PISA and the improvement in Portuguese students' performance.", *Education: Principles, Policy & Practice*, Vol. 23/4, pp. 456-472, <https://doi.org/10.1080/0969594X.2015.1105784>. [165]
- Fry, C., K. Langley and K. Shelton (2017), "A systematic review of cognitive functioning among young people who have experienced homelessness, foster care, or poverty.", *Child Neuropsychology*, Vol. 23/8, pp. 907-934, <https://doi.org/10.1080/09297049.2016.1207758>. [175]
- Gauvain, M. and R. Richert (2016), "Cognitive Development", in *Encyclopedia of Mental Health: Second Edition*, Elsevier Inc., <http://dx.doi.org/10.1016/B978-0-12-397045-9.00059-8>. [10]
- Geoffroy, M. et al. (2016), "Child neglect and maltreatment and childhood-to-adulthood cognition and mental health in a prospective birth cohort.", *Journal of the American Academy of Child & Adolescent Psychiatry*, Vol. 55/1, pp. 33-40, <https://doi.org/10.1016/j.jaac.2015.10.012>. [176]
- Gershenson, S., A. Jackowitz and A. Brannegan (2017), "Are student absences worth the worry in US primary schools?", *Education Finance and Policy*, Vol. 12/2, pp. 137-165, http://dx.doi.org/10.1162/EDFP_a_00207. [81]
- Girardin, V., J. Lequesne and O. Thévenon (2019), "How Variation of Scores of the Programme for International Student Assessment can be Explained through Analysis of Information", in *Data Analysis and Applications 2*, John Wiley & Sons, Inc., <http://dx.doi.org/10.1002/9781119579465.ch11>. [164]
- Grisay, A., E. Gonzalez and C. Monseur (2009), "Equivalence of item difficulties across national versions of the PIRLS and PISA reading assessments.", *IERI*, Vol. 2, pp. 63-83, <https://orbi.uliege.be/bitstream/2268/121044/1/IERI-Grisay-Gonzalez-Monseur.pdf>. [169]

- Gropen, J. et al. (2017), "Foundations of science literacy: Efficacy of a preschool professional development program in science on classroom instruction, teachers' pedagogical content knowledge, and children's observations and predictions.", *Early Education and Development*, Vol. 28/5, pp. 607-631, <https://doi.org/10.1080/10409289.2017.1279527>. [51]
- Guill, K. and W. Bos (2014), "Effectiveness of private tutoring in mathematics with regard to subjective and objective indicators of academic achievement. Evidence from a German secondary school sample.", *Journal for Educational Research Online*, Vol. 6/1, pp. 34-67, <http://nbn-resolving.org/urn:nbn:de:0111-opus-88400>. [118]
- Guthrie, J. and S. Klauda (2014), "Effects of classroom practices on reading comprehension, engagement, and motivations for adolescents.", *Reading Research Quarterly*, Vol. 49/4, pp. 387-416, <https://doi.org/10.1002/rrq.81>. [86]
- Gutiérrez-García, R. et al. (2017), "NEET adolescents grown up: eight-year longitudinal follow-up of education, employment and mental health from adolescence to early adulthood in Mexico City.", *European Child & Adolescent Psychiatry*, Vol. 26/12, pp. 1459-1469, <https://doi.org/10.1007/s00787-017-1004-0>. [70]
- Gutman, L. and R. Akerman (2008), "Determinants of aspirations", *Centre for Research on the Wider Benefits of Learning Research Report*, Vol. 27, <https://core.ac.uk/download/pdf/82863.pdf>. [77]
- Hancock, K., M. Gottfried and S. Zubrick (2018), "Does the reason matter? How student-reported reasons for school absence contribute to differences in achievement outcomes among 14-15 year olds", *British Educational Research Journal*, Vol. 44/1, pp. 141-174, <https://doi.org/10.1002/berj.3322>. [82]
- Hanushek, E. and L. Wößmann (2006), "Does educational tracking affect performance and inequality? Differences-in-differences evidence across countries.", *The Economic Journal*, Vol. 116/510, pp. C63-C76, <https://doi.org/10.1111/j.1468-0297.2006.01076.x>. [153]
- Hart, B. and T. Risley (1995), *The Early Catastrophe The 30 Million Word Gap by Age 3*, American Federation of Teachers, <https://www.aft.org/sites/default/files/periodicals/TheEarlyCatastrophe.pdf> (accessed on 1 October 2019). [42]
- Havnes, T. and M. Mogstad (2011), "No child left behind: Subsidized child care and children's long-run outcomes", *American Economic Journal: Economic Policy*, Vol. 32/2, pp. 97-129, <http://dx.doi.org/10.1257/pol.3.2.97>. [128]
- Heckman, J. (2006), "Skill formation and the economics of investing in disadvantaged children", *Science*, Vol. 312/5782, pp. 1900-1902, <http://dx.doi.org/10.1126/science.1130121>. [1]
- Heidlage, J. et al. (2019), "The effects of parent-implemented language interventions on child linguistic outcomes: A meta-analysis", *Early Childhood Research Quarterly*, Vol. 50, pp. 6-23, <http://dx.doi.org/10.1016/j.ecresq.2018.12.006>. [41]
- Hendren, N. and B. Sprung-Keyser (2020), *A Unified Welfare Analysis of Government Policies*, Oxford University Press, <http://dx.doi.org/10.1093/qje/qjaa006>. [15]
- Hindman, A., B. Wasik and E. Snell (2016), "Closing the 30 Million Word Gap: Next Steps in Designing Research to Inform Practice", *Child Development Perspectives*, Vol. 10/2, pp. 134-139, <http://dx.doi.org/10.1111/cdep.12177>. [45]

