Integrating Care to Prevent and Manage Chronic Diseases

BEST PRACTICES IN PUBLIC HEALTH

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Foreword

People with complex health needs require care from different providers across multiple healthcare settings. Therefore, they are at greater risk of receiving fragmented care. Countries have responded to this challenge by implementing patient-centred, integrated models of care designed to prevent and manage chronic diseases.

This report is part of the OECD's work on promoting best practices in public health in OECD and EU27 countries. It aims to help countries improve care delivery by examining the potential to scale-up and transfer best practice integrated care models. Integrated care models reviewed as part of the report range from small pilots operating at the city level to nationwide programmes covering entire populations. Further, many case studies operate at a specific level of care, such as primary care, while others cover the whole spectrum of healthcare services.

Selected integrated care models were assessed against a validated performance framework outlined in the *OECD Guidebook on Best Practices in Public Health*. The framework includes five criteria namely effectiveness, efficiency, equity, the quality of the evidence-base, and the extent of coverage. The assessment also covered the potential to transfer integrated care models across countries.

Based on assessments of selected integrated care models, this report recommends several ways to reduce care fragmentation, including:

- Strengthening governance structures by breaking down silos across administrative systems in health and social care with the support of key stakeholders
- Exploring innovative payment models that encourage providers to deliver co-ordinated care
- Investing in training programmes to teach health professionals new skills and supporting new professional roles, such as case managers
- Implementing digital inclusion activities targeting vulnerable populations as well as promoting digital tools and health information systems
- Strengthening the evidence-base supporting integrated care by measuring structural, process and outcome indicators specific to integrated care that are comparable across countries
- Adapting integrated care models to the needs of vulnerable populations as well as investing in health literacy programmes to reduce health inequalities
- Utilising existing frameworks that measure a region's readiness to implement best practice integrated care models to facilitate their expansion, as well as promote close ties between owners and adopters of best practice models.

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Acronyms and abbreviations

BMI	Body mass index
BSA	Badalona Serveis Assistencials
CHE	Current health expenditure
COPD	Chronic obstructive pulmonary disease
CVD	Cardiovascular disease
DALY	Disability-adjusted life year
EHR	Electronic Health Record
EU	European Union
G20	Group of 20 countries
GDP	Gross domestic product
GP	General Practitioner
H@H	Hospital-at-Home
HALE	Healthy life expectancy
HF	Heart failure
ICT	Information and communication technologies
JA	Joint Action
JADECARE	Joint Action on implementation of Digitally Enabled integrated person-centred Care
LE	Life expectancy
MDC	Medical Diagnostic Centre
NCD	Non-communicable disease
OECD	Organisation for Economic Co-operation and Development
PAP	Personalised Action Plans
PPP	Purchasing power parity
QALY	Quality-adjusted life year
SCS	Self Care Service
SELFIE	Sustainable Integrated Care Models for Multimorbidity Delivery, Financing and Performance
SES	Socio-economic status
SPHeP	Strategic Planning for Public Health
TEC	Technology Enabled Care
UN	United Nations
WHO	World Health Organization

Executive summary

People today are living longer with chronic health conditions. Stronger healthcare systems and better socio-economic conditions mean people today live longer: between 1970 and 2019, life expectancy at birth increased by over 11 years across OECD countries. As people age, they are at greater risk of disease, disability, and dementia. For example, recent estimates indicate nearly two-thirds of people in OECD countries aged 65 years and over live with one or more chronic conditions.

Care fragmentation is a key issue for people with complex health needs. People with complex health needs, such as patients with a chronic condition, require care from different providers across multiple healthcare settings. Without proper care integration, people may try to address their unmet needs using excessive services in an uncoordinated manner. Not only does this worsen their experience, it is also dangerous and costly, with estimates showing fragmented care increases costs by over EUR 4 000 per patient.

Countries are experimenting with integrated models of care in response to the growing number of people living with complex health needs who are at risk of receiving fragmented care. Such models of care provide continuous, co-ordinated, high-quality care over a person's life. At a high level, these models aim to prevent and manage chronic conditions thereby enhancing population health, improving patient experiences, reducing per capita costs of healthcare, creating a better work/life balance for health professionals, and advancing health equity.

This report examines 13 integrated care models implemented in OECD and EU27 countries using a validated performance assessment framework. Selected case studies cover a wide range of integrated care models ranging from small pilots operating at the city level to nationwide programmes covering entire populations. Further, many case studies operate at a specific level of care, such as primary care, while others cover the whole spectrum of healthcare services. The majority of OECD and EU27 countries have implemented at least one of the selected case studies. Case studies were selected in consultation with the European Commission and were assessed using OECD's Best Practice Identification Framework in Public Health, which was co-created with OECD member countries.

Key findings and policy recommendations outlined in this report will help countries deliver integrated care to patients with complex health needs. Findings and recommendations cover the key dimensions of integrated care, namely governance, financing, the workforce, and digital tools and health information systems. In addition, the report covers monitoring and evaluation, health equality, and scaling-up and transferability. Findings and recommendations are based on a review of the 13 selected case studies; therefore, *this report does not comprehensively address all issues related to integrated care in all contexts, but rather offers interesting insights and highlights the value of applying a common assessment methodology.*

Governance

Many case studies pursued care integration at a specific level of care, such as primary care, and often for a specific disease. Only a small number of case studies operate across the entire spectrum of healthcare services for whole populations. The limited number of integrated care models covering entire populations and all healthcare services is in large part due to fragmented governance structures across health and social care sectors. Findings from case studies highlight the importance of **strengthening governance structures by breaking down silos across administrative systems in health and social care with the support of key stakeholders.** Such governance structures encourage sustainable integration of care. For example, in Badalona, Spain, health and social care services were merged into one integrated care organisation (ICO), which is owned by the city council. The ICO's governance model involves all stakeholders, crucially policy leaders, which ensures organisational support for, and commitment to, the ICO. The governance model has also created a cohesive culture that supports integrated care. Based on modelling work by the OECD, governance structures that support care integration are a good investment with estimates showing they reduce annual health expenditure by up to 4% (as a proportion of total health expenditure), as in the case of the OptiMedis population-based integrated care case study.

Financing (payment models)

Traditional payment models, such as fee-for-service, do not encourage care co-ordination and may contribute to excessive expenditure. **Innovative payment models that incentivise providers to deliver co-ordinated care** have been implemented in several settings**.** These include add-on payments, for instance, to employ a case manager; episode-based bundled payments, whereby providers receive one payment per patient along a clinical care pathway; or comprehensive capitation payment models that cover a set of providers for a specific population. The OptiMedis integrated care model operating in certain regions of Germany, for example, utilises a comprehensive capitation payment model with a shared savings contract. This payment model incentivises provider networks to deliver high-quality care given they receive a proportion of the difference between expected and actual healthcare costs.

Workforce

Patients with complex health needs benefit from multidisciplinary care. However, several barriers prevent this type of care provision such as a culture of professional silos. Actions to embed multidisciplinary care into everyday practice include **investing in training programmes** to teach health professionals new hard and soft skills (e.g. collaboration and relationship building), and **promoting new professional roles that support care integration**. For example, as part of Poland's strategy to improve its primary healthcare sector (Primary Healthcare PLUS), the country introduced care co-ordinators responsible for improving co-ordination between health providers as well as well between providers and the patient.

Digital tools and health information systems

Digital tools play a key role in supporting care integration as highlighted by selected case studies including telehealth services for patients with chronic diseases in Italy, the Czech Republic and Denmark. Despite the benefit of deploying digital tools, they are not widely used for reasons such as low levels of digital health literacy among patients and professionals. Policies to promote the use of digital tools include **digital inclusion activities** targeting vulnerable populations, **involving health professionals in the design of digital tools**, undertaking **robust evaluations of digital tools** to build trust, and implementing **digital health competency frameworks**. On a broader level, countries can improve their health information systems by creating an overarching digital strategy, strengthening governance of health data, and building institutional and operational capacity.

Monitoring and evaluation

Evaluations of selected case studies focused on changes in patient experiences and healthcare utilisation, and to a much lesser extent, health outcomes. Economic evaluations were also scarce making it difficult to comment on the efficiency of integrated care models. To build the evidence base supporting integrated care, there should be a focus on **measuring structural, process and outcome indicators specific to integrated care that are comparable across countries.** Example indicators include hospital readmissions, mortality after hospital discharge, prescription of appropriate medication for secondary care prevention, and the use of digital tools. In addition, researchers should focus on **undertaking economic evaluations that use robust methodologies** to measure outcomes in relation to costs.

Health equality

Vulnerable populations, such as people with low socio-economic status, are at greater risk of experiencing care fragmentation. To reduce health inequalities, case studies such as the Finnish City of Oulu's patient provider portal will offer its services in languages spoken by minority groups. Nevertheless, tangible actions to meet the needs of vulnerable populations were limited among case studies. To reduce existing health inequalities, future studies should aim to **stratify data according to vulnerable populations** with findings used to adapt care to better meet the needs of these patients. More broadly, **investing in health literacy programmes with a focus on vulnerable populations** will help narrow existing health inequalities.

Scaling-up and transferability

Only half of all selected case studies were explicitly scaled-up or transferred, however, nearly all were based on a pre-existing model of care. Utilising **existing frameworks to measure a region's readiness to implement best practice integrated care models** will facilitate their expansion. Example frameworks include the SCIROCCO (Scaling Integrated Care in Context) Maturity Model for Integrated Care as well as OECD's Transferability Framework for public health interventions. Promoting **close ties between owners and adopters of best practice models** is also important for ensuring "lessons learnt" from past transfers are considered in the future.

1

Key findings and recommendations

People today are living longer with complex health needs. This has prompted countries to implement patient-centred, integrated models of care. Chapter 1 outlines key findings and policy recommendations to promote integrated care based on a review of strategically important care models operating in OECD and EU27 countries.

Key messages

In OECD countries, two in three people aged 65 years and over live with at least one chronic condition. People living with chronic conditions often require care from different providers in multiple healthcare settings. To meet the needs of these people, countries are transitioning towards patient-centred, integrated models of care. As highlighted by the COVID-19 pandemic, such models of care play a key role in making health systems more resilient.

This document outlines findings and policy recommendations following a review of 13 integrated care case studies selected in consultation with country delegates. Findings and recommendations cover the key dimensions of integrated care – governance, financing (payment models), digital tools and health information systems, and the workforce – as well as monitoring and evaluation, health equality, and scaling-up and transferability. Addressing the key dimensions of integrated care ultimately places the patient at the centre of their care thereby improving patient experiences and outcomes.

Governance

Governance structures covering health and social care sectors are often fragmented, which hinders the implementation of population-wide integrated care models. Findings from selected case studies highlight the importance of **strengthening governance structures by breaking down silos across administrative systems in health and social care with the support of key stakeholders**. For example, the Badalona City Council in Spain merged health and social care services into one integrated health and social care organisation called Badalona Serveis Assistencials (BSA). BSA's governance model brings together all stakeholders, crucially policy leaders, which has created a strong commitment to, and culture of, integrated care.

Financing (payment models)

Traditional payment models, such as fee-for-service, pay providers for the activities they perform. Such models do not promote care integration and may contribute to excessive expenditure. Countries can consider other **innovative payment models that encourage providers to deliver co-ordinated care.** These include add-on payments to employ a case manager; episode-based bundled payments, whereby providers receive one comprehensive payment per patient along a clinical care pathway; or comprehensive capitation payment models that cover a set of providers for a specific population. The OptiMedis integrated care model operating in certain regions of Germany, for example, utilises a comprehensive capitation payment model with a shared savings contract. This payment model incentivises provider networks to deliver high-quality care given they receive a proportion of the difference between expected and actual healthcare costs.

Workforce

Several barriers prevent health professionals from delivering patient-centred, multidisciplinary care, such as a culture of professional silos. Further, health professionals are not always supported to deliver integrated models of care. Actions to embed multidisciplinary care into everyday practice include **investing in training programmes to teach health professionals new hard and soft skills**, such as shared decision-making, inter-professional collaboration, and socio-cultural competencies. In addition, it is important to promote **new professional roles that support care integration**. For example, in the Basque Country, Spain, patients living with multimorbidities are assigned a case manager who works closely with a hospital liaison nurse to co-ordinate care once the patient is discharged from hospital. Similarly, Poland has introduced care co-ordinators as part of its strategy to enhance primary care.

Digital tools and health information systems

Digital tools play a key role in supporting integrated care. This is highlighted by selected case studies including Hospital-at-Home services in Catalonia, Spain, telehealth services for patients with chronic diseases in Italy, the Czech Republic, and Denmark, and an mHealth app for patients with asthma. However, the widespread use of digital tools is hindered by several factors including low levels of digital health literacy among patients and professionals.

Digital inclusion activities targeting vulnerable populations such as providing affordable and reliable broadband internet is one of several policies to increase uptake of digital tools among the population. For example, during the COVID-19 pandemic, Technology Enabled Care in Scotland, which aims to scale-up digital health programmes, provided over EUR 5 million to improve access to digital health services for vulnerable populations. For health professionals, uptake can be improved by implementing **digital health competency frameworks** to ensure they have the skills to utilise electronic health records and other eHealth tools. As an example, Finland created the national MEDigi project, which aims to harmonise and improve eHealth training for doctors and dentists.

Monitoring and evaluation

Evaluations of selected case studies focused on changes in patient experiences and healthcare utilisation. For example, the TeleCOPD (chronic obstructive pulmonary disease) programme operating in Southern Denmark recorded a drop in hospital admissions as well as a self-reported improvement in managing symptoms. Data on health outcomes and results from economic evaluations, however, were scarce among case studies. To build the evidence base supporting integrated care, there should be a focus on **measuring structural, process and outcome indicators specific to integrated care that are comparable across countries.** Example indicators include hospital readmissions, mortality after hospital discharge, prescription of appropriate medication for secondary care prevention, and use of digital tools. In addition, researchers should focus on **undertaking economic evaluations that use robust methodologies** to measure outcomes in relation to costs.

Health equality

Vulnerable populations are at greater risk of experiencing care fragmentation. Some actions were taken by selected case studies to narrow existing health inequalities. For example, by adapting programmes into languages spoken by minority groups, as was done for a patient-provider portal operating in the Finnish City of Oulu. Overall, however, tangible actions to adapt models of care to suit the needs of vulnerable populations were limited. To reduce existing health inequalities, future studies of integrated care models should **examine the impact of integrated care models by stratifying data according to vulnerable populations** with findings used to adapt care to better meet the needs of these patients. More broadly, **investing in health literacy programmes that focus on vulnerable populations** will help narrow existing health inequalities.

Scaling-up and transferrals

Only half of all selected case studies were explicitly scaled-up or transferred, however, nearly all were based on a pre-existing model of care. Utilising **existing frameworks to measure a region’s readiness to implement best practice integrated care models** will facilitate their expansion. Example frameworks include the SCIROCCO (Scaling Integrated Care in Context) Maturity Model for Integrated Care as well as OECD’s Transferability Framework for public health interventions. Promoting **close ties between owners and adopters of best practice models** is also important for ensuring “lessons learnt” from past transfers are considered in the future. For example, administrators of ParkinsonNet, a Dutch programme for patients with Parkinson’s Disease, highlighted the importance of having a “champion” to drive the project. Similarly, administrators of Personalised Action Plans (PAPs) in Andalusia, Spain, noted several transfer facilitators including the importance of linking PAPs with patient electronic health records.