- Holden, K. (2016), "Buy the book? Evidence on the effect of textbook funding on school-level achievement.", *American Economic Journal: Applied Economics*, Vol. 8/4, pp. 100-127, <http://dx.doi.org/10.1257/app.20150112>. [146]
- Horowitz-Kraus, T. and J. Hutton (2018), "Brain connectivity in children is increased by the time they spend reading books and decreased by the length of exposure to screen-based media.", *Acta Paediatrica*, Vol. 107/4, pp. 685-693, <https://doi.org/10.1111/apa.14176>. [54]
- Hsieh, P. (2011), "Mastery Orientation", in Goldstein S., N. (ed.), *Encyclopedia of Child Behavior and Development*, Springer, Boston, MA, http://dx.doi.org/10.1007/978-0-387-79061-9_1722. [180]
- Hsin, A. and C. Felfe (2014), "When Does Time Matter? Maternal Employment, Children's Time With Parents, and Child Development", *Demography*, Vol. 51/5, pp. 1867-1894, <http://dx.doi.org/10.1007/s13524-014-0334-5>. [124]
- Hutton, J. et al. (2020), "Associations between home literacy environment, brain white matter integrity and cognitive abilities in preschool-age children.", *Acta Paediatrica*, Vol. 109/7, pp. 1376-1386, <https://doi.org/10.1111/apa.15124>. [111]
- IEA (2017), *TIMSS 2019 Assessment Frameworks*, <http://timss2019.org/wp-content/uploads/frameworks/T19-Assessment-Frameworks.pdf>. [161]
- IEA (2015), *PIRLS 2016 Assessment Frameworks*, https://timssandpirls.bc.edu/pirls2016/downloads/P16_Framework_2ndEd.pdf. [160]
- Ikeda, M. and E. García (2014), "Grade repetition: A comparative study of academic and non-academic consequences.", *OECD Journal: Economic Studies*, Vol. 2013/1, https://doi.org/10.1787/eco_studies-2013-5k3w65mx3hnx. [63]
- Ismail, F., A. Fatemi and M. Johnston (2017), *Cerebral plasticity: Windows of opportunity in the developing brain*, W.B. Saunders Ltd, <http://dx.doi.org/10.1016/j.ejpn.2016.07.007>. [17]
- Jackson, C. (2018), "Does school spending matter? The new literature on an old question", *NBER Working Paper*, Vol. 25368, <http://dx.doi.org/10.3386/w25368>. [142]
- Jackson, C., R. Johnson and C. Persico (2016), "The effects of school spending on educational and economic outcomes: Evidence from school finance reforms.", *The Quarterly Journal of Economics*, Vol. 131/1, pp. 157-218, <http://dx.doi.org/10.1093/qje/qjv036>. [145]
- Jakubowski, M. (2010), "Institutional tracking and achievement growth: Exploring difference-in-differences approach to PIRLS, TIMSS, and PISA data", in Dronkers, J. (ed.), *Quality and Inequality of Education*, Springer, Dordrecht, https://doi.org/10.1007/978-90-481-3993-4_3. [168]
- Jakubowski, M. and A. Pokropek (2015), "Reading achievement progress across countries.", *International Journal of Educational Development*, Vol. 45, pp. 77-88, <https://doi.org/10.1016/j.ijedudev.2015.09.011>. [166]
- Jennings, P. and M. Greenberg (2009), "The prosocial classroom: Teacher social and emotional competence in relation to student and classroom outcomes.", *Review of Educational Research*, Vol. 79/1, pp. 491-525, <https://doi.org/10.3102%2F0034654308325693>. [148]

- Jerrim, J., L. Lopez-Agudo and O. Marcenaro-Gutierrez (2020), “The association between homework and primary school children’s academic achievement. International evidence from PIRLS and TIMSS.”, *European Journal of Education*, Vol. 55/2, pp. 248-260, <https://doi.org/10.1111/ejed.12374>. [87]
- Jeynes, W. (2007), “The relationship between parental involvement and urban secondary school student academic achievement: A meta-analysis.”, *Urban Education*, Vol. 42/1, pp. 82-110, <https://doi.org/10.1177%2F0042085906293818>. [114]
- Jordan, N. et al. (2007), “Predicting first-grade math achievement from developmental number sense trajectories.”, *Learning Disabilities Research & Practice*, Vol. 22/1, pp. 36-46, <https://psycnet.apa.org/doi/10.1111/j.1540-5826.2007.00229.x>. [50]
- Jordan, N. et al. (2009), “Early math matters: kindergarten number competence and later mathematics outcomes”, *Developmental Psychology*, Vol. 45/3, pp. 850-867, <https://doi.org/10.1037/a0014939>. [49]
- Kang, C. (2007), “Does Money Matter? The Effect of Private Educational Expenditures on Academic Performance”, *National University of Singapore. Department of Economics Working Paper*, Vol. 704, http://www.ecnais.org/wp/wp-content/uploads/2013/01/PrivateTutoring_C_Kang.pdf. [120]
- Kao, G. and M. Tienda (1998), “Educational aspirations of minority youth.”, *American Journal of Education*, Vol. 106/3, pp. 349-384, <https://psycnet.apa.org/doi/10.1086/444188>. [78]
- Kell, M. and P. Kell (2014), *Global Testing: PISA, TIMSS and PIRLS.*, Springer, Singapore, https://doi.org/10.1007/978-981-4451-30-7_5. [170]
- Kluczniok, K. et al. (2013), “Quality of the home learning environment during preschool age—Domains and contextual conditions.”, *European Early Childhood Education Research Journal*, Vol. 21/3, pp. 420-438, <https://doi.org/10.1080/1350293X.2013.814356>. [95]
- Knudsen, E. (2004), “Sensitive periods in the development of the brain and behavior”, *Journal of Cognitive Neuroscience*, Vol. 16/8, pp. 1412-1425, <http://dx.doi.org/10.1162/0898929042304796>. [13]
- Kretschmann, J. et al. (2019), “Effects of grade retention on students’ motivation: A longitudinal study over 3 years of secondary school”, *Journal of Educational Psychology*, Vol. 111/8, pp. 1432-1446, <https://psycnet.apa.org/doi/10.1037/edu0000353>. [67]
- Kyndt, E. et al. (2013), “A meta-analysis of the effects of face-to-face cooperative learning. Do recent studies falsify or verify earlier findings?”, *Educational Research Review*, Vol. 10, pp. 133-149, <https://doi.org/10.1016/j.edurev.2013.02.002>. [149]
- Lafortune, J., J. Rothstein and Schanzenbach (2018), “School finance reform and the distribution of student achievement.”, *American Economic Journal: Applied Economics*, Vol. 10/2, pp. 1-26, <http://dx.doi.org/10.1257/app.20160567>. [144]
- Lavrijsen, J. and I. Nicaise (2016), “Educational tracking, inequality and performance: New evidence from a differences-in-differences technique.”, *Research in Comparative and International Education*, Vol. 11/3, pp. 334-349, <https://doi.org/10.1177%2F1745499916664818>. [154]

- Law, J. et al. (2018), "Early home activities and oral language skills in middle childhood: A quantile analysis.", *Child Development*, Vol. 89/1, pp. 295-309, <https://doi.org/10.1111/cdev.12727>. [107]
- Law, J. et al. (2009), "Modeling developmental language difficulties from school entry into adulthood: literacy, mental health, and employment outcomes", *Journal of Speech, Language, and Hearing Research*, Vol. 52/6, pp. 1401-1416, [https://doi.org/10.1044/1092-4388\(2009/08-0142\)](https://doi.org/10.1044/1092-4388(2009/08-0142)). [35]
- Leaper, C. (2002), "Parenting girls and boys.", in *Handbook of parenting: Children and parenting*, Lawrence Erlbaum Associates Publishers, <https://psycnet.apa.org/record/2002-02629-007> (accessed on 6 May 2021). [101]
- Leaper, C., K. Anderson and P. Sanders (1998), "Moderators of gender effects on parents' talk to their children: A meta-analysis.", *Developmental Psychology*, Vol. 34/1, pp. 3-27, <http://dx.doi.org/10.1037/0012-1649.34.1.3>. [100]
- Lee, J. (2013), "Private tutoring and its impact on students' academic achievement, formal schooling, and educational inequality in Korea", *Doctoral dissertation, Columbia University*, <https://doi.org/10.7916/D8K64R8K>. [119]
- LeRoy, B. et al. (2019), "Students with special educational needs within PISA.", *Assessment in Education: Principles, Policy & Practice*, Vol. 26/4, pp. 386-396, <https://doi.org/10.1080/0969594X.2017.1421523>. [178]
- Letourneau, N. et al. (2011), "Socioeconomic status and child development: A meta-analysis.", *Journal of Emotional and Behavioral Disorders*, Vol. 21/3, pp. 211-224, <https://doi.org/10.1177%2F1063426611421007>. [37]
- Leuven, E. and S. Løkken (2020), "Long-Term Impacts of Class Size in Compulsory School.", *Journal of Human Resources*, Vol. 55/1, pp. 309-348, <http://dx.doi.org/10.3368/jhr.55.2.0217.8574R2>. [141]
- Li, Y. and R. Lerner (2011), "Trajectories of school engagement during adolescence: implications for grades, depression, delinquency, and substance use.", *Developmental Psychology*, Vol. 47/1, pp. 233-247, <https://psycnet.apa.org/doi/10.1037/a0021307>. [89]
- Macours, K., N. Schady and R. Vakis (2012), "Cash Transfers, Behavioral Changes, and Cognitive Development in Early Childhood: Evidence from a Randomized Experiment", *American Economic Journal: Applied Economics*, Vol. 4/2, pp. 247-273, <http://dx.doi.org/10.1257/app.4.2.247>. [94]
- Madrid, L., M. Canas and M. Ortega-Medina (2007), "Effects of team competition versus team cooperation in classwide peer tutoring.", *The Journal of Educational Research*, Vol. 100/3, pp. 155-160, <https://doi.org/10.3200/JOER.100.3.155-160>. [150]
- Mahjoub, M. (2017), "The treatment effect of grade repetitions", *Education Economics*, Vol. 25/4, pp. 418-432, <https://doi.org/10.1080/09645292.2017.1283006>. [64]
- Manu, A., A. Barros and C. Victora (2019), "Association between availability of children's book and the literacy-numeracy skills of children aged 36 to 59 months: secondary analysis of the UNICEF Multiple-Indicator Cluster Surveys covering 35 countries.", *Journal of Global Health*, Vol. 9/1, <https://dx.doi.org/10.7189%2Fjogh.09.010403>. [6]