Introduction

A growing proportion of people in OECD and EU27 countries live with complex health needs. Stronger healthcare systems and better socio-economic conditions mean people today live longer: between 1970 and 2019, life expectancy (LE) among OECD and EU27 countries increased by over 11 years (OECD, 2021[1]). Concurrently, people lead increasingly unhealthy lifestyles characterised by poor diets and physical inactivity, and are more likely to suffer from poor mental health. As a result, a growing proportion of the population live with complex health needs and require care from different providers in multiple healthcare settings.

Better care co-ordination is necessary to meet the changing health needs of the population. It is important that patients with complex health needs receive co-ordinated care centred on their individual needs (see Chapter 2 for information on how integrated care promotes patient-centredness). OECD and EU27 countries have responded by implementing a number of patient-centred, integrated care models. These models aim to improve patient experiences and population health, reduce per capita costs of healthcare, create a better work/life balance among health professionals, and advance health equity.

The COVID-19 pandemic highlighted the need to deliver patient-centred, integrated care. COVID-19 led to a rapid surge in the number of acutely ill patients needing treatment. To maintain preventative care services as well as manage care for patients with chronic conditions, countries introduced policies that altered the delivery of care. For example, many OECD and EU27 countries relied on digital tools to deliver patient-centred, integrated care such as teleconsultations, ePrescriptions, and hospital-at-home services (OECD, forthcoming[2]).

Despite efforts to promote integrated care, co-ordination among providers remains fragmented. As outlined within a 2020 OECD report on primary care, international data shows there continues to be "significant problems with the co-ordination of care between primary healthcare teams, specialists, and hospitals" (OECD, 2020[3]; Barrenho et al., 2022[4]).

This report analyses a selection of strategically important integrated care models operating in OECD and EU27 countries using a validated performance assessment framework. Thirteen case studies were selected based on submissions from delegates to the OECD (see Table 1.1). For this reason, the report does not cover all models of integrated care, rather, it focuses on those that are of key strategic interest to policy makers. OECD's Best Practice Identification Framework, which was co-created with member countries, formed the structure of the assessment (OECD, 2022[5]).

Findings and policy recommendations are grouped according to themes covering the key dimensions of integrated care. These themes are governance, financing (payment models), digital tools and health information systems, and the workforce (Wodchis et al., 2020[6]). In addition, the review covers monitoring and evaluation, health equality, and scaling-up and transferability, all of which are important for spreading best practices (OECD, 2022[5]). Findings and recommendations are based on a review of the 13 selected case studies. Therefore, *this report does not comprehensively address all issues related to integrated care in all contexts, but rather offers interesting insights and highlights the value of applying a common assessment methodology.*

Findings and recommendations from this report can help make health systems more resilient against future shocks. COVID-19 had a profound impact on health systems across the world. Future shocks are inevitable. Therefore, it is important countries enhance the resilience of their healthcare system by promoting integrated care based on the policies outlined in this report.

Table 1.1. Overview of selected case study interventions

Name and description	Country*
OptiMedis, regionally based integrated care model The OptiMedis integrated care model emerged in 2005 following reforms in Germany to promote care co-ordination. The model of care, which operates in the west (state of Hesse) and south-west region (state of Baden-Württemberg) of Germany, aims to improve patient experiences and population health, while reducing per capita costs. A key feature of the care model is its "shared savings contract", which incentivises the delivery of high-quality, preventative care	EU-supported Joint Action – JADECARE**
Hospital-at-Home programme The Hospital-at-Home (H@H) programme offers patients acute, home-based care that would otherwise be delivered in a hospital setting.	JADECARE Catalonia, Spain
Oulu's Self Care Service Oulu's Self Care Service (SCS) is a digital patient provider portal available to all residents. SCS offers patients a range of online primary care services such as online appointment booking and ePrescriptions. For health professionals, SCS provides guidelines and care pathways based on individual patient data.	Finland
Integrated care model for multimorbid patients As part of the strategy for chronicity in the Basque Country, Spain, an integrated care model was implemented that includes a comprehensive baseline assessment; individualised care plans; care from a multidisciplinary team; co-ordinated hospital discharge; patient empowerment programmes; and a strong health information system. Eligible patients are identified through a sophisticated risk stratification system, which covers 100% of the population.	Basque Country, Spain
Badalona Healthcare Services The Badalona City Council developed an integrated care organisation bringing together health and social care sectors – Badalona Serveis Assistencials, BSA. In addition to organisational integration (i.e. combining health and social care), BSA creates other forms of integration such as professional integration with the use of multidisciplinary teams and normative integration by developing a shared organisational and professional culture.	Badalona, Spain
Medical Diagnostic Centre (MDC) MDC is a primary care model for patients with chronic conditions. Patients who access MDC obtain an Individual Medical Care Plan based on a comprehensive assessment by a general practitioner. Results from the comprehensive assessment are used to stratify patients into risk groups, which helps health professionals proactively manage patient needs. Following the comprehensive assessment, patients receive care from a multidisciplinary care team, which is co-ordinated through a case manager.	Poland
TeleHomeCare TeleHomeCare is a digital intervention designed to support home care through telemonitoring and teleconsultation for patients who suffer from one or more of the following chronic diseases: heart failure, chronic obstructive pulmonary diseases, and diabetes. The programme operates in the Italian town of Ceglie Messapica.	Italy
Digital Roadmaps towards an integrated healthcare system The Digital Roadmap initiative aims to improve co-ordination across healthcare settings and therefore care for patients, with a specific focus on those living with one or multiple chronic conditions. The initiative comprises several digital care interventions such as TeleCOPD, Telepsychiatry, virtual rehabilitation services and an mHealth app.	Southern Denmark
Technology Enabled Care (TEC) The TEC programme in Scotland is to ensure that successful digital health and care initiatives are mainstreamed. At the national level TEC provides leadership, evidence, and guidance on mainstreaming TEC to the government, healthcare providers and other stakeholders. It also invests in national infrastructure, such as national licenses for digital care tools. At a local level, it helps to grow TEC initiatives by providing dedicated funding, as well as change management support and knowledge exchange, to organisations implementing or trialling such initiatives	Scotland
Telemonitoring for patients with advanced heart failure The University Hospital Olomouc in the Czech Republic implemented a telemonitoring intervention for patients with advanced heart failure. As part of the intervention, a patient's vital signs are automatically shared daily with health professionals at the hospital including blood pressure, blood saturation, and results from electrocardiograms.	Czech Republic
ParkinsonNet ParkinsonNet was developed to deliver high-quality, specialist care for Parkinson's disease. Through regional networks, allied health interventions are delivered by specially trained therapists who work according to evidence-based guidelines.	Netherlands
Personalised Action Plans (PAPs) Andalusia, Spain, introduced PAPs for people living with one or more chronic diseases. The PAP programme outlines a formal process whereby practitioners and patients collaborate to create a longitudinal treatment plan.	Andalusia, Spain
Mobile Airways Sentinel Network (MASK) MASK is an mHealth intervention designed to reduce the burden of allergic rhinitis (AR) and asthma. MASK is broken into two components – one for individuals and the other for health professionals. Individuals can download the MASK-air app for free which includes an allergy diary. Health professionals have access to a *MASK-air Companion*, an electric decision support system to promote personalised treatment for patients with AR and asthma	Several OECD and EU-27 countries

Note: *The case study may operate across the country or in specific regions within that country. **Joint Action on implementation of digitally enabled integrated person-centred care.

Governance and financing

Traditional governance structures and payment models prevent widespread care integration

Many case studies pursued care integration at a specific level of care, such as primary care, and often for a specific disease. For example, the Finnish City of Oulu implemented a digital patient-provider portal at the primary care level, while programmes such as ParkinsonNet in the Netherlands cater to the needs of patients with Parkinson's disease. Only a small number of case studies operate across the entire spectrum of healthcare services for whole populations, such as the OptiMedis model in certain regions of Germany and Badalona's (Spain) integrated care organisation.

The limited number of integrated care models covering entire populations and all healthcare services is in large part due to existing governance structures. Governance systems across and within health and social care sectors are often fragmented making it difficult for providers to work together to deliver patient-centred, integrated care. For example, in some countries, primary care is governed at the national level while inpatient care falls under the responsibility of regions, which hinders vertical care integration. Further, in countries with social health insurance or private compulsory insurance, long-term care isn't necessarily included in the scope of insurance and is therefore governed and financed separately (Barrenho, Fujisawa and Kendir, 2020[7]).

Traditional payment models can also discourage care integration. Specifically, in most OECD countries, providers are paid for the activities they perform – i.e. using fee-for-service (FFS) or diagnostic-related groups (DRGs). The former pays providers based on the service provided, while the latter pays providers for every patient treated. Both FFS and DRGs contribute to care fragmentation and excessive health expenditure (Lorenzoni and Milstein, 2022[8]). For example, in Badalona, Spain, despite integrating health and social care into one organisation, different types of care are financed separately – e.g. primary care is financed based on the population covered, which is adjusted for several factors such as age, while hospitals are paid for each service provided. The variability of financing methods "hinders the management of services, which are thought from an integrated perspective but financed from different budgets" (Vallve et al., 2016[9]) (see Chapter 7). Changes in financial payment models can have a significant impact on the way care is delivered, but ultimately are only a means, not an end, for integrating care.

Policy recommendations

Embed integrated care within the health system's governance structure

Stronger governance systems that facilitate care integration across and within health and social care sectors are necessary for deploying population-wide integrated care models covering all services. How countries achieve this is complex and context-specific. For this reason, this high-level report on integrated care does not seek to map out the multiple paths to achieve strong governance systems that support care integration. Instead, it acknowledges the importance of strengthening governance structures by breaking down silos across administrative systems in health and social care with the support of key stakeholders.

Among selected case studies, an integrated care model in the Basque Country, Spain, highlights how countries can strengthen governance structures to promote better care for multimorbid patients. At a high level, the region introduced integrated health organisations to replace independently run hospitals, primary and outpatient care centres (see Chapter 6). Similar changes were introduced in 2000 in the Spanish municipality of Badalona (see Chapter 7). See Box 1.1 for further details.

Box 1.1. Case studies: Integrated health organisations

Strong governance structures promote integrated care. Example policies implemented to strengthen governance structures among selected case studies are detailed below.

Integrated Health Organisations, the Basque Country, Spain

In response to challenges posed by multimorbidity, in 2010 the Basque Country's Department of Health launched the "Strategy to tackle the challenges of chronicity" (Ministry of Health and Consumer Affairs, 2010[10]). The objective of the strategy was to "re-orient the health system toward an integrated care model" that is patient-centred and meets the needs of people with chronic conditions (The CareWell Group, 2018[11]).

To realise this objective, the Basque Country transformed from a system made up of 35 independent organisations (15 hospitals and 20 primary healthcare centres, as well as an additional 475 outpatient health centres) to one comprising 13 integrated health organisations (IHOs), a well as two hospitals and three mental health networks. Each IHO is set up around a regional hospital and offers a range of services for a geographically defined population (Izagirre-Olaizola, Hernando-Saratxaga and Aguirre-García, 2021[12]).

Providers within an IHO have the same management and objectives, further, each IHO has its own budget. A single budget for an IHO is designed to encourage providers to work together to ensure services are provided at the right level of care (Izagirre-Olaizola, Hernando-Saratxaga and Aguirre-García, 2021[12]).

Changes to the governance structure and the delivery of healthcare (i.e. by multidisciplinary care teams) contributed to an improvement in **access to primary care and reduced demand for inpatient care**. Further, patients and carers who participated in the integrated care model provided **largely positive feedback** – for example, health professionals felt more alert and watchful, while patients felt they received more co-ordinated care and that the management of information improved (Mateo-Abad et al., 2020[13]).

Badalona Healthcare Services, Badalona, Spain

Before 2000, health and social care services operated in silos within Badalona. Specifically, the Badalona Healthcare Services (Badalona Serveis Assistencials, BSA) was responsible for healthcare while the City Council operated social services. This arrangement led to service duplication and uncoordinated care delivery. In response, in 2000, the Badalona City Council agreed to merge health and social care services into one integrated health and social care organisation. This organisation goes by the name of BSA and is owned by the Badalona City Council.

BSA's governance structure supports several types of care integration within the health and social care system, for example, functional integration (back-of-office and support function co-ordination), organisational integration (single organisation responsible for health and social care services), and professional integration (multidisciplinary care teams including primary care doctors, specialists, doctors, and nurses based in hospitals, and social workers).

Benefits generated by BSA include better adherence to treatment due to clinical pathways, improved co-ordination between different levels of care and with third-party providers and improved organisational and decision-making processes.

Consider innovative payment models that incentivise care integration, while recognising that the current evidence on their impact is mixed

Payment models play a key role in incentivising providers to deliver high-quality, integrated care that is affordable. Three payment models of particular interest are 1) add-on payments; 2) episode-based (bundled) payments; and 3) comprehensive capitation payments.

Countries can consider these innovative payment models to promote integrated care delivery. However, it is noted that real-world evidence supporting these models of payment is mixed, ranging from no changes to standard delivery of care, or higher expenditures without quality improvements, to improved quality and lower health expenditures.

- *Add-on payments:* Add-on payments refer to additional payments made on top of existing payment models to incentivise desired behaviours, including integrated care. Among OECD countries, 12 use this payment model to incentivise prevention or co-ordination: Australia, Austria, Canada, Denmark, France, Germany, Iceland, Israel, Italy, Mexico, Norway,[1] and Sweden (OECD, 2018[14]). Add-on payments to incentivise integrated care may be referred to as pay-for-co-ordination (P4C). For example, an additional payment to primary care providers for undertaking a comprehensive review of a patient's case involving notes from several providers, or a payment to employ a case manager (Struckmann et al., 2016[15]). Add-on payments typically target individual providers, usually physicians, and do not change the base structure of existing payment models. Therefore, add-on payments can be introduced more easily than bundled or comprehensive capitation payment models.
- *Episode-based (bundled) payments:* Episode-based payment models bundle the activities of different providers, such as a hospital and an outpatient physician, along one care pathway (Lorenzoni and Milstein, 2022[8]; Lindner and Lorenzoni, forthcoming[16]). Providers then receive one comprehensive payment per patient for the clinical care pathway. Several OECD member countries have introduced episode-based payments for chronic conditions (e.g. the Netherlands and the United States) or for surgical interventions (e.g. France and Norway). For the former, providers receive a budget covering all condition-related services within a given period, while for the latter, a group of providers receive a joint price per patient treated (Lorenzoni and Milstein, 2022[8]; Lindner and Lorenzoni, forthcoming[16]).
- *Comprehensive capitation payments:*[2] comprehensive capitation payment models cover the activities of a set of providers that provide care over a given period. Under this model, a network of providers generally receives a yearly or monthly joint payment for every patient covered in a programme (Lorenzoni and Milstein, 2022[8]; Lindner and Lorenzoni, forthcoming[16]). The payment per patient is typically adjusted for age, sex, and health status to account for differences in costs. The payment may also include quality-related adjustments to further incentivise the provision of high-quality care. The OptiMedis model in Chapter 3 utilises a comprehensive capitation payment model with a shared savings contract, as summarised in Box 1.2. Under this model of care, provider networks are incentivised to deliver integrated care given they receive any realised healthcare expenditure savings. Comprehensive capitation payments are typically harder to implement given they require stronger governance arrangements, as well as improvements in data collection, analysis, monitoring, and reporting. Therefore, it is not surprising that only three OECD countries have implemented such payment models (i.e. France, Germany and the United States).

Box 1.2. Case study: The OptiMedis model of care – comprehensive capitation payment model with a shared savings contract

The OptiMedis model involves the creation of a regional integrator, an institution in charge of managing the network integration with a physical presence in the region and legally constituted as an enterprise. Healthcare providers in partnership with the network participate in the regional integrator in the capacity of partners, owners, or associates (depending on the context) together with OptiMedis AG, a German healthcare management company with an expertise in management support, business intelligence and health data analytics.

A key feature of the OptiMedis model is the payment system, which is based on a “shared savings contract”. The contract is drawn between the integrated network on one side and sickness funds on the other. As part of this contract, positive differences between expected costs* and the real healthcare costs of the population the network is accountable for are considered “savings” and are shared between the integrated network and sickness funds.

The share of savings received by the integrated network is used to finance integration efforts, including performance bonuses and operations of the regional integrator. Any remaining profits are re-invested in the regional healthcare system.

To avoid an under provision of services to generate savings, there are minimum quality standards that need to be complied with. The payment system is therefore designed so that there is a financial incentive to invest in delivering high-quality, efficient, preventative care.

Using OECD’s Strategic Planning for Public Health microsimulation model and real-world data from OptiMedis, this model of care is estimated to lead to an additional 146 441 life years and 97 558 disability-adjusted life years by 2050 in Germany. Over the same period, cumulative health expenditure savings per person are estimated at EUR 3 470 in Germany.

Note: *Expected costs are calculated according to the risk-adjusted funds received by the sickness funds to care for their contracted insurees from the central authority (Gesundheitsfonds).

Workforce

Barriers such as a culture of professional siloes and systems not suitable for sharing patient data prevent health professionals from delivering patient-centred, multidisciplinary care

Patients with complex health needs access care from several health professionals. For example, a patient with type 2 diabetes and hypertension may require care from a general practitioner (GP), a dietician, a cardiologist, and a practice nurse. To ensure treatment is co-ordinated and patient-centred, these patients should receive care from a multidisciplinary care team (see Box 1.3). For example, evidence-based clinical guidelines are often disease-specific and do not consider the cumulative impact of different treatments (Hughes, McMurdo and Guthrie, 2012[17]). Therefore, it is important that a team of professionals, along with the patient or carer, develop individualised care plans based on factors such as interactions and the level of burden placed on the patient.

Box 1.3. Multidisciplinary care teams

Multidisciplinary care teams include two or more health/social/community professionals who work together to provide comprehensive care centred on the patient's needs. Chosen professionals may function under one organisation or come together from different organisations.

Professionals who make up the multidisciplinary care team will depend on the needs of the patient. Examples of professionals include:

- General practitioners (GP)
- Medical specialists
- Practice nurses
- Community health nurses
- Allied health professionals (e.g. dieticians, psychologists, pharmacists, occupational therapists)
- Social workers
- Health educators
- Long-term care manager
- Geriatricians.

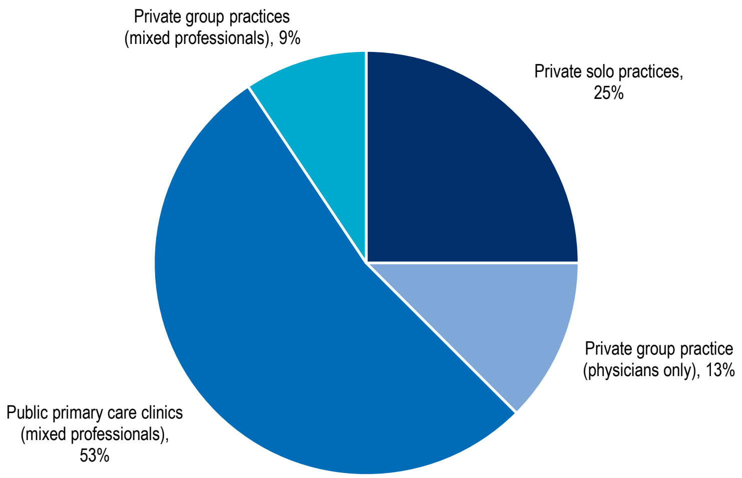
Multidisciplinary care teams specify a case manager. The case manager has many roles including maintaining team co-ordination, managing a patient's treatment schedule, tracking patient progress, making referrals, as well as communicating the patient's health status to the team (Saint-Pierre, Herskovic and Sepúlveda, 2017[18]). Evidence from the literature indicates that "well-organised" multidisciplinary care teams improve patient satisfaction and reduce staff burnout (Leach et al., 2017[19]).

For real-world examples, see case studies from the Basque country, Spain (Chapter 6), and Poland's medical diagnostic centres (Chapter 8).

Barriers to implementing patient-centred, multidisciplinary care include, but are not limited to, a culture of professional silos, lack of resources, national or regional legislation that restricts providers from sharing patient information, lack of financial incentives to encourage professionals to work together, and undefined relationships across professionals. Furthermore, professionals often do not have the skills to work as a team given they receive their training and work experience in different settings (e.g. one in four general practitioners work in private solo practices, see Figure 1.1) (OECD, 2020[3]). Difficulties transitioning to multidisciplinary care occurred in Badalona, Spain, which saw "resistance and conflict among professionals". Specifically, social care workers did not support their portfolio of services being managed by an enterprise from the health sector, while medical staff resisted the introduction of domiciliary services (Vallve et al., 2016[9]) (see Chapter 7 for more details).

Figure 1.1. One in four general practitioners work in solo practices

Where are primary care services predominantly provided?



Note: Data collected from 32 OECD countries.
Source: OECD (2016[20]), "Health Systems Characteristics Survey 2016", https://qdd.oecd.org/subject.aspx?Subject=hsc.

Despite playing a lead role in delivering integrated care, the primary care workforce is not always sufficiently supported to take on new roles

Primary healthcare workers are often the first point of contact for people accessing the healthcare system. This includes people with minor ailments to those with complex health needs. Therefore, primary healthcare professionals play a key role in providing co-ordinated, patient-centred care from the earliest possible point in time. Despite growing consensus that a strong primary healthcare sector is essential for an effective, efficient, and equitable healthcare system, countries often prioritise secondary and tertiary care (Hanson et al., 2022[21]).

From selected case studies, there is some evidence that primary care staff are not sufficiently supported. For example, a review of the Basque Country's integrated care model found primary care professionals felt their workload markedly increased, particularly among nurses who were now responsible for leading weekly education sessions and following-up with patients more regularly (Mateo-Abad et al., 2020[13]). See Chapter 6 for further details.

Policy recommendations

Invest in training programmes to upskill the health workforce

The workforce requires appropriate skills to deliver patient-centred, integrated care to those with complex health needs. Health systems must therefore invest in training programmes that teach health workers vital "hard" and "soft" skills:

- *Hard skills:* New ways of work require health professionals to develop new technical skills. Building digital health literacy among the health workforce is of particular importance given ICT tools play a key role in promoting care integration (e.g. electronic health records and patient provider portals). See the section on "Digital tools and health information systems" for further details.

- *Soft skills (or transversal skills):* The transition towards patient-centred, multidisciplinary care represents a major cultural shift for many health professionals. To adjust to this new way of work, health professionals must acquire new soft skills (i.e. non-technical skills). These include shared behavioural counselling, communication, collaboration, and relationship building (Ranjan, 2015[22]). For example, in Badalona, Spain, health professionals highlighted the importance of those providing care in a patient's home to have specific skills related to "flexibility, teamwork, communication, and empathy" (Vallve et al., 2016[9]).

Introducing training programmes into the formal curriculum can ensure all health professionals obtain the same skills thereby promoting multidisciplinary care. It is possible to supplement formal training (i.e. continuing medical education) with informal training by establishing "learning networks". Learning networks led by health professionals can help spread good practices, for example, through webinars, conferences, as well as online materials and guidebooks.

Promote new professional roles that support integrated care, such as case managers

Integrated care requires the establishment of new professional roles, in particular case managers (Looman et al., 2021[23]). Case managers are responsible for co-ordinating professionals, the patient and their carer (see Box 1.3). Case managers represent a relatively new professional role; therefore, it is important that:

- *Case managers have a well-defined role*: there needs to be clarity on their role and that this is well understood among the multidisciplinary care team, patient, and carer.
- *Case managers have the right skills:* an effective case manager has many skills that extend beyond clinical knowledge. These include interpersonal skills, problem-solving skills, and negotiation and brokerage skills.

Among selected case studies, case managers were typically nurses, however, they may also come from other qualified backgrounds such as social and community workers. For example, case management within Badalona's integrated care organisation in Spain is led by both nurses and social workers (see Chapter 7). Another example comes from Austria, which, as part of its Recovery and Resilience Plan, will implement "Project Community Nursing" to promote the role of community nurses in delivering integrated care (Box 1.4).

In the right context, assigning case manager roles to community or social workers can result in several benefits. These include (Kim et al., 2016[24]; Berini, Bonilha and Simpson, 2021[25]; Kim et al., 2016[26]; OECD, 2020[3]):

- An improvement in patient satisfaction and health outcomes
- Reduced pressure on primary care nurses and doctors
- A reduction in healthcare costs
- A reduction in health inequalities.

Box 1.4. Project Community Nursing – Austria

Funded by the EU (NextGenerationEU), Austria will implement Project Community Nursing as part of its Recovery and Resilience Plan, in which community nurses will take on various roles to promote care integration including:

- Providing low-threshold support and relief services close to the patient's home
- Networking between patients and care providers
- Co-ordinating care services for patients, covering both health and social care services
- Undertaking health prevention and promotion activities, such as building health literacy.

Community nurses will focus on caring for vulnerable populations, namely older people living at home and their relatives. However, the target group may expand to meet the specific needs of the local community.

Over 100 pilots will be deployed as part of Project Community Nursing across Austria. A level of homogeneity is guaranteed across the pilots given they are co-ordinated at the national level.

Assigning community workers as case managers is particularly beneficial when treating vulnerable and hard to reach patients such as racial and ethnic minorities, as well as those with a low socio-economic status and/or living in a rural area. For example, a community worker with a close understanding of the population being served can act as a liaison between health, social and community services thereby facilitating access to culturally appropriate care (American Public Health Association, 2022[27]). For the reasons outlined above, health systems should develop their community health workforce and ensure they can take on new roles, including case management.

Case managers are not the only new professional role to emerge from the transition to integrated care. New professional roles identified among selected case studies include:

- *Referent internist* who supports decisions made at the primary care level as well as co-ordinating specialists involved in treating the patient in the hospital
- *Hospital liaison nurse* who works with a primary care nurse (who is also the case manager) to co-ordinate care when the patient is discharged from the hospital
- *Domiciliary attention physician* who provides care to patients either in the hospital or in a home setting.

Digital tools and health information systems

Digital tools support patient-centred, integrated care by improving the flow of information between providers and patients

Digital tools enable integrated care by improving communication and co-ordination across service providers, for example, between hospitals and home- and community-based care as well as transitions between health and social care. Digital tools also enable communication channels between patients and providers, thereby promoting patient-centredness (OECD, 2019[28]).

Digital tools included within selected case studies can be categorised into one of three groups: eHealth, big data and mHealth (Fahy and Williams, 2021[29]). The role each of these technologies plays in promoting integrated care is summarised below, with real-world examples from selected case studies available in Box 1.5:

- *eHealth* uses information and communication (ICT) technologies to improve communication processes and ways of recording patient information. Example technologies include electronic health records (EHRs), patient portals and telehealth.
- *Big data* collected from sources such as EHRs can be used to stratify the population into different risk categories, which helps deploy population-based integrated care models. Big data also supports population monitoring, research, innovation, and continuous improvement of health system effectiveness.
- *mHealth* offers people access to new services using mobile phone devices and apps. These services aim to empower people and encourage healthy lifestyle behaviours, improve communication between patients and providers, and may also provide important diagnostic and treatment information.

Box 1.5. Case studies: Digital tools to promote integrated care

This box summarises digital tools identified in selected case studies to promote integrated care.

Patient portals

Patient portals give people access to their health data in an easy-to-understand format. Finland's City of Oulu has deployed a voluntary digital patient-provider portal focused on primary care and to a lesser extent social care. With the patient's consent, data from a patient's EHR is uploaded to the portal ensuring primary care professionals have access to patient data. The portal allows patients to book appointments, communicate with health and social care professionals on non-urgent matters, share home monitoring test results (e.g. blood pressure), and access information on health prevention. For providers, the portal provides tailored guidelines and care pathways based on individual patient information such as laboratory results.

Big data

In line with the strategy for chronicity, the Basque Health Service, Spain, developed an integrated care model for multimorbid patients. The model has several key characteristics including individualised care plans, care delivery by a multidisciplinary team and patient empowerment programmes. Patients eligible for this model of care are identified using a sophisticated risk stratification system – i.e. Johns Hopkins Adjusted Clinical Groups Predictive Model (ACG-PM). ACG-PM uses patient data to predict utilisation of healthcare services (a proxy measure for patient morbidity) over the next 12 months.

mHealth apps

mHealth apps improve communication between patients and providers, while simultaneously encouraging patients to take control of their own health. Chapter 15 includes a description of the Mobile Airways Sentinel Network (MASK) mHealth app, which helps reduce the burden associated with allergic rhinitis (AR) and asthma. The mHealth app has two components, one for individuals and another for health professionals:

- *For patients*: users are encouraged to upload daily data related to topics such as allergy symptoms and treatment. Including data from a patient's EHR to complement self-reported information is possible.
- *For health professionals*: physicians and pharmacists have access to the MASK-air Companion, which is interoperable with the patient app. The Companion is an electronic decision support system to assist health professionals diagnose and provide personalised treatment to patients.

MHealth apps were explored in previous work by OECD on best practices in public health. Specifically, the best practice booklet on healthy eating and active lifestyles examined the web- and mobile-based intervention, “Let Food Be Your Medicine”, which provides users with personalised nutrition advice (OECD, 2022[30]).

Utilisation of digital health tools is lower among vulnerable populations

OECD populations are increasingly reliant on the internet to access information and services, including in the health sector. For example, between 2007 and 2021 the proportion of adults seeking health information online in the last three months increased by over 150% (i.e. from 25% to 62%) (OECD, 2019[31]). Nation-wide averages on the use of digital health tools, however, mask stark differences across population groups. Specifically, vulnerable populations including the elderly, racial and ethnic minorities, and those with a lower socio-economic status and/or living in a remote area are less likely to: a) be digitally literate and b) have access to the internet as well as smartphone devices. For these reasons, digital tools risk exacerbating existing health inequalities as highlighted by selected case studies:

- *Age inequalities*: health professionals involved in the integrated care model operating in the Basque Country, Spain, highlighted that digital tools within the model of care (e.g. Personal Health Folders, which allow patients access to their information) hold great promise, but are limited given older patients lack the necessary technical skills.
- *Geographical inequalities*: administrators of TeleHomeCare, as implemented in the Italian city of Ceglie Messapica for multimorbid patients, identified technical difficulties implementing TeleHomeCare in areas where there was poor or no internet network coverage.

Digital tools are not widely used among health professionals

Several factors prevent health professionals from supporting digital health technologies. These include:

- *Low levels of digital health literacy* with up to 70% of health workers stating they do not feel accustomed to using digital solutions “due to gaps in knowledge and skills in data analytics” (OECD, 2019[28]).
- *Additional burden* posed by the digital tool due to insufficient training and/or poor design, which do not consider the needs of end users.
- *Distrust* that the digital tool improves service delivery and therefore patient outcomes.