- McLaughlin, M. (2011), "Speech and language delay in children", *American Family Physician*, Vol. 83/10, pp. 1183-1188, <https://www.aafp.org/afp/2011/0515/p1183.html>. [25]
- Melhuish, E. et al. (2008), "Effects of the home learning environment and preschool center experience upon literacy and numeracy development in early primary school.", *Journal of Social Issues*, Vol. 64/1, pp. 95-114, <https://doi.org/10.1111/j.1540-4560.2008.00550.x>. [106]
- Messacar, D. and P. Oreopoulos (2013), "Staying in school: A proposal for raising high-school graduation rates.", *Issues in Science and Technology*, Vol. 29/2, pp. 55-61, <https://www.jstor.org/stable/43315719>. [69]
- Meyer, L. et al. (2009), "Secondary student motivation orientations and standards-based achievement outcomes", *British Journal of Educational Psychology*, Vol. 79/2, pp. 273-293, <https://doi.org/10.1348/000709908X354591>. [72]
- Morschheuser, B., J. Hamari and A. Maedche (2019), "Cooperation or competition—When do people contribute more? A field experiment on gamification of crowdsourcing.", *International Journal of Human-Computer Studies*, Vol. 127, pp. 7-24, <https://doi.org/10.1016/j.ijhcs.2018.10.001>. [151]
- Mostafa, T., A. Echazarra and H. Guillou (2018), "The science of teaching science: An exploration of science teaching practices in PISA 2015", *OECD Education Working Papers*, Vol. 188, <https://doi.org/10.1787/f5bd9e57-en>. [138]
- Nandrup, A. and L. Beuchert-Pedersen (2017), "The Danish national tests at a glance.", *Nationaløkonomisk Tidsskrift*, Vol. 1, <https://www.forskningsdatabasen.dk/catalog/2523930161>. [159]
- Nelissen, J. (2018), "Emergent Numeracy: Nature, Nurture and Meaning.", *Curriculum and Teaching*, Vol. 33/2, pp. 5-22, <https://doi.org/10.7459/ct/33.2.02>. [40]
- Neumann, M. (2016), "A socioeconomic comparison of emergent literacy and home literacy in Australian preschoolers", *European Early Childhood Education Research Journal*, Vol. 24/4, pp. 555-566, <https://doi.org/10.1080/1350293X.2016.1189722>. [96]
- Niklas, F. and W. Schneider (2014), "Casting the die before the die is cast: The importance of the home numeracy environment for preschool children.", *European Journal of Psychology of Education*, Vol. 29/3, pp. 327-345, <https://psycnet.apa.org/doi/10.1007/s10212-013-0201-6>. [108]
- Ning, B. et al. (2015), "The influence of classroom disciplinary climate of schools on reading achievement: A cross-country comparative study.", *School Effectiveness and School Improvement*, Vol. 26/4, pp. 586-611, <https://doi.org/10.1080/09243453.2015.1025796>. [137]
- NSCDC (2016), "From Best Practices to Breakthrough Impacts: A Science-based Approach to Building a More Promising Future for Young Children and Families", Harvard University Center on the Developing Child, <https://developingchild.harvard.edu/resources/from-best-practices-to-breakthrough-impacts/>. [14]
- OECD (2021), *Positive, High-Achieving Students? What Schools and Teachers Can Do*, TALIS, OECD Publishing, Paris, <https://dx.doi.org/10.1787/3b9551db-en>. [132]
- OECD (2020), *Early Learning and Child Well-being: A Study of Five-year-Olds in England, Estonia, and the United States*, OECD Publishing, Paris, <https://doi.org/10.1787/3990407f-en>. [5]

- OECD (2020), *Education at Glance*, OECD Publications, Paris, [172]
<https://doi.org/10.1787/69096873-en>.
- OECD (2020), *Is Childcare Affordable? Policy Brief on Employment, Labour and Social Affairs*, [131]
 OECD, Paris, <http://oe.cd/childcare-brief-2020>.
- OECD (2020), *PISA 2018 Results (Volume III): What School Life Means for Students' Lives*, [2]
 PISA, OECD Publishing, Paris, <https://doi.org/10.1787/acd78851-en>.
- OECD (2019), *OECD Future of Education and Skills 2030: OECD Learning Compass 2030: A Series of Concept Notes*, OECD, Paris, <https://www.oecd.org/education/2030-project/teaching-and-learning/learning/all-concept-notes/> (accessed on 5 May 2021). [27]
- OECD (2019), *PISA 2018 Assessment and Analytical Framework*, PISA, OECD Publishing, [162]
 Paris, <https://doi.org/10.1787/b25efab8-en>.
- OECD (2019), *Providing Quality Early Childhood Education and Care: Results From the Starting Strong Survey 2018*, TALIS, OECD Publishing, Paris, <https://doi.org/10.1787/301005d1-en> [129]
 (accessed on 12 May 2021).
- OECD (2018), *PISA Special Education Needs Feasibility Study*, [179]
<https://www.oecd.org/pisa/pisaproducts/PISA-Special-Education-Needs-Feasibility-Study.pdf>.
- OECD (2018), *Responsive School Systems: Connecting Facilities, Sectors and Programmes for Student Success*, OECD Reviews of School Resources, OECD Publishing, Paris, [143]
<https://dx.doi.org/10.1787/9789264306707-en>.
- OECD (2018), *The Future of Education and Skills: Education 2030: Position paper*, OECD, [26]
 Paris, [https://www.oecd.org/education/2030-project/about/documents/E2030%20Position%20Paper%20\(05.04.2018\).pdf](https://www.oecd.org/education/2030-project/about/documents/E2030%20Position%20Paper%20(05.04.2018).pdf) (accessed on 5 May 2021).
- OECD (2014), *Does Homework Perpetuate Inequities in Education?*, OECD Publishing, Paris, [84]
<https://doi.org/10.1787/5jxrhqhtx2xt-en>.
- Özen, S. (2017), "The effect of motivation on student achievement", in Karadag, E. (ed.), *The Factors Effecting Student Achievement*, Springer, Cham, https://doi.org/10.1007/978-3-319-56083-0_3. [73]
- Parks, R., R. Stevens and S. Spence (2007), "A systematic review of cognition in homeless children and adolescents.", *Journal of the Royal Society of Medicine*, Vol. 100/1, pp. 46-50, [174]
<https://dx.doi.org/10.1258%2Fjrs.100.1.46>.
- Parsons, S. et al. (2011), "Long-term outcomes for children with early language problems: Beating the odds.", *Children & Society*, Vol. 25/3, pp. 202-214, <https://doi.org/10.1111/j.1099-0860.2009.00274.x>. [58]
- Pellegrino, J. and M. Hilton (eds.) (2012), *Education for life and work: Developing transferable knowledge and skills in the 21st century*, National Academies Press, Washington, DC, [28]
<http://dx.doi.org/10.17226/13398>.
- Pinquart, M. and M. Ebeling (2020), "Parental educational expectations and academic achievement in children and adolescents - A meta-analysis", *Educational Psychology Review*, [113]
 Vol. 32, pp. 463-480, <https://doi.org/10.1007/s10648-019-09506-z>.

- Rathmann, K., K. Loter and T. Vockert (2020), "Critical Events throughout the Educational Career: The Effect of Grade Retention and Repetition on School-Aged Children's Well-Being.", *International Journal of Environmental Research and Public Health*, Vol. 17/2, <https://doi.org/10.3390/ijerph17114012>. [68]
- Reyes, M. et al. (2012), "Classroom emotional climate, student engagement, and academic achievement", *Journal of Educational Psychology*, Vol. 104/3, pp. 700-712, <https://psycnet.apa.org/doi/10.1037/a0027268>. [134]
- Rindermann, H. (2007), "The g-factor of international cognitive ability comparisons: The homogeneity of results in PISA, TIMSS, PIRLS and IQ-tests across nations.", *European Journal of Personality: Published for the European Association of Personality Psychology*, Vol. 21/5, pp. 667-706, <https://doi.org/10.1002/per.634>. [167]
- Ritchie, S. and T. Bates (2013), "Enduring links from childhood mathematics and reading achievement to adult socioeconomic status.", *Psychological Science*, Vol. 24/7, pp. 1301-1308, <http://dx.doi.org/10.1177/0956797612466268>. [21]
- Romeo, R. et al. (2018), "Beyond the 30-Million-Word Gap: Children's Conversational Exposure Is Associated With Language-Related Brain Function", *Psychological Science*, Vol. 29/5, pp. 700-710, <http://dx.doi.org/10.1177/0956797617742725>. [8]
- Roseberry, S., K. Hirsh-Pasek and R. Golinkoff (2014), "Skype me! Socially contingent interactions help toddlers learn language.", *Child development*, Vol. 85/3, pp. 956-970, <http://dx.doi.org/10.1111/cdev.12166>. [43]
- Roseth, C., D. Johnson and R. Johnson (2008), "Promoting early adolescents' achievement and peer relationships: The effects of cooperative, competitive, and individualistic goal structures", *Psychological Bulletin*, Vol. 134/2, pp. 223-246, <https://doi.apa.org/doi/10.1037/0033-2909.134.2.223>. [147]
- Rosholm, M. et al. (2021), "Are Impacts of Early Interventions in the Scandinavian Welfare State Consistent with a Heckman Curve? A Meta-Analysis", *Journal of Economic Surveys*, p. joes.12400, <http://dx.doi.org/10.1111/joes.12400>. [16]
- Rowe, M. (2008), "Child-directed speech: Relation to socioeconomic status, knowledge of child development and child vocabulary skill", *Journal of Child Language*, Vol. 35/1, pp. 185-205, <http://dx.doi.org/10.1017/S0305000907008343>. [44]
- Ruhose, J. and G. Schwerdt (2016), "Does early educational tracking increase migrant-native achievement gaps? Differences-in-differences evidence across countries.", *Economics of Education Review*, Vol. 52, pp. 134-154, <https://doi.org/10.1016/j.econedurev.2016.02.004>. [171]
- Schanzenbach, D. (2020), "The economics of class size", in Bradley, S. and C. Green (eds.), *The Economics of Education*, Academic Press, <https://doi.org/10.1016/B978-0-12-815391-8.00023-9>. [139]
- Scheerens, J. (2014), *Effectiveness of time investments in education. Insights from a review and meta-analysis*, *SpringerBriefs in Education.*, Springer, Cham, <http://dx.doi.org/10.1007/978-3-319-00924-7>. [85]