Digital tools to support integrated care are often deployed as small-scale pilots

Many case studies selected for this review include digital tools implemented locally, and often for a specific disease. Therefore, the selected case studies only covered a small number of eligible patients, which limited their overall impact. For example:

- TeleHomeCare for certain chronic conditions in the Italian town of Ceglie Messapica only covered 207 patients (see Chapter 9)
- Telemonitoring for patients with advanced heart failure has been implemented in just one hospital in the Czech Republic, which covers between 100 and 250 eligible patients (see Chapter 12).

This key finding aligns with previous OECD work on digital health, which states that innovative ways of delivering healthcare and supportive ICT are typically deployed as pilots or research projects, with project-specific funding (OECD, 2019[28]). Further, many digital tools are not scaled to reach a larger population even if they are successful or show promise (OECD, 2019[28]). There are several reasons for this such as issues with reimbursement mechanisms, interoperability and ICT infrastructure, culture of change and adoption of new technologies, and suitability of skills among staff (Oliveira Hashiguchi, 2020[32]).

Policy recommendations

Invest in digital inclusion activities targeting vulnerable populations

Digital inclusion activities ensure all individuals and communities, including the most vulnerable, have access to and use ICTs (National Digital Inclusion Alliance, 2022[33]). Specific activities to promote digital inclusion include:

- Digital literacy training
- Affordable and reliable broadband internet services
- Internet-enabled devices that incorporate feedback from end-users, including patients
- High-quality technical support
- Applications and online content designed to enable and encourage self-sufficient, participation and collaboration
- Offering incentives for and improving access to adult learning activities.

Efforts to promote digital inclusion among selected cases studies include Scotland’s Technology Enabled Care (TEC) programme, which, during the COVID-19 pandemic created the “Connecting Scotland” initiative. As part of this initiative, TEC invested GBP 5 million (EUR 5.73 million) to provide internet connection, training and support, and a laptop or tablet to 9 000 people who were considered at clinically high risk. Further, as part of its latest strategic plan, TEC will offer support and funding to ensure care homes have reliable internet connections, devices and other infrastructure needed for digital care. It will also support the development and adoption of a suite of tools that can be used in care homes, such as telecare, video-consultations, messaging, and assessment tools.

Invest in activities that promote the use of digital tools among health professionals

This review identified several activities needed to promote the widespread use of digital health technologies among health professionals, namely:

- Developing **formal digital health literacy training** by implementing digital health competency frameworks. For example, every university in Finland plans to provide medical students with streamlined digital health education – MEDigi – to ensure all doctors have appropriate digital skills. Curricula related to digital health should be frequently revised to reflect ongoing technological changes.
- Providing **additional training specific to the digital tool**. For example, health professionals in the Finnish City of Oulu receive two-hour training sessions on how to use the patient-provider portal, Self Care Service (SCS). Further, as part of TeleHomeCare in the Italian city of Ceglie Messapica, GPs and specialists receive two weeks’ worth of training run by control room operators and telemedicine experts. (See Chapters 5 and 9 for further details).
- **Involving health professionals in the design of digital tools** to ensure technologies are integrated into current workflows, are non-burdensome, and are interoperable with patients.
- **Ensuring digital tools align with current practices** to ensure they do not create additional work for health professionals.

- **Undertaking robust evaluations of digital health technologies** to promote trust (discussed further under the section on "Monitoring and evaluation"). Given evidence is rapidly evolving in this space, there must be a supportive environment for knowledge accumulation and up-to-date evidence (e.g. publication of regular rapid reviews).

Institutional and organisational changes are needed to digitally transform the health sector

This review looked at a small selection of integrated care models, most of which are confined to a specific region within a country and in some cases are just pilots. Therefore, this review did not explore in detail the wider digital health system in which these models operate. Nevertheless, it is recognised that population-wide integrated care requires digitally advanced health systems.

Previous work by the OECD identified three main government actions to digitally transform health systems (OECD, 2019[28]). These are:

- An **overarching digital strategy** that is comprehensive and includes a consolidated vision, plan, and policy framework.
- **Strengthening the governance of health data** to enable data and digital technologies to be put to productive use while ensuring security and respect for individuals. At present, legal issues, a lack of trust among stakeholders, and non-unified data standards and exchange formats act as barriers to realising the potential of health data to improve outcomes.
- **Building institutional and operational capacity** including preparing the workforce to harness opportunities presented by digital technology, as well as empowering the population. In addition, institutional systems must be in place to link, share and analyse patient data.[3] This last point is of key importance given data fragmentation, weak data-sharing practices and a lack of interoperability between systems are some of the key barriers to providing integrated care.

Monitoring and evaluation

Evaluations of integrated care models focus on patient experiences and healthcare utilisation

Across the 13 selected case studies, less than half collected data on objective health outcomes such as changes in mortality. Selected case studies instead focused on measuring changes in patient experiences and utilisation of healthcare services (see Table 1.2). Further, two of the selected cases studies provided no evidence at all.

Table 1.2. Evidence measuring effectiveness by selected case studies

	Measured changes in objective health outcomes	Measured changes in subjective health outcomes (i.e. patient experiences)	Measured changes in utilisation of healthcare services	No evidence
OptiMedis, regionally based integrated care model	✓	✓	✓	
Hospital-at-Home	✓		✓	
Mobile Airways Sentinel Network (MASK) app	✓	✓		
Oulu Self Care Service (patient portal)			✓	
Integrated care model for multimorbidity, Basque Country	✓	✓	✓	
Badalona Healthcare Services (BSA)	✓		✓	
Medical Diagnostic Centre		✓	✓	
TeleHomeCare in the Italian city of Ceglie Messapica				✓
Digital Roadmaps towards an integrated healthcare system		✓	✓	
Technology Enabled Care (TEC)*		✓	✓	
Telemonitoring for patients with advanced heart failure				✓
ParkinsonNet	✓	✓	✓	
Personalised Actions Plans		✓	✓	

Note: *This report evaluated TEC as opposed to the individual interventions within TEC. An evaluation of each programme funded by TEC fell outside the scope of this review, therefore, it is possible that individual TEC funded programmes collected data on objective health outcomes.

The finding above aligns with the broader literature whereby (Baxter et al., 2018[34]):

- Evidence supporting integrated care is strongest regarding patient satisfaction, perceived quality of care and access to care
- Objective quality of care outcome measures is limited.

Integrated care models have the potential to deliver healthcare more efficiently, however, real-world evidence is limited

Efficiency refers to how well the mix of monetary and non-monetary inputs were used to achieve desired outcomes in a real-world setting (OECD, 2022[5]). In the health sector, economic evaluations such as cost-benefit or cost-effectiveness analyses are frequently used to measure efficiency.

Among selected case studies, none included results from an economic evaluation. Instead, many case studies relied on estimates measuring changes in health expenditure to prove efficiency (see Table 1.3). These estimates fail to show the whole picture given cost savings should be measured in relation to changes in outcomes. For example, an integrated care model may increase expenditure but still be efficient if changes in health outcomes are large.

Table 1.3. Evidence measuring efficiency by selected case studies

	Economic evaluation	Changes in health expenditure	No evidence
OptiMedis, regionally based integrated care model*		✓	
Hospital-at-Home		✓	
Mobile Airways Sentinel Network (MASK) app			✓
Oulu Self Care Service (patient portal)		✓	
Integrated care model for multimorbidity, Basque Country		✓	
Badalona Healthcare Services (BSA)*			✓
Medical Diagnostic Centre			✓
TeleHomeCare in the Italian city of Ceglie Messapica			✓
Digital Roadmaps towards an integrated healthcare system**			✓
Technology Enabled Care (TEC)**			✓
Telemonitoring for patients with advanced heart failure			✓
ParkinsonNet		✓	
Personalised Actions Plans		✓	

Note: *Individual programmes within OptiMedis and BSA have results from an economic evaluation, but not the model as a whole. **Digital Roadmaps and TEC are both programmes that support a range of individual integrated care digital projects. Individual projects may have data on cost-effectiveness and/or changes in costs. Nevertheless, there is no data for the programmes as a whole.

The lack of robust data measuring the efficiency of selected case studies aligns with the broader literature. For example, a 2020 systematic review and meta-analysis of integrated care models concluded there is a paucity of studies measuring cost-effectiveness and studies are not of high quality (Rocks et al., 2020[35]). Further, the 2021 Handbook on Integrated Care noted that the “substantial resources” necessary for collecting high-quality data pose a significant barrier to undertaking cost-effectiveness analyses (Tsiachristas and Rutten-van Mölken, 2021[36]).

Policy recommendations

Focus on developing and measuring indicators specific to integrated care

To understand the true impact of integrated care models, it is important to develop and measure indicators specific to the model of care under evaluation. Drawing upon the Donabedian approach to evaluating care quality, indicators should cover structures, processes and outcomes (Donabedian, 1988[37]; Report by the Expert Group on Health Systems Performance Assessment, 2017[38]):

- *Structures* to assess the system levers necessary to transition to an integrated care system (e.g. use of digital tools for integration of care among primary care physicians, and share of primary care offices using electronic health records (OECD, 2021[39]))
- *Processes* such as care transitions between and within sectors and task shifting across health professionals
- *Outcomes* by population groups and/or disease areas, self-reported outcomes, as well as utilisation indicators that act as a proxy for health outcomes. See Box 1.6 for further examples.

> *“Good structure increases the likelihood of good process, and good process increases the likelihood of good outcomes.” (Donabedian, 1988[37])*

The SMART framework provides useful information on how to select high-quality integrated care indicators. Criteria within the framework cover relevance, accessibility, reliability, validity, and timeframe, as described in Box 1.6 (OECD, 2022[5]).

Box 1.6. Measuring health outcomes

This box outlines health outcomes that are useful for measuring the impact of integrated care models. It also outlines criteria important to consider when selecting which health outcomes to measure.

Types of health outcomes

Measuring health outcomes enhances the quality of evidence supporting integrated care thereby building support from policy makers, health professionals and patients.

Regarding outcomes, the types of indicators to collect will ultimately depend on the integrated care model under evaluation, with examples listed below:

- All-cause and disease-specific mortality (and mortality after hospitalisation) (see (Barrenho et al., 2022[4]))
- All-cause and disease-specific hospital readmissions (Barrenho et al., 2022[4])
- Adverse events
- Complications
- Disease incidence
- Blood pressure
- Condition specific clinical measures (e.g. cholesterol control, glycaemic control)
- Body mass index
- Levels of physical activity (e.g. steps per day, minutes per day or moderate to vigorous exercise)
- Falls and other injuries.

In addition to the objective measures of health outlined above, it is important to collect self-reported measures from patients (e.g. patient reported experience measures, PREMs, such as the proportion of patients who have not experienced good care co-ordination (OECD, 2021[39])), as well as utilisation measures that act as a proxy for outcomes such as avoidable hospitalisations for ambulatory care sensitive conditions.

Selecting high quality indicators

Features of high-quality indicators to measure the impact of integrated care models are below (OECD, 2022[5]):

- ***Importance/relevance/utility:*** time and resources need to be invested to collect data on any indicator. They should therefore be important and meaningful to evaluate the intervention.
- ***Accessibility/feasibility****:* data needs to be obtainable, which depends on resource constraints, the availability of the data, and the frequency by which it is made available.
- ***Reliability****:* indicators should measure the issue or outcome consistently, to allow comparisons over time and between people or groups.
- ***Validity/accuracy/robustness****:* indicators should accurately measure the concept or event. However, in some cases this is not possible, and proxy measures should be considered (e.g. using income as a proxy for socio-economic status).
- ***Timeframe***: it is important to consider the timeframe in which a change in the indicator can reasonably be expected, and whether this falls within the evaluation study period.

Data measuring changes in outcome indicators should be collected over a period that allows researchers to understand the long-term impact of integrated care models. For example, by setting up continuous monitoring systems that track set indicators over time (i.e. data collection is not part of a once-off study, but forms part of routine practices) (Tsiachristas and Rutten-van Mölken, 2021[36]). This is important given improvements in chronic disease take time to eventuate.

As discussed under "Digital tools and health information systems", the collection of robust data over time requires countries to have health information systems that support data linkage and sharing of patient information.

Develop internationally comparable data to measure the impact of integrated care models

Studies measuring the impact of selected integrated care models used a range of indicators. Therefore, it is difficult to assess the relative impact of different integrated care models implemented across OECD and EU27 countries. To understand which integrated models work best and therefore which to scale-up and transfer, countries should prioritise the collection of internationally comparable data (Report by the Expert Group on Health Systems Performance Assessment, 2017[38]).

As part of its work on integrated care, the OECD have outlined 13 promising internationally-comparable outcome indicators to be routinely collected with a focus on ischaemic stroke and congestive heart failure (CHF) (Barrenho et al., 2022[4]). Indicators relate to either hospital readmissions, mortality, or prescription of appropriate medication for secondary care prevention after hospital discharge. These are calculated for people admitted to the hospital with an acute non-elective (urgent) episode of care for a first-time event of ischaemic stroke or CHF. Data for these indicators submitted by countries used at least seven years of patient-linked datasets from hospitals (inpatient care), emergency care, death registries, and pharmaceutical and prescribing data. (See Chapter 6 of the latest OECD Health at a Glance report for initial findings across 11 OECD countries (OECD, 2021[1])).

The use of several data points from different datasets to measure the impact of integrated care highlights the importance of having governance structures that support data linkage and sharing of patient information (see "Digital tools and health information systems" for further details).

Prioritise economic evaluations of integrated care models

Evidence supporting the economic value of integrated care models is of key importance given tight budgetary constraints in government. Types of economic evaluations, such as cost-utility and cost-effectiveness analyses, are in Box 1.7 with details on factors to consider when developing an economic evaluation study below (Tsiachristas and Rutten-van Mölken, 2021[36]):

- The **integrated care model under evaluation must be clearly and thoroughly defined**. The definition should include information on the setting, target population, intervention components, and duration of the intervention, for example.
- **Comparator(s) to the integrated care model should be defined** – for example, usual care practices and/or alternative models of care.
- **An appropriate study design should be confirmed at the outset** before the model of care is introduced to establish baseline data. Example study designs include observational studies and randomised controlled trials (see OECD's Guidebook on Best Practices in Public Health for information on the types of study designs available) (OECD, 2022[5]).
- **Define an evaluation period** that is suitable for the benefits of the integrated care model to be realised and ensure baseline data is collected before the model is implemented.

- **Define appropriate outcome measures,** such as those outlined in Box 1.6, which include routinely collected indicators by the OECD as well as new integrated care indicators recently piloted by the OECD (Barrenho et al., 2022[4]).
- **Define how to measure and value costs** such as labour, capital, consumables, administrative and overhead costs, as well as societal costs more broadly. For example, evaluations of telehealth should consider their impact on patient travel and waiting times, both of which result in lost productivity. As an example, research undertaken in Canada found the Canadian Ontario Telemedicine Network reduced patient travel distance by 270 million km in one year, leading to costs savings from a reduction in travel grants by CAD 71.9 million (EUR 50.2 million) (OTN, 2018[40]).

Box 1.7. Types of economic evaluations

An economic evaluation assesses costs in relation to benefits to assist policy makers make decisions that maximise outcomes from a limited set of resources. Commonly applied economic evaluations in the health sector include cost-utility, cost-benefit, cost-effectiveness analysis, and cost-consequence analysis. The appropriate economic evaluation depends on several factors including on how outcomes are measured (OECD, 2022[5]).