- Schoon, I. et al. (2015), "The impact of early life skills on later outcomes (final report)", *Report for the OECD (Early Childhood Education and Care)*, [62]
https://discovery.ucl.ac.uk/id/eprint/10051902/1/Schoon_2015%20The%20Impact%20of%20Early%20Life%20Skills%20on%20Later%20Outcomes_%20Sept%20in2015.pdf.
- Schuelka, M. (2013), "Excluding students with disabilities from the culture of achievement: The case of the TIMSS, PIRLS, and PISA", *Journal of Education Policy*, Vol. 28/2, pp. 216-230, [177]
<http://dx.doi.org/10.1080/02680939.2012.708789>.
- Schwerdt, G., M. West and M. Winters (2017), "The effects of test-based retention on student outcomes over time: Regression discontinuity evidence from Florida.", *Journal of Public Economics*, Vol. 152, pp. 154-169, [65]
<https://doi.org/10.1016/j.jpubeco.2017.06.004>.
- Scott, C. (2015), "The Futures of learning 2: what kind of learning for the 21st century?", [30]
UNESCO Education, Research and Foresight Working Paper Series, No. 14,
<https://unesdoc.unesco.org/ark:/48223/pf0000242996> (accessed on 5 May 2021).
- Shager, H. et al. (2013), "Can Research Design Explain Variation in Head Start Research Results? A Meta-Analysis of Cognitive and Achievement Outcomes", *Educational Evaluation and Policy Analysis*, Vol. 35/1, pp. 76-95, [126]
<http://dx.doi.org/10.3102/0162373712462453>.
- Shanahan, T. and C. Lonigan (2010), "The National Early Literacy Panel: A Summary of the Process and the Report", *Educational Researcher*, Vol. 39/3, pp. 279-285, [47]
<https://doi.org/10.3102%2F0013189X10369172>.
- Shuey, E. and M. Kankaras (2018), "The Power and Promise of Early Learning", *OECD Education Working Papers*, No. 186, OECD Publishing, Paris, [173]
<https://doi.org/10.1787/f9b2e53f-en>.
- Skolverket (2020), *Kartläggning i förskoleklass "Mapping in Preschool Class"*, [155]
<https://www.skolverket.se/undervisning/forskoleklassen/kartlaggning-i-forskoleklassen>.
- Slaten, C. et al. (2015), "Hearing the voices of youth at risk for academic failure: What professional school counselors need to know.", *The Journal of Humanistic Counseling*, [152]
 Vol. 54/3, pp. 203-220, <https://doi.org/10.1002/johc.12012>.
- Smerillo, N. et al. (2018), "Chronic absence, eighth-grade achievement, and high school attainment in the Chicago Longitudinal Study.", *Journal of School Psychology*, Vol. 67, [80]
 pp. 163-178, <https://doi.org/10.1016/j.jsp.2017.11.001>.
- Snowling, M. et al. (2006), "Psychosocial outcomes at 15 years of children with a preschool history of speech-language impairment.", *Journal of Child Psychology and Psychiatry*, [34]
 Vol. 47/8, pp. 759-765, <https://doi.org/10.1111/j.1469-7610.2006.01631.x>.
- St Pourcain, B. et al. (2014), "Common variation near ROBO2 is associated with expressive vocabulary in infancy", *Nature Communications*, Vol. 5/4831, [36]
<http://dx.doi.org/10.1038/ncomms5831>.
- Stiles, J. and T. Jernigan (2010), "The basics of brain development", *Neuropsychology Review*, [22]
 Vol. 20/4, pp. 327-348, <http://dx.doi.org/10.1007/s11065-010-9148-4>.
- Sullivan, A. and M. Brown (2015), "Reading for pleasure and progress in vocabulary and mathematics.", *British Educational Research Journal*, Vol. 41/6, pp. 971-991, [57]
<http://dx.doi.org/10.1002/berj.3180>.

- Sylva, K. et al. (2008), *Final report from the primary phase: Pre-school, school and family influences on children's development during Key Stage 2 (7-11)*, <https://ro.uow.edu.au/cgi/viewcontent.cgi?article=2806&context=sspapers>. [59]
- Taggart, B. et al. (2015), *Effective pre-school, primary and secondary education project (EPPSE 3-16+)*, UCL Institute of Education, University College London, Birkbeck, University of London, Oxford University, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/455670/RB455_Effective_pre-school_primary_and_secondary_education_project.pdf (accessed on 11 December 2020). [23]
- Thévenon, O. (2011), "Family Policies in OECD Countries: A Comparative Analysis", *Population and Development Review*, Vol. 37/1, <http://dx.doi.org/10.1111/j.1728-4457.2011.00390.x>. [121]
- Ulferts, H. (2020), "Why parenting matters for children in the 21st century: An evidence-based framework for understanding parenting and its impact on child development", *OECD Education Working Papers*, No. 222, OECD Publishing, Paris, <https://dx.doi.org/10.1787/129a1a59-en>. [115]
- UNICEF (2017), *The Adolescent Brain: A Second Window of Opportunity*, <http://www.unicef-irc.org> (accessed on 17 January 2020). [19]
- van Huizen, T. and J. Plantenga (2018), "Do children benefit from universal early childhood education and care? A meta-analysis of evidence from natural experiments", *Economics of Education Review*, Vol. 66, pp. 206-222, <http://dx.doi.org/10.1016/j.econedurev.2018.08.001>. [9]
- Vincent-Lancrin, S. et al. (2019), *Fostering Students' Creativity and Critical Thinking: What it Means in School*, Educational Research and Innovation, OECD Publishing, Paris, <https://dx.doi.org/10.1787/62212c37-en>. [12]
- Walkey, F. et al. (2013), "Low expectations equal no expectations: Aspirations, motivation, and achievement in secondary school.", *Contemporary educational psychology*, Vol. 38/4, pp. 306-315, <https://doi.org/10.1016/j.cedpsych.2013.06.004>. [74]
- Wang, M. and J. Degol (2015), "School climate: A review of the construct, measurement, and impact on student outcomes", *Educational Psychology Review*, Vol. 28/2, pp. 315-35, <http://dx.doi.org/10.1007/s10648-015-9319-1>. [136]
- Wang, M. and J. Fredricks (2014), "The reciprocal links between school engagement, youth problem behaviors, and school dropout during adolescence", *Child Development*, Vol. 85/2, pp. 722-737, <https://doi.org/10.1111/cdev.12138>. [90]
- Wang, M. and R. Holcombe (2010), "Adolescents' perceptions of school environment, engagement, and academic achievement in middle school", *American Educational Research Journal*, Vol. 47/3, pp. 633-662, <https://doi.org/10.3102%2F0002831209361209>. [133]
- Wang, W. et al. (2014), "School climate, peer victimization, and academic achievement: Results from a multi-informant study", *School Psychology Quarterly*, Vol. 29/3, pp. 360-377, <https://psycnet.apa.org/doi/10.1037/spq0000084>. [4]
- Wang, Y. and A. Benner (2014), "Parent-child discrepancies in educational expectations: Differential effects of actual versus perceived discrepancies", *Child Development*, Vol. 85/3, pp. 891-900, <https://doi.org/10.1111/cdev.12171>. [116]