- *Cost-utility analysis (CUA):* CUA provides an estimate of the additional monetary cost of obtaining one quality-adjusted life year (QALY) (i.e. one year in full health). CUAs are appropriate when assessing multiple interventions with different objectives, all of which are converted into QALYs.
- *Cost-benefit analysis (CBA):* CBA transforms outcome measures into a monetary unit and compares this with the cost of the intervention (i.e. cost-benefit ratio). It provides a net monetary cost of achieving an additional unit of outcome. It is an appropriate technique when outcomes can be translated into monetary terms.
- *Cost-effectiveness analysis (CEA):* CEA calculates the estimated costs of an additional outcome unit across one or more interventions. The outcome unit is dependent on the intervention being evaluated. CEAs are useful when assessing interventions with the same outcome indicator of interest.
- *Cost-consequence analysis (CCA*): CCA assesses several costs and consequences (i.e. effects) for the intervention under evaluation and reports them separately.

Health equality

Vulnerable populations are at greater risk of experiencing care fragmentation

Vulnerable populations include, but are not limited to, people with a low socio-economic status (SES), older populations, racial and ethnic minorities, and those living in rural and remote areas (OECD, 2022[5]). People in these groups are at greater risk of living with complex health needs for several reasons including lower levels of health literacy thereby making it difficult to navigate the health system, as well as reduced access to healthcare services. For example, across EU27 countries, the proportion of people who report living with a long-standing illness or health problem is 15 percentage points higher among those living in the poorest income quintile compared to those in the richest quintile (43% versus 28%) (Eurostat, 2022[41]).

People with complex health needs often require multiple treatments and interact with several providers. For these reasons, vulnerable populations are at greater risk of "poor quality care, poor health outcomes, and poor experiences of care as a result of fragmentation" (Barrenho et al., 2022[4]).

The needs of vulnerable populations are not always addressed by integrated care models

The importance of designing integrated care models to reduce health inequalities is well recognised. Despite this, **only three of the 13 selected case studies have activities in place to address the specific needs of vulnerable populations**:

- *Incorporating new languages into existing services:* the Finnish city of Oulu's patient-provider portal is in the process of adding Arabic, Dari, and Somali languages to its service. Refugees in Finland typically speak these languages. Similarly, the OptiMedis Health Kiosk offers counselling services in Arabic, Farsi, Russian and Polish.
- *Offering user friendly interfaces:* the patient-provider portal in Oulu has also adapted its video platform to include an easy-to-use function for patients with a disability.
- *Providing technological support:* Scotland's Technology-Enabled Care (TEC) intervention offers support and funding to ensure older people in care homes have reliable internet connections, devices and other infrastructure needed for digital care.

The remaining case studies may indirectly reduce health inequalities by targeting patients with complex health needs, which, as previously mentioned, are more likely to be vulnerable. However, this assumption is dependent on patients from vulnerable groups having equal access to healthcare in the first place, which is not always supported by real-world evidence among OECD countries. For example, poorer populations are less likely to access preventative care, such as screening, as well as primary care via a visit to their general practitioner (OECD, 2019[42]).

The impact of integrated care models on health inequalities is not adequately assessed

As outlined under "Monitoring and evaluation", studies measuring the impact of integrated care models focus on patient experience and utilisation of healthcare services. Just one case study, the integrated care model for multimorbidity in the Basque Country, Spain, produced evaluation results disaggregated by different population groups. Specifically, an evaluation by Sorto-Gordoa et al. (2019[43]) found that the most deprived economic group had a higher probability of accessing primary care and a lower probability of utilising hospital services among all participants.

Given the limited amount of data among selected case studies, it is not possible to determine if integrated care models narrow or widen existing health inequalities.

Policy recommendations

Evaluate the impact of integrated care models on different population groups and adapt accordingly

When studying the impact of healthcare interventions, such as integrated care models, it is important to look at their impact on inequalities. Future research should therefore prioritise collecting patient information on variables relevant to assessing inequalities. These variables include (O'Neill et al., 2014[44]):

- Gender
- Age
- Race and ethnicity

- Education
- Income
- Geographical location.

Further details on stratifying data and undertaking rigorous evaluations are available in OECD’s Guidebook on Best Practices in Public Health (OECD, 2022[5]).

Evaluations that stratify findings according to key sociodemographic variables provide important information on how integrated care models affect population groups differently. For example, differences in access to and outcomes from integrated care. This information can subsequently be used to adapt specific integrated care models as well as larger policy plans for integrated care to ensure the needs of vulnerable populations are met.

Promote health literacy among vulnerable populations

Health literacy (HL) refers to an individual’s knowledge, motivation, and skills to access, understand, evaluate, and apply health information. As outlined above, HL is lower among vulnerable populations. For example, a nationwide study of HL in Denmark found immigrants and individuals with basic education and below-average income had lower levels of HL (Svendsen et al., 2020[45]). Activities to promote HL among vulnerable populations have the potential to improve overall population health and narrow existing health inequalities.

Scaling-up and transferability

Only half of all selected case studies have been transferred to another country or scaled-up across the country in which they were originally implemented

Four of the 13 selected case studies have been transferred from their original “owner” country to another “target” country (see Table 1.4). For example, the mHealth app, Mobile Airways Sentinel Network (MASK), operates in 28 countries, most of which are OECD member countries. Further, the United States (California), Luxembourg, the Czech Republic and Norway adopted the nationwide Dutch programme, ParkinsonNet. Most case studies, however, operate within a specific region in a country, either permanently or as a pilot programme. The City of Oulu in Finland, for example, scaled-up the Self Care Service patient portal from a pilot to the whole city in 2011. (See Chapter 5 for further details).

Table 1.4. Scale-up and transfers of selected integrated care case studies

	Transferred to another country	Scaled-up across a whole country	Scaled-up across a region within a country	Pilot programme
OptiMedis, regionally based integrated care model*			✓	
Hospital-at-Home			✓	
Mobile Airways Sentinel Network (MASK) app	✓			
Oulu Self Care Service (patient portal)			✓	
Integrated care model for multimorbidity, Basque Country	✓		✓	
Badalona Healthcare Services			✓	
Medical Diagnostic Centre				✓
TeleHomeCare in the Italian city of Ceglie Messapica				✓
Digital Roadmaps towards an integrated healthcare system	✓		✓	

	Transferred to another country	Scaled-up across a whole country	Scaled-up across a region within a country	Pilot programme
Technology Enabled Care (TEC)		✓		
Telemonitoring for patients with advanced heart failure				✓
ParkinsonNet	✓	✓		
Personalised Actions Plans			✓	

Note: *There are active discussions in regions of France (Strasbourg) and Belgium (Germany speaking community) to transfer this model of care as part of the EU Joint Action on implementation of digitally enabled person-centred care (JADECARE).

Although most selected case studies were not widely scaled-up or transferred, they are, in most cases, based on a well-known model of care. For example:

- **The City of Oulu's patient portal**: patient portals are increasingly common in OECD and EU27 countries; based on a 2016 EHR survey, 12 (out of 15) OECD countries reported they have or are in the process of implementing a patient portal (OECD, 2019[28]).
- **The Basque Country's integrated care model of multimorbidity** and **Poland's Medical Diagnostic Centres (MDC)**: 17 OECD member countries have developed "new models of primary care" that promote care integration. Like the Basque Country's integrated care model and Poland's MDC, these new models of care offer (OECD, 2020[3]):
    - Multidisciplinary practices or inter-professional practices
    - Comprehensive health services in the community
    - Population health management (generally based on risk stratification using sophisticated IT systems, although not in the case of MDC)
    - Engage patients in shared decision-making.
- **Personalised Actions Plans in Andalusia, Spain**: personalised care plans have been widely used across developed countries for many years including in Australia, England (United Kingdom) and even different regions of Spain (OECD, 2020[3]).
- **Hospital-at-Home, Catalonia, Spain**: healthcare systems increasingly provide post-discharge care at home as an alternative to hospital-based care. Example countries include Australia, Canada, Germany, Israel, and the United Kingdom.
- **Telemonitoring for Advanced Heart Failure (HF), Olomouc, the Czech Republic**: Sweden, Spain and Japan have national-level telemonitoring programmes for HF patients, while pilot interventions operate in countries such as Austria, Denmark, Portugal and the United Kingdom.
- **TeleHomeCare, Ceglie Messapica, Italy**: similar telemonitoring programmes are in place in many countries either at the local, regional or national level, for instance, the Ontario Telemedicine Network in Canada (Oliveira Hashiguchi, 2020[32]).

International programmes assist the cross-country transfer of best practice integrated care models

Several of the selected case studies have or currently participate in international programmes dedicated to transferring best practice integrated care models. These programmes include the Joint Action on implementation of digitally enabled integrated person-centred care (JADECARE), SCIROCCO (Scaling Integrated Care in Context) Exchange project, Digital Health Europe Twinning Project, and the European Innovation Partnership on Active and Health Ageing (EIP-AHA) Twinning Project. Box 1.8 outlines how selected case studies were involved in these programmes.

Box 1.8. International programmes to transfer best practice integrated care models

Listed below are EU-funded projects to promote the transfer of best practice integrated care models.

JADECARE

JADECARE is an EU initiative designed to help Member States make the transition to digitally-enabled and integrated, person-centred care. Under the Joint Action, "early adopters" of original good practice interventions support "next adopters" to transfer the integrated care model to their local setting.

Four of the 13 selected case studies are early adopters of good practice interventions, as summarised below:

- Specific features of the **OptiMedis Model** will be transferred to six regions in Europe.
- **Hospital-at-Home within the Catalan Open innovation on ITC-supported integrated care services for chronic patients** will be transferred to five regions in Europe.
- **Specific features of the integrated care model for multimorbid patients, the Basque Country, Spain** will be transferred to nine European regions. Specifically, regions in Bosnia and Herzegovina, Croatia, the Czech Republic, Denmark, Greece, Italy (two regions) Portugal and Serbia.
- **Specific interventions within Southern Denmark's Digital Roadmaps programme** will be transferred to nine Member States in Europe. Next adopters participated in a study visit where the owners of the intervention in Denmark presented the transferability of individual interventions that make up the initiative.

SCIROCCO Exchange Project

Technology-Enabled Care (TEC) in Scotland participated in the SCIROCCO Exchange project – a project that aims to support health and social care authorities to adopt and scale-up integrated care models.

EIP-AHA Twinning Project

As part of the EIP-AHA Twinning Project, the MASK-air app is being transferred to 25 reference sites. A reference site may be a country, region, or organisation. The purpose of the Twinning Project is to assess the transferability of MASK-air to a range of different contexts and to better understand the burden, diagnosis, and management of rhinitis.

Digital Health Europe funded Twinning Project

As part of a Digital Health Europe-funded Twinning project, the Scottish TEC programme shared good practices from Scotland with the University of Agder (Norway), Grimstad Kommune (Norway) and the Agency for Social Services and Dependency of Andalusia (Spain), and vice versa.

Policy recommendations

Utilise existing frameworks to assist the transfer of best practice integrated care models

The design, implementation and delivery of integrated care models involve multiple stakeholders across different levels of health and social care systems. Transferring such models of care within and across countries is therefore complex.

Several publicly available frameworks to begin the process of scaling-up or transferring an integrated care model are available. These frameworks assist stakeholders to compile information to assess whether the model of care can be transferred and, if so, what steps need to be taken to adapt the model to the local setting. Box 1.9 describes a selection of frameworks identified as part of this review.

Box 1.9. Frameworks for scaling-up and transferring integrated care models

Described below are three publicly available frameworks to assist the transfer of integrated care models.

OECD’s Transferability Framework within the Guidebook of Best Practices in Public Health

OECD’s Guidebook on Best Practices in Public Health outlines four contextual factors that affect the successful transfer of an intervention (OECD, 2022[5]):

- *Population context*: covers population characteristics, sociodemographic factors as well as broader cultural considerations. For example, does the model of care align with population health needs?
- *Sector specific context:* governance/regulation, financing, workforce, capital (including technological infrastructure) and access arrangements.
- *Political context:* political will from policy makers to implement integrated care models.
- *Economic context:* whether implementing and operating the integrated care model is affordable in the long run.

The SCIROCCO Maturity Model for Integrated Care

Scaling Integrated Care in Context (SCIROCCO) is a project co-funded by the European Commission which aims to adopt and transfer good practices in integrated care. A key output of SCIRICCO is the Maturity Model which outlines 12 dimensions necessary for assessing areas of strength and weakness in regard to implementing integrated care (SCIROCCO, n.d.[46]). Outcomes from the self-assessment determine the readiness of care authorities to adopt integrated care and supports authorities improve their capacity to deploy integrated care (Report by the Expert Group on Health Systems Performance Assessment, 2017[38]).

The 12 dimensions are capacity building, readiness to change, structure and governance, information and eHealth services, financing and funding, standardisation and simplification, removal of inhibitors, population approach, citizen empowerment, evaluation methods, breadth of ambition, innovation management and capacity building (SCIROCCO, n.d.[46]).

The MAST Model (Model of Assessment of Telemedicine)

The MAST Model is a tool designed to evaluate telemedicine interventions. The model consists of three steps the first of which assesses the “maturity of the telemedicine technology and the organisation using the service” (Kidholm et al., 2012[47]). Specifically, step one obtains a view of patient characteristics, primary outcomes and whether the telemedicine approach can be compared with usual care, an upgraded system or different technology, and identified barriers and issues including legislation (national and regional level), reimbursement (how services are paid for), maturity, and number of patients.

Develop close ties between the owner and adopter of best practice integrated care models

A review of health promotion intervention transfers as part of the EU's Joint Action on Chronic Diseases found building a "strong relationship between the good practice owner and implementer" was a key transfer facilitator (Stegeman et al., 2020[48]). This finding aligns with feedback from owners of selected cases studies who highlighted the importance of sharing "lessons learnt" and "core features" of their best practice model. Examples of how to facilitate the transfer of selected case studies are below, several of which highlight the importance of local authorities in spreading best practice models of care:

- The **transfer of ParkinsonNet** from the Netherlands to the German region of Niederrhein identified several valuable lessons from the failure of the intervention to "take off". Specifically, the need for a "champion" with expertise in Parkinson's disease to promote the programme, a "super trouper" who receives ongoing training and educates other trainers, and lastly a "business case" to capitalise on healthcare savings made by the programme.
- Administrators of the **Personalised Action Plans (PAPs) in Andalusia, Spain,** shared key factors to consider before transferring PAPs. These factors include having a team of experts to develop training materials on how to treat patients with complex needs, ensuring there is sufficient training for health professionals and patients, linking PAPs with patient EHRs, and ensuring health professionals have the time and resources to develop PAPs.
- Administrators of the **Hospital-at-Home programme in Catalonia, Spain**, identified three key factors necessary for the successful transfer of the programme: strong and supportive leadership at the hospital level, a culture of integrated care, and reimbursement arrangements that incentivise care delivered in a home setting.
- Administrators of the **integrated care organisation in the Spanish municipality of Badalona** outlined several transfer facilitators regarding integrated care models that bring together health and social care. These facilitators cover policy, governance, workforce and culture, and digital tools (see Box 1.10).

International transfer projects, such as those outlined in Box 1.9, help build ties between implementers and adopters, and therefore create an international learning network. (See Chapters 3 to 15 for further details on each case study mentioned above).

Box 1.10. Case study: transfer facilitators of integrated healthcare organisations, Badalona, Spain

This box outlines facilitators for transferring integrated care models that bring together health and social care. The facilitators are broken into four categories: policy, governance, workforce and culture, and digital tools. Facilitators were identified by administrators of Badalona's integrated care organisation.