- Wentzel, K. (2017), "Peer relationships, motivation, and academic performance at school", in Elliot, A., C. Dweck and D. Yeager (eds.), *Handbook of Competence and Motivation: Theory and Application*, The Guilford Press, <https://psycnet.apa.org/record/2017-17591-031>. [3]
- Whitehouse, A. et al. (2012), "Sex-specific associations between umbilical cord blood testosterone levels and language delay in early childhood", *Journal of Child Psychology and Psychiatry*, Vol. 53/7, pp. 726-734, <http://dx.doi.org/10.1111/j.1469-7610.2011.02523.x>. [104]
- Whitehurst, G. and C. Lonigan (1998), "Child development and emergent literacy", *Child Development*, Vol. 69/3, pp. 848-87, <https://doi.org/10.1111/j.1467-8624.1998.tb06247.x>. [38]
- Whittaker, J. et al. (2020), "Impacts of an early childhood mathematics and science intervention on teaching practices and child outcomes.", *Impacts of an early childhood mathematics and science intervention on teaching practices and child outcomes.*, Vol. 113/2, pp. 177-212, <https://doi.org/10.1080/19345747.2019.1710884>. [52]
- Wilson, V. et al. (2008), "Bunking off: The impact of truancy on pupils and teachers", *British Educational Research Journal*, Vol. 34/1, pp. 1-17, <https://doi.org/10.1080/01411920701492191>. [83]
- World Economic Forum (2015), *New Vision for Education: Unlocking the Potential of Technology*, World Economic Forum, Geneva, http://www3.weforum.org/docs/WEFUSA_NewVisionforEducation_Report2015.pdf (accessed on 5 May 2021). [29]
- Zambrana, I., E. Ystrom and F. Pons (2012), "Impact of Gender, Maternal Education, and Birth Order on the Development of Language Comprehension", *Journal of Developmental & Behavioral Pediatrics*, Vol. 33/2, pp. 146-155, <http://dx.doi.org/10.1097/dbp.0b013e31823d4f83>. [99]
- Zebroff, D. and D. Kaufman (2017), "Texting, reading, and other daily habits associated with adolescents' literacy levels.", *Education and Information Technologies*, Vol. 22/5, pp. 2197-2216, <https://doi.org/10.1007/s10639-016-9544-3>. [55]

Annex 6.A. Details on data availability

Annex Table 6.A.1. Data on cognitive development and educational achievements

	Country coverage	Age coverage	Data source	Data type	Regular update	Disaggregation
Early cognitive development						
Emergent literacy and numeracy	England (United Kingdom), Estonia and the United States	5 years	International Early Learning and Child Well-Being Study (IELS) - OECD	Emergent literacy and numeracy, self-regulation	England (United Kingdom), Estonia and the United States	Yes
	1 OECD country (Colombia)	4-6 years	Measuring Early Learning and Outcomes (MELQO)	Survey	Uncertain	Yes
Pre-school and school entry exams	Single countries, e.g. Sweden	years	Kartläggning i förskoleklass - Skolverket	Survey	Yes	Uncertain
Cognitive development in middle childhood and adolescence						
Reading literacy	32 OECD countries*	9-10 years (4th grade)	Progress in International Reading Literacy Study (PIRLS) - IEA	Reading literacy	32 OECD countries*	9-10 years (4th grade)
	OECD	15 years	Programme for International Student Assessment (PISA) - OECD	Survey	Yes	Yes
Math and science literacy	28 OECD countries**	9-11 years (4th grade), 13-14 years (4th grade)	Trends in Mathematics and Science Study (TIMSS) - IEA	Math and science literacy	28 OECD countries**	9-11 years (4th grade), 13-14 years (4th grade)
	OECD	15 years	PISA	Survey	Yes	Yes
Educational progression and attainment						
School grades	Single countries, e.g. Denmark	7-14 years (2nd to 8th grade, varying by subject area)	Danish National Test	Administrative	Yes	Yes
Grade repetition	OECD	All grades	PISA	Survey	Yes	Yes
Educational attainment (graduation rates, dropout, NEET)	OECD	-	OECD Education at a Glance	Collection of national sources	Yes	No

Note: *Australia, Austria, Belgium (Flanders & Wallonia separately), Canada, Chile, Colombia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Latvia, Lithuania, Luxembourg, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Turkey, United Kingdom (England, Northern Ireland and Scotland separately), United States;

**Australia, Austria, Belgium (Flanders), Canada (Ontario & Quebec), Chile, Czech Republic, Denmark, Finland, France, Germany, Hungary, Ireland, Israel, Italy, Japan, Latvia, Lithuania, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Spain (Madrid), Sweden, Turkey, United Kingdom (England), United States. "Disaggregation" means that the publicly available data allows for disaggregation by at least basic socio-economic and demographic groups, such as by sex, age, family status, and family income.

Annex Table 6.A.2. Data on educational attitudes and aspirations

	Country coverage	Age coverage	Data source	Data type	Regular update	Dis-aggregation
Education aspirations						
Educational expectations (degree level)	OECD	15 years	PISA	Survey	Yes	Yes
Educational ambition (top grades etc.)	OECD	15 years	PISA	Survey	No	Yes
Education attitudes and behaviours, and home learning behaviours						
School absence and truancy	32 OECD countries*	9-10 years (4th grade)	PIRLS	Survey	Yes	Yes
	OECD	15 years	PISA	Survey	Yes	Yes
	Single countries, e.g. United Kingdom (England)	All grade levels	United Kingdom Statistics Authority	School census	Yes	No
Homework (time spent)	OECD	15 years	PISA	Survey	Yes	Yes
Homework (teacher assigned)	32 OECD countries*	9-10 years (4th grade)	PIRLS	Survey	Yes	Yes
Leisure reading	32 OECD countries*	9-10 years (4th grade)	PIRLS	Survey	Yes	Yes
	OECD	15 years	PISA	Survey	Yes	Yes

Note: *Australia, Austria, Belgium (Flanders & Wallonia separately), Canada, Chile, Colombia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Latvia, Lithuania, Luxembourg, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Turkey, United Kingdom (England, Northern Ireland and Scotland separately), United States. "Disaggregation" means that the publicly available data allows for disaggregation by at least basic socio-economic and demographic groups, such as by sex, age, family status, and family income.

Annex Table 6.A.3. Data on the student's environment

	Country coverage	Age coverage	Data source	Data type	Regular update	Dis-aggregation
Family and home environment						
Educational resources (books, toys, etc.)	32 OECD countries*	9-10 years (4th grade)	PIRLS	Survey	Yes	Yes
	OECD	15 years	PISA	Survey	Yes	Yes
Study supports (computer, desk, own room)	32 OECD countries*	9-10 years (4th grade)	PIRLS	Survey	Yes	Yes
	OECD	15 years	PISA	Survey	Yes	Yes
Parental interactions and involvement in learning						
Early literacy and numeracy activities (recall)	32* and 28** OECD countries	9-10 years (4th grade), 13-14 years (8th grade)	PIRLS*, TIMSS**	Survey	Yes	Yes
	OECD	15 years	PISA	Survey	Yes	Yes
Parental involvement (discussing school, helping with homework, etc.)	OECD	15 years	PISA	Survey	Yes	Yes
Parental support and expectations	OECD	15 years	PISA	Survey	Yes	Yes
School environment						
School safety	32* and 28** OECD countries	9-10 years (4th grade), 13-14 years (8th grade)	PIRLS*, TIMSS**	Survey	Yes	Yes
Disciplinary climate and class size	32 OECD countries*	9-10 years (4th grade)	PIRLS	Survey	Yes	Yes
	OECD	15 years	PISA	Survey	Yes	Yes
School belonging	32 OECD countries*	9-10 years (4th grade)	PIRLS	Survey	Yes	Yes
	OECD	15 years	PISA	Survey	Yes	Yes
Classroom cooperation and competition	OECD	15 years	PISA	Survey	Yes	Yes
Bullying and peer victimisation	32 OECD countries*	9-10 years (4th grade)	PIRLS	Survey	Yes	Yes
	OECD	15 years	PISA	Survey	Yes	Yes
School spending	OECD	ECEC, primary, secondary	Education at a Glance - OECD	Collection of national sources	Yes	No

Note: *Australia, Austria, Belgium (Flanders & Wallonia separately), Canada, Chile, Colombia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Latvia, Lithuania, Luxembourg, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Turkey, United Kingdom (England, Northern Ireland and Scotland separately), United States; **Australia, Austria, Belgium (Flanders), Canada (Ontario & Quebec), Chile, Czech Republic, Denmark, Finland, France, Germany, Hungary, Ireland, Israel, Italy, Japan, Latvia, Lithuania, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Spain (Madrid), Sweden, Turkey, United Kingdom (England), United States. "Disaggregation" means that the publicly available data allows for disaggregation by at least basic socio-economic and demographic groups, such as by sex, age, family status, and family income.

Measuring What Matters for Child Well-being and Policies

To design, implement and monitor effective child well-being policies, policy-makers need data that better capture children's lives, measure what is important to them and detect emerging problems and vulnerabilities early on. Despite improvements in recent decades, there are still important gaps in both national and cross-national child data. Countries can achieve progress if the right actions are taken.

Measuring What Matters for Child Well-being and Policies lays the groundwork for improved child well-being measurement and better data to inform better child well-being policies. It outlines an “aspirational” framework for child well-being measurement, setting out which aspects of children's lives should be measured, and how, to better monitor child well-being. It also outlines priorities for child data development and identifies key data gaps, all with the aim of motivating improvements in child data infrastructures.



PRINT ISBN 978-92-64-92443-7
PDF ISBN 978-92-64-58353-5



9 789264 924437