Policy

- Strong policy commitment towards providing patient-centric care
- Ensure the views of all key stakeholders are included – e.g. research organisations, policy makers, service providers and end-users

Governance

- One governance and organisational structure for health and social care services – without such a structure, implementation costs are likely to be very high given the change required for institutional, organisation, cultural and legal arrangements

- Implementation is more straightforward in countries with national health systems as opposed to insurance-based models
- Involvement of as many stakeholders as possible in terms of horizontal governance

Workforce and culture

- Allowing health and social care providers to play a leading role in developing and implementing this new model of care
- Willingness and motivation among the workforce to implement such models of care
- Culture of innovation
- Involvement of young people given they tend to be more innovative, experience fewer cultural constraints and have good ideas

Digital tools

- Sophisticated health information system, including wide-spread use of EHRs that allow for efficient communication across the spectrum of care
- No resistance to health technology among patients and providers

Source: Vallis, Piera and Tolra (n.d.[49]), "Report of in depth analysis of Badalona Healthcare services (BSA)" case study"; Vallive et al. (2016[50]), "SELFIE 2020: Work Package 2: Thick descriptions of the two Catalan case studies, Badalona Serveis Assistencials (BSA) (Spain)"; Lupiañez-Villanueva and Theben (2015[51]), "Strategic Intelligence Monitor on Personal Health Systems Phase 3 (SIMPHS3): BSA (Spain) Case Study Report".

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Notes

[1] Norway has introduced several add-on payments to incentivise integrated care. For example, an add-on tariff to the existing DRG-based activity financing system that is dedicated to specialised treatment provided outside the hospital/patient clinic (e.g. at a patient’s home or long-term care facility). Specialised treatment here refers to mental health and drug abuse treatment (introduced in 2017) and somatic care (introduced in 2018). Other examples of add-on payments in Norway include a DRG for collaborative activities between hospital and other institutions (e.g. social services and schools) and a results-based financing scheme targeting specialised healthcare services.

[2] These payment models are also referred to as “population-based payment models”.

[3] The level of government most appropriate to facilitate data linkages is context specific and will therefore differ across countries.

2

Complex health needs and the transition to integrated care models

This chapter discusses the rise of integrated care models to cater to the needs of patients with complex health needs. It includes information on the types of integrated care models implemented in OECD and EU27 countries and their objectives. The chapter concludes with a short discussion on why integrated care models, despite their benefits, are not dominant in health and social care systems.

Key messages

People today are living longer with complex health needs

- Stronger healthcare systems and better socio-economic conditions mean people today are living longer: between 1970 and 2019, life expectancy grew by, on average, 11 years among OECD countries
- As people age, they are at greater risk of living with disease, disability, and dementia
- In addition to ageing, poor lifestyle behaviours, such as unhealthy diets, have contributed to the burden of disease (e.g. from type 2 diabetes, cancer, stroke)

Vulnerable populations are more likely to live with complex health needs

- Vulnerable populations, such as those with lower socio-economic status, are more likely to lead an unhealthy lifestyle (e.g. higher rates of physical inactivity)
- Riskier lifestyle behaviours mean vulnerable populations are at greater risk of developing one or more chronic health conditions

In response to rising complex health needs, countries are transitioning towards patient-centred, integrated care models

- Patients with complex health needs require care from different providers across multiple healthcare settings, as well as informal care. For this reason, providing co-ordinated care is of high importance to these patients.
- Failing to deliver co-ordinated care to patients with complex needs worsens a patient's experience and outcomes and is costly.
- To improve treatment for patients with complex health needs, OECD and EU27 countries are turning to patient-centred, integrated care models. These models aim to improve patient experiences and population health, reduce the per capita cost of healthcare, promote a good work-life balance for health professionals, and advance health equity.
- There are many types of integrated care models. The different types of integrated care models have been summarised in several taxonomies.

As highlighted by the COVID-19 pandemic, patient-centred, integrated care models improve the resilience of healthcare systems

- In response to the COVID-19 pandemic, countries introduced several policies that altered the delivery of healthcare – such as telemedicine and hospital-at-home services.
- Selected case studies for this review provide real-world examples of these policies, which improved the continuity of care during the pandemic.

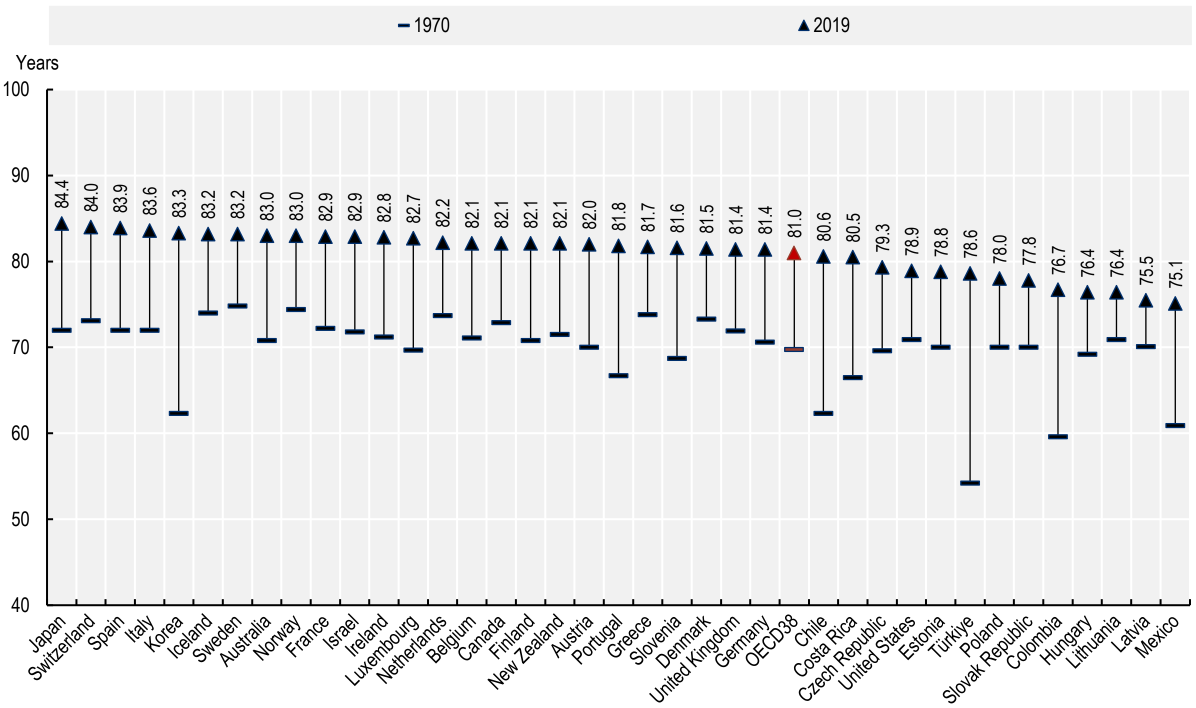
Despite efforts to promote integrated care, co-ordination among providers is often fragmented

- Care models among OECD and EU27 countries remain disease focused
- Fragmented care continues for several reasons including organisational (governance) and financial barriers, as well as an underutilisation of digital tools
- Fragmentation not only exists within the healthcare system but also between the health and social care systems

People today are living longer with complex health needs

Life expectancy has been steadily increasing across OECD countries. Between 1970 and 2019, life expectancy at birth increased by over 11 years among OECD countries, that is, from 69.7 to 81.0 (Figure 2.1) (OECD, 2021[1]). Gains in life expectancy reflect stronger healthcare systems, rising incomes, better education and improved living environments. The onset of the COVID-19 pandemic, however, saw life expectancy fall in many countries, including those in the OECD (OECD, 2021[1]).

Figure 2.1. Life expectancy at birth in OECD countries, 1970-2019 (or nearest year)

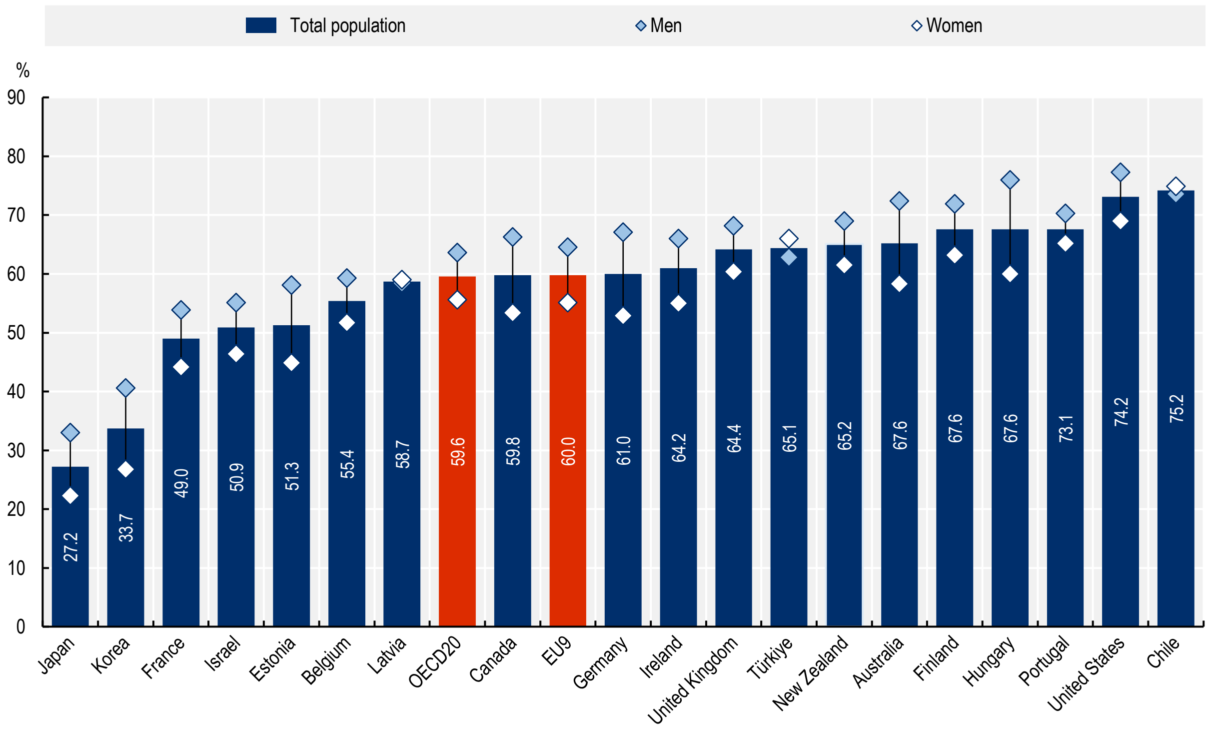


Note: The data ends in 2019 due to the impact of COVID-19.
Source: OECD (2021[1]), *Health at a Glance 2021: OECD Indicators*, https://doi.org/10.1787/ae3016b9-en.

Increasing life expectancy means people are living longer with health problems. As people age, they are at greater risk of disease, disability, and dementia. Therefore, people today are more likely to die "slowly from degenerative diseases preceded by years of multiple morbidity and advanced ageing" (Brown, 2014[2]). For example, across OECD countries, nearly two in three people aged 65 years and over live with one or more chronic conditions (OECD, 2019[3]).

Poor lifestyle behaviours contribute to an increasing burden of disease. Diets among OECD and EU27 countries are increasingly comprised of foods associated with weight gain (e.g. added fats and sugar) at the expense of foods with healthy dietary elements (e.g. fruits and vegetables). Concurrently, people today have fewer reasons to be physically active, for example, with the rise of labour-saving technologies. Combined, these two risk factors have fuelled high rates of obesity:[1] as of 2019, over half of all men and women in OECD and EU countries live with overweight, which includes obesity, with rates higher for men than women (Figure 2.2). Overweight has contributed to poor population health given it increases the risk of developing several NCDs including type 2 diabetes, several cancers, stroke, and asthma (Nyberg et al., 2018[4]). Other risky lifestyle behaviours include alcohol and tobacco consumption.

Figure 2.2. Measured overweight (including obesity) rates among adults, 2019 (or the nearest year)



Note: The OECD20 average is unweighted.
Source: OECD Health Statistics 2022, https://doi.org/10.1787/health-data-en.

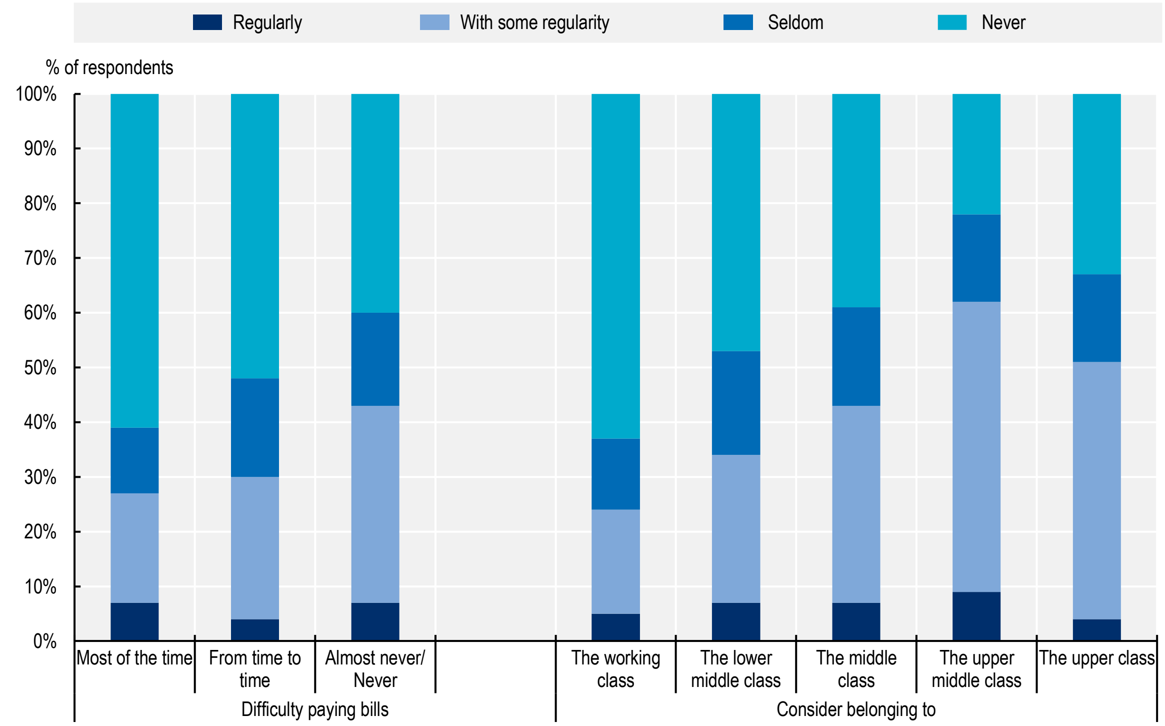
Rising rates of poor mental health also add to the burden of disease. The COVID-19 pandemic had a devastating impact on people's mental health due to factors such as financial insecurity, social isolation, and grief. Data collected from several OECD countries estimate that around 12% of people experienced anxiety or symptoms of anxiety before the pandemic compared to 25% in 2020. Countries also saw rates of depression rise by nearly 15 percentage points over the same period (OECD, 2021[1]). Despite the significant health and economic impact of mental ill-health, mental health support is not sufficiently integrated into social welfare, labour, and youth policies.

Disadvantaged groups are more likely to live with complex health needs

People from certain vulnerable groups are more likely to engage in unhealthy lifestyle behaviours and suffer from mental ill-health. There are various reasons why people from vulnerable groups[2] engage in riskier lifestyle behaviours that contribute to poor health. These include, but are not limited to, restricted access to healthy foods due to high prices or physical proximity to stores that stock such foods (i.e. "food deserts"), as well as lower levels of health literacy. Therefore, it is not surprising that risk factors such as obesity, tobacco consumption, and physical inactivity are more prevalent among vulnerable populations. For example, a recent analysis by OECD and WHO-Europe found a third of people who consider belonging to the "upper class" report never doing sport or exercise compared to around two-thirds of "working class" people (63%) (Figure 2.3). Those from vulnerable groups are also more likely to suffer from mental ill-health including indigenous populations, LQBQTI+ communities, certain ethnic groups including ethnic minorities, older adults, and refugees (OECD, 2021[5]).

Figure 2.3. Sports and exercise by socio-economic group

The proportion of people who reported doing sports or exercise regularly, with some regularity, seldom and never, by socio-economic group, the average for EU28

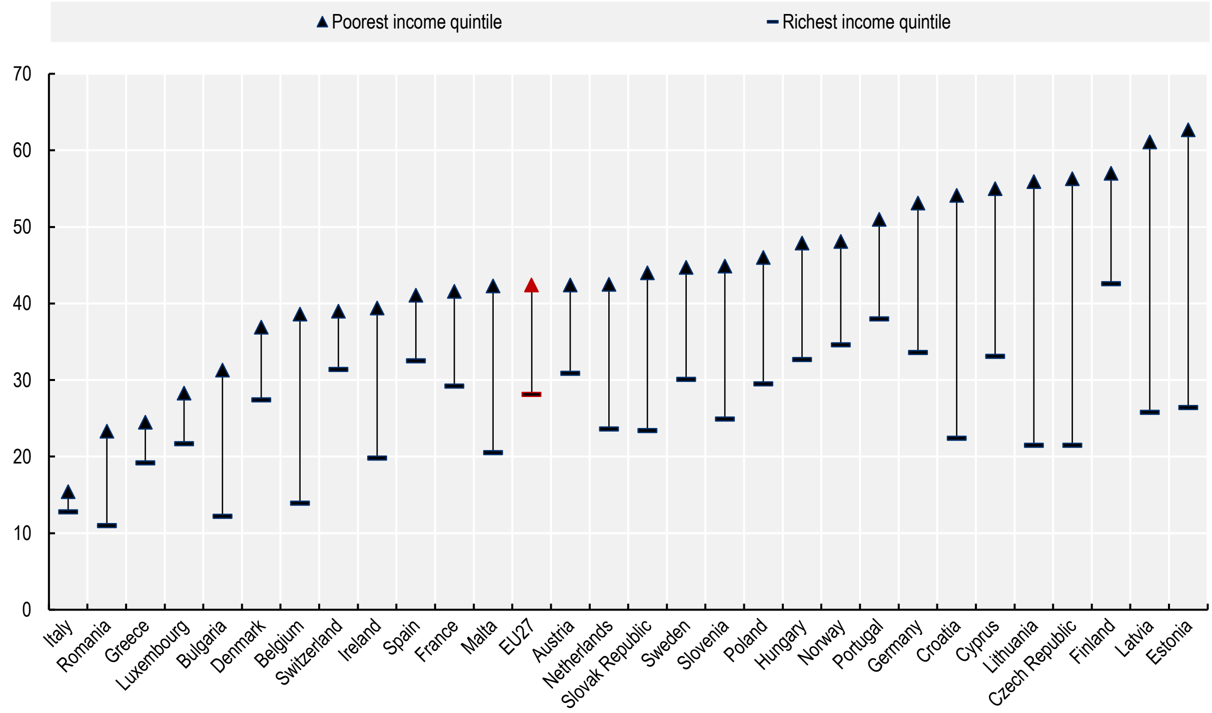


Note: Question asked was “How often do you exercise or play sport?”; regularly: at least 5 times a week; with some regularity: at least once a week; seldom: less than once a week.
Source: OECD/WHO (2023[6]), *Step Up! Tackling the Burden of Insufficient Physical Activity in Europe*, https://doi.org/10.1787/500a9601-en.

Riskier lifestyle behaviours mean vulnerable populations are more likely to live with one or more chronic health conditions. For the reasons outlined above, vulnerable populations are more likely to live with one or more chronic conditions. For example, a recent study by Mair and Jani (2020[7]) found that, after adjusting for lifestyle factors, those with low socio-economic status are at an increased risk of developing 18 of the 56 major diseases and health conditions compared to advantaged groups. This is reflected by data from EU27 countries showing that the proportion of people who report living with a long-standing illness or health problem is 15 percentage points higher among those living in the poorest income quintile compared to those in the richest quintile (43% versus 28%) (Figure 2.4).

Figure 2.4. The proportion of people with a long-standing illness or health problem by income quintile

Data for EU27 countries in 2020, or the latest year



Source: Eurostat (2022[8]), "Database – Eurostat", https://ec.europa.eu/eurostat/data/database.

Despite having greater healthcare needs, vulnerable populations are less likely to access healthcare services. For example, certain vulnerable populations are less likely to utilise preventative care services such as cancer screening as well as digital tools due to low levels of digital health literacy and issues accessing the internet. Furthermore, vulnerable populations may experience barriers to accessing care due to financial reasons, waiting times as well as difficulties navigating the healthcare system (see Box 2.1 for further details) (OECD, 2019[9]).

Box 2.1. Vulnerable populations and access to healthcare

Among OECD countries, vulnerable populations are less likely to access healthcare services. For example:

- Differences in **screening rates** between the highest and lowest income quintile for cervical, breast and colorectal cancer are 17, 13 and 6 percentage points, respectively (with rates higher for those in the top income quintile) (OECD, 2019[9]).
- Nearly all individuals in the highest income quartile (97.6%) **used the internet to access healthcare services** in the past three months compared to 78% in the lowest income quartile (OECD, 2019[10]). There are similar differences when measuring access to broadband internet at home.
- 72% of people in the highest income quintile have **visited a general practitioner** (GP) in the past 12 months compared to 67% of those in the lower income quintile after adjusting for needs. There are similar differences when measuring access to specialist care (OECD, 2019[9]).

Vulnerable populations are therefore less likely to benefit from policy changes that improve the delivery of care.

In response to rising complex health needs, countries are transitioning towards integrated care models

Uncoordinated care is particularly problematic for patients with complex health needs. People with complex health needs require care from different providers across multiple healthcare settings, as well as informal care. For example, a patient with type 2 diabetes and hypertension may require care from a general practitioner (GP), an endocrinologist, a dietician, a cardiologist, and a practice nurse. Without proper care integration, such patients may try to address their unmet needs by using "excessive health and social services in an uncoordinated way" (Hudon et al., 2018[11]). Not only does this worsen a patient's experience, but it is also costly and sometimes dangerous. For example, a study in the United States by Frandsen et al (2015[12]). found that high levels of care fragmentation were associated with an increase in expenditure equivalent to USD 4 542 (EUR 4 180) per patient between the years 2004-08. Further, patients who experienced high levels of care fragmentation were less likely to receive care considered clinical best practice and had higher rates of preventable hospitalisations (Frandsen et al., 2015[12]).

> *"Uncoordinated care is a particular problem for people with chronic conditions that require care and support, many of whom have multiple conditions associated with complex social needs." (OECD, 2020[13])*
>
> *"Persons with multi-morbidity often require care from multiple professionals within the healthcare and social care sectors. In a fragmented care system, this creates conflicting, overly-demanding, treatment advice that may discourage compliance." (Leijten et al., 2018[14])*

To improve quality and efficiency, countries are seeking to deliver integrated care to patients with complex health conditions. Patients with complex health needs incur higher costs; in the United States, 71% of healthcare spending comes from patients with at least two chronic conditions, despite comprising just over a quarter of the total population (Chapel et al., 2017[15]; Boersma, Black and Ward, 2020[16]). At the individual level, the cost of multimorbidity varies widely depending on factors such as disease combination as well as the country. In a recent meta-analysis, Tran et al. (2022[17]) estimated the annual, per person cost of multimorbidity between USD 800 and USD 150 000 (using international dollars). These figures are likely conservative given costing studies typically exclude societal costs such as a reduction in work productivity[3] for the patient and their carer(s). Higher costs and worse health outcomes and experiences have prompted policy makers to find better ways of delivering care to patients with complex health needs. Specifically, by delivering integrated, patient-centred care.

The remainder of this chapter defines what constitutes integrated care and its objectives, prominent taxonomies used to classify different integrated care models, and the link between integrated care and patient-centredness.

What is integrated care?

Integrated care represents a significant change in the way healthcare services are designed and delivered. For this reason, the term has no agreed interpretation (Goodwin, Stein and Amelung, 2021[18]). Commonly applied definitions in OECD and EU27 countries are listed in Table 2.1.

Table 2.1. Commonly used integrated care definitions

Author	Definition
Leijten et al. (2018[14])	"Integrated care is defined as structured efforts to provide co-ordinated, pro-active, person-centred, multidisciplinary care by two or more well-communicating and collaborating care providers either within or across sectors"
WHO Regional Office for Europe (2016[19])	"Integrated health services delivery is defined as an approach to strengthen people-centred health systems through the promotion of the comprehensive delivery of quality services across the life-course, designed according to the multidimensional needs of the population and the individual and delivered by a co-ordinated multidisciplinary team of providers working across settings and levels of care. It should be effectively managed to ensure optimal outcomes and the appropriate use of resources based on the best available evidence, with feedback loops to continuously improve performance and to tackle upstream causes of ill health and to promote well-being through intersectoral and multisectoral actions"
Contandriapoulos et al. (2003[20])	"Integrated health services: health services that are managed and delivered so that people receive a continuum of health promotion, disease prevention, diagnosis, treatment, disease-management, rehabilitation and palliative care services, co-ordinated across the different levels and sites of care within and beyond the health sector, and according to their needs throughout the life course"
Lewis et al. (2010[21])	"I can plan my care with people who work together to understand me and my carer(s), allow me control, and bring together services to achieve the outcomes important to me"
Kodner and Spreeuwenberg (2002[22])	"Integration is a coherent set of methods and models on the funding, administrative, organizational, service delivery and clinical levels designed to create connectivity, alignment and collaboration within and between the cure and care sectors. The goal of these methods and models is to enhance quality of care and quality of life, consumer satisfaction and system efficiency for people by cutting across multiple services, providers, and settings. Where the result of such multi-pronged efforts to promote integration lead to benefits for people, the outcome can be called 'integrated care"

What are the objectives of delivering integrated care?

At a high-level, integrated care models aim to achieve the following five objectives ("Quintuple aim") (Nundy, Cooper and Mate, 2022[23]):

- Improve patient experiences of care (including quality and satisfaction)
- Improve population health
- Reduce the per capita cost of healthcare
- Improve the work-life balance of healthcare providers
- Advance health equity.

What types of integrated care models are there?

Integrated care models come in many forms. This section summarises key taxonomies of integrated care. These include taxonomies developed by the World Health Organization (WHO), the EU and the King's Fund (United Kingdom).

World Health Organization (WHO)

As part of the 2016 working document, the WHO developed a taxonomy of integrated care comprised of four types of integration: organisational, functional, service, and clinical (Table 2.2). The taxonomy was adapted from Lewis et al. (2010[21]). One integrated care model may include several types of integration.

Table 2.2. WHO taxonomy of integrated care models

Integrated care model type	Definition
Organisational	"Integration of organisations are brought together formally by mergers or through 'collectives' and/or virtually through co-ordinated provider networks or via contacts between separate organisations brokered by purchaser"
Functional	"Integration of non-clinical support and back-office functions, such as electronic patient records"
Service	"Integration of different clinical services at an organisational level, such as through teams of multidisciplinary professionals"
Clinical	"Integration of care delivered by professional and providers to patients into a single or coherent process within and/or across professions, such as through use of shared guidelines and protocols"

Source: WHO (2016[19]), *Integrated care models: an overview*.

The WHO taxonomy aligns closely with the four types of integration outlined by Nolte and Pitchforth (Nolte and Pitchforth, 2014[24]).

SELFIE (Sustainable Integrated Care Models for Multimorbidity: delivery, financing, and performance)

The EU-funded Horizon 2020 project, SELFIE, developed a conceptual framework for integrated care specific to multimorbidity.[4] The different types of integrated care models (or integrated care concepts) are grouped into one of six components: service delivery, leadership and governance, workforce, financing, technologies and medical products, and information and research. The models in each of these components are further categorised as to whether the model exists at the micro-, meso- or macro-level. A few examples are listed below:

- **Multidisciplinary care teams** are a micro-level workforce integrated care model
- **Developing a culture of share vision, ambition and values** is a meso-level leadership and governance integrated care model
- **Policies to integrate care across organisations and sectors** is a macro-level service delivery integrated care model.

Integrate Framework

As part of the EU-funded "Project Integrate", Calciolari et al. (2016[25]) developed a conceptual framework outlining the key dimensions and associated items related to integrated care (Table 2.3). Several of these dimensions overlap with the framework developed by the WHO (e.g. functional integration).

Table 2.3. Project Integrate: dimensions of integrated care

Dimension	Example aligning items*
Person-centred care "Perspective of improving someone's overall well-being – and not focusing solely on a particular condition/disease – through the active engagement of service users (patients, carers, etc.) as partners in care."	Shared decision-making Shared care planning Patient access to their healthcare record
Clinical integration "How care services are co-ordinated and/or organised around the needs of service users."	Assigned care co-ordinators Care professionals work together to undertake care assessments and planning
Professional integration "The existence and promotion of partnerships between professionals to work together (e.g. in teams)."	Formal agreements to support collaborative work between health professionals Multidisciplinary care teams
Organisational integration "How providers come together to deliver care services in a linked-up fashion across partner organisations"	Use of measures and indicators to monitor outcomes and performance Shared strategic objectives and written policies or procedures to promote integrated care
Systemic integration "How the care system provides an enabling platform for integrated care, such as through the alignment of key systemic factors" (e.g. financing mechanisms)	The care system aligns its regulatory framework with the goals of integrated care National and regional policies proactively support multi-sectoral partnerships and person-centred care
Functional integration "The capacity to communicate data and information effectively within an integrated care system"	A unique patient identifier that is used across the health and social care system Decision support systems foster shared decision-making
Normative integration "The extent to which different partners in care developed and shared a common reference frame (e.g. vision, norms, values) on care integration"	Existence of a collective vision of person-centred, holistic care Presence of leaders with a clear and common vision of integrated care

Note: *Not all aligning items are outlined in this table.
Source: Calciolari et al. (2016[25]), "The Project Integrate Framework", http://projectintegrate.eu.com/wp-content/uploads/2017/04/The-Project-Integrate-Framework-TOP.pdf.

Other

Other classifications of integrated care include:

- **Horizontal versus vertical integration**: horizontal integration refers to co-ordination that occurs at the same stage of care delivery (e.g. mergers across hospitals). Conversely, vertical integration refers to when two or more organisations or services delivering care at different levels come together. These types of integration are not mutually exclusive, with many programs addressing both vertical and horizontal integration.
- **Levels of integration**: Curry and Ham (2010[26]) distinguish between different levels of integration:
    - *Macro-level*: where providers seek to deliver integrated care to the populations they cover
    - *Meso-level*: where providers seek to deliver integrated care for a particular population (e.g. disease management programs)
    - *Micro-level*: providers seek to deliver integrated care to individual patients and their carers through care co-ordination, planning and use of technology, for example.

How does integrated care promote patient-centredness?

Given the importance of incorporating peoples' voices into the development of health systems, countries are increasingly interested in delivering patient-centred care (OECD, 2021[1]). Specifically, care that is "respectful of, and responsive to, individual patient preferences, needs and values, and ensures values guide all clinical decisions" (Goodwin, Stein and Amelung, 2021[18]).[5]

An important dimension of patient-centred care is care integration (see Box 2.2) (OECD, 2020[13]). Specifically, patient-centred care requires a “good flow of information and consistency of decisions across different levels of care in the health system, including primary healthcare settings, specialist settings and hospitals” (OECD, 2020[13]). Failing to co-ordinate care leads to patients repeating information and diagnostic tests, receiving conflicting information, and experiencing a breakdown of care when transitioning between providers, all of which worsen patient experiences and outcomes. Among selected case studies, there are several examples of how integrated care models promote patient-centredness. For example, in Finland, the City of Oulu’s patient-provider portal promotes information sharing between patients, and primary and social care professionals (see Chapter 5). Further, the integrated care model for multimorbidity in the Basque Country, Spain, utilises unified electronic health records (EHRs), which are accessible to all health professionals, as well as a “Personal Health Folder” that gives patients access to their data (see Chapter 6).

Box 2.2. OECD Framework for People-Centred Health Systems

The OECD Framework for People-Centred Health Systems includes five dimensions – voice, choice, co-production, **integration,** and respectfulness

- *Voice*: People have a formal role in health policy decision-making bodies or processes
- *Choice*: People have a choice of healthcare providers; people do not face barriers to access
- *Co-production*: People are given accessible information during care; people are consulted about their care; people are engaged in their care; people use digital tools to engage with their health and with the health system
- *Integration:* digital technology is used for the integration of care; electronic clinical records are used; people experience integrated and co-ordinated care
- *Respectfulness*: people receive high personal attention during care; people feel the treatment is fair; people are treated with respect by health professionals.

These dimensions allow policy makers to methodically analyse people-centredness within the health sector.

Source: OECD (2021[27]), *Health for the People, by the People: Building People-centred Health Systems*, https://doi.org/10.1787/c259e79a-en.

To address the social determinants of health, integration is needed across the health, social and long-term care settings, as well as in the home and community. For example, equitable access to housing, education, and nutritious foods, among others. Further, any effort to promote integration must consider the role of informal carers given they are responsible for a significant amount of care for older persons and persons with disabilities.

As highlighted by the COVID-19 pandemic, patient-centred, integrated care models improve the resilience of healthcare systems

The COVID-19 pandemic highlighted the need to deliver patient-centred, integrated care. COVID-19 saw a rapid surge in demand for treating acutely ill patients. To maintain preventive care services as well as manage care for patients with chronic conditions, countries introduced several policies that altered the delivery of healthcare. For example, many OECD and EU27 countries implemented policies that promote the use of digital tools to promote patient-centred, integrated care such as telemedicine, ePrescriptions, and hospital-at-home services.

Selected case studies for this review provide real-world examples of digital integrated care models used during the pandemic. Example case studies include the Finnish City of Oulu's patient-provider portal, the Hospital-at-Home Programme in Catalonia, Spain, TeleHomeCare for patients with chronic conditions in the Italian city of Ceglie Messapica, and Telemonitoring for patients with advanced heart failure in Oloumuc, the Czech Republic. These case studies require countries to have advanced digital health systems, a workforce with the necessary skills to deliver digital care, as well as a population with access to digital tools and broadband internet access (for further details see Chapter 1: "Digital tools and health information systems").

Policies, such as those outlined above, play a key role in **making health systems more resilient against future shocks**.

Despite efforts to promote integrated care, co-ordination among providers is often fragmented

Countries have implemented national policies to promote integrated care. These include policies related to the key dimensions of integrated care, namely financing, the workforce, and digital tools and health information systems. A summary of the policy landscape across OECD countries is in Table 2.4. Please note, the analysis only includes indicators where there is data for a significant number of OECD countries.

Table 2.4. Integrated care: Policy landscape across OECD countries

A darker shade indicates a stronger policy response to promote integrated care

Country	Financing	Workforce	Digital tools and health information systems	
	Financial incentive for co-ordination	Policies to strengthen the primary healthcare workforce	Share (%) of primary care physicians using electronic heath records	Computers used by primary care physicians to prescribe, refer, and make orders**
Australia	Bundled payments & add-on payments*	Concrete measures	96.2	High
Austria	Add-on payments	Concrete measures	80.0	High
Belgium	Bundled payments	Concrete measures	..	..
Canada	Bundled payments & add-on payments	Concrete measures	77.2	Low
Chile	..	..	65.0	High
Colombia	..	..	..	..
Costa Rica	..	Concrete measures	..	..
Czech Republic	..	Planned	77.6	Low
Denmark	Add-on payments	..	100.0	High
Estonia	..	Concrete measures	99.0	High
Finland	..	..	100.0	High
France	Bundled payments, population-based financing & add-on payments	Concrete measures	80.0	Low
Germany	Population-based financing & add-on payments	Concrete measures	..	..
Greece	..	Planned	100.0	High
Hungary	..	..	..	..
Iceland	Add-on payments	Concrete measures	100.0	Medium
Ireland	..	Planned	95.0	High

Country	Financing	Workforce	Digital tools and health information systems	
	Financial incentive for co-ordination	Policies to strengthen the primary healthcare workforce	Share (%) of primary care physicians using electronic heath records	Computers used by primary care physicians to prescribe, refer, and make orders**
Israel	Add-on payments	Concrete measures	100.0	High
Italy	Bundled payments & add-on payments	Concrete measures	..	Medium
Japan	..	..	..	..
Latvia	..	Planned	70.0	Low
Lithuania	..	Concrete measures	..	..
Luxembourg	..	Concrete measures	..	Low
Mexico	Add-on payments	Concrete measures	..	..
Netherlands	Bundled payments	Concrete measures	..	High
New Zealand	..	..	..	..
Norway	Bundled payments & add-on payments	Concrete measures	100.0	High
Poland	..	..	30.0	..
Portugal	..	..	..	High
Republic of Korea	..	Planned	..	..
Slovak Republic	..	Planned	89.0	..
Spain	..	..	99.0	High
Slovenia	..	Concrete measures	..	Medium
Sweden	Add-on payments	No plan	100.0	High
Switzerland	..	Planned	40.0	Medium
Türkiye	..	Concrete measures	..	Medium
United Kingdom	..	Concrete measures (England)	99.0	High
United States	Population-based financing	..	83.0	..

Note: *Add-on payments may be for co-ordination or prevention. **Composite indicator based on country responses to six questions. Each question refers to whether 75% or more of primary care physicians use computers for each of the following tasks: (1) making appointments, (2) ordering laboratory tests, (3) sending referral letters to specialists, (4) issuing drug prescriptions, (5) receiving alerts or prompts about drug dose or drug interaction, and (6) sending prescriptions to pharmacy. Countries are scored on a 1-3 (low to high) scale depending on the number of areas in which primary care practitioners use a computer. To establish three groups with a similar number of countries, countries with zero to four affirmative responses were given a score of one, countries with five affirmative responses were given a score of two, and countries with six affirmative responses were given a score of two. ".." means there is no data for that country.

Source: OECD (2021[27]), "Health for the People, by the People: Building People-centred Health Systems", https://doi.org/10.1787/c259e79a-en; OECD (2020[13]), "Realising the Potential of Primary Healthcare", https://doi.org/10.1787/a92adee4-en.

Despite efforts to promote integration, care models continue to be disease-focused and tailored to younger, healthier populations. Offering integrated, patient-centred care is a key policy priority among OECD and EU27 countries. As a result, several, mainly local level, integrated care models have emerged. Many of these models have shown great promise. Nevertheless, predominant models of care remain disease-focused and for this reason, disproportionately benefit younger patients to restore them to full health. See Box 2.3 for data summarising the level of care co-ordination among OECD and EU27 countries.

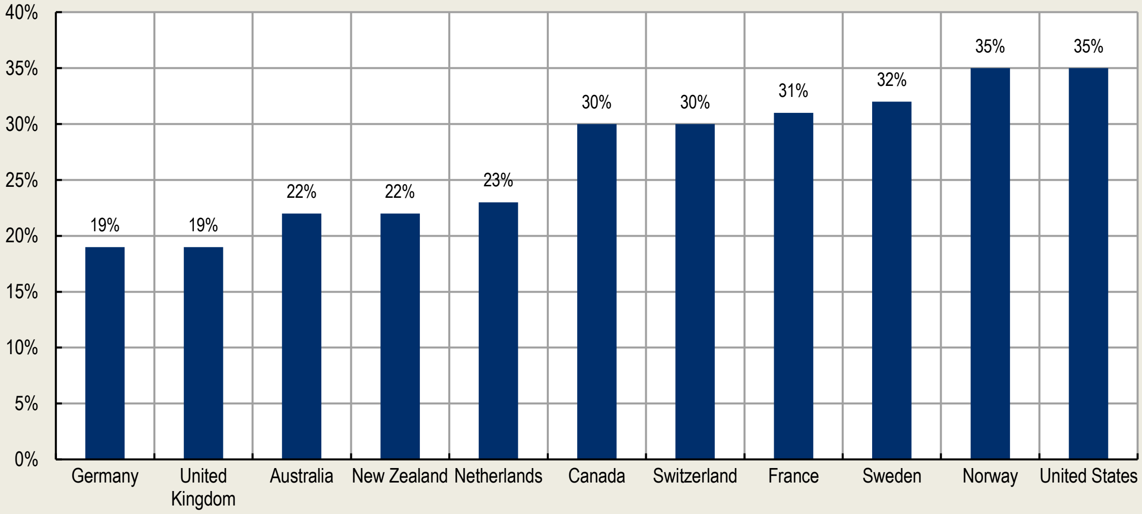
Box 2.3. Data measuring levels of care co-ordination among OECD and EU27 countries

There are several indicators to measure the level of care co-ordination in OECD and EU27 countries. This box presents salient indicators from both a patient and provider perspective.

Patient perspective

Figure 2.5 shows results from a 2016 survey of adult patients in 11 OECD countries. Results from the survey show around one-third (27%) of patients experienced care co-ordination problems. This was due to issues such as duplicate tests ordered, the specialist not having the patient's medical history, and/or receiving conflicting information from different doctors (The Commonwealth Fund, 2016[28]).

Figure 2.5. The proportion of patients who experienced a problem with care co-ordination*



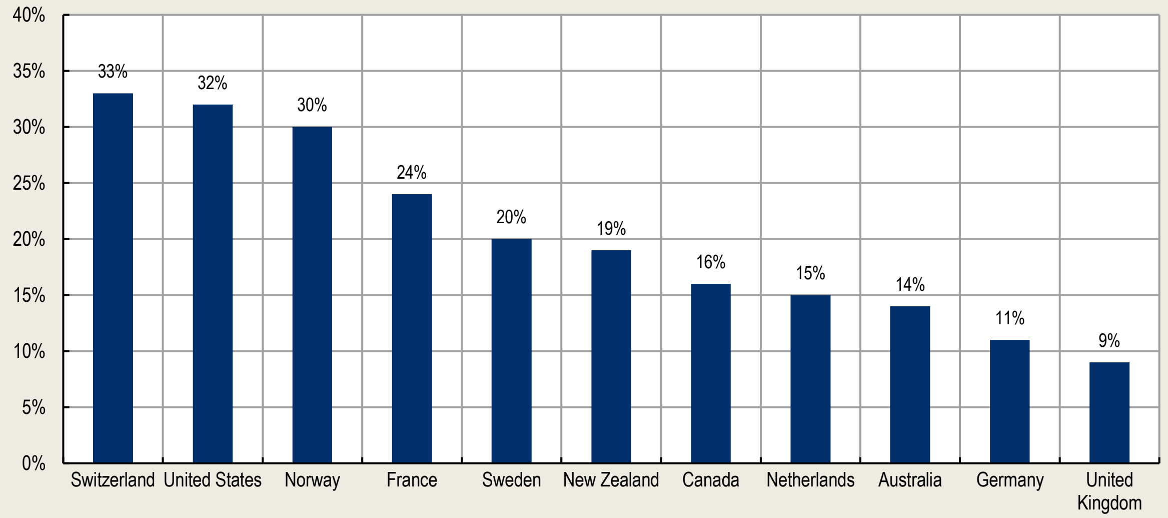
Note: *Care co-ordination issues include: test results/records not being available at appointment or duplicate tests ordered; specialist lacking medical history or regular doctor not informed about specialist care; and/or receiving conflicting information from different doctors or healthcare professionals in the past two years.
Source: The Commonwealth Fund (2016[28]), "Commonwealth Fund 2016 International Health Policy Survey of Adults in 11 Countries", https://www.commonwealthfund.org/publications/surveys/2016/nov/2016-commonwealth-fund-international-health-policy-survey-adults.

Provider perspective

Figure 2.6 shows that, on average, just one in five primary care physicians receive results from the patient's specialist within one week with data ranging from 9% in the United Kingdom to 33% in Switzerland. Other results from the same survey are summarised below:

- Just over half (56%) of primary care physicians are informed about changes to a patient's medication or care plan
- Only a third (34%) of primary care physicians receive the necessary information to treat a patient once they have been discharged from the hospital within two days.

Figure 2.6. The proportion of primary care physicians who usually receive results from specialists within one week



Source: The Commonwealth Fund (2019[29]), "2019 Commonwealth Fund International Health Policy Survey of Primary Care Physicians", https://www.commonwealthfund.org/sites/default/files/2019-12/PDF_2019_intl_hlt_policy_survey_primary_care_phys_CHARTPACK_12-10-2019.pdf.

Fragmented healthcare continues for several reasons. These include organisational and financial structures that do not support integrated care, and underutilisation of digital tools (OECD, 2021[27]; OECD, 2017[30]). For example, population-based payment models that pay a set of providers a lump payment (e.g. every month or year) to serve patients in the population-based network have been shown to incentivise care co-ordination as well as disease prevention activities (see "Governance and Financing" under Chapter 1 for further details and Chapter 3 for a real-world example) (OECD, 2020[13]). Despite this, only three OECD countries have population-based payment models in place (i.e. France, Germany and the United States). Regarding digital tools, data on the use of computers in primary care for tasks related to care integration as well as the share of primary care physician offices using EHRs indicate there is room for improvement (Box 2.4).

Box 2.4. Use of digital health technologies to co-ordinate care

This box outlines two key indicators measuring the use of digital health technologies to promote care co-ordination. Both indicators are collected from the primary care sector.

Use of indicators in primary care for tasks related to care integration

Fifteen out of 25 OECD countries with available data state that at least 75% of primary care physicians use computers to complete tasks that promote care co-ordination – e.g. making appointments, issuing prescriptions, ordering laboratory tests, sending referrals, sending prescriptions to pharmacies, and being alerted of drug dose or drug interaction issues.

Share of primary care physician offices using electronic clinical records

Among a selection of 10 OECD countries, nine have primary care offices that use EHRs as of 2021, which represents an increase from 70% in 2012. Despite progress, linking EHRs across the healthcare system has been slow, with primary care often excluded.

Source: OECD (2021[27]), *Health for the People, by the People: Building People-centred Health Systems*, https://dx.doi.org/10.1787/c259e79a-en.

Integration is also a problem between the health and social care system. Previous work by OECD in areas such as dementia, cancer, and cardiovascular diseases (CVDs) has highlighted the need to address care fragmentation between health and social care systems (Barrenho et al., 2022[31]). Data from the Commonwealth Fund's survey of primary care physician supports the need to improve co-ordination between health and social care systems (The Commonwealth Fund, 2019[29]):

- Less than half (45%) of primary care physicians report frequently co-ordinating with social services or community providers, with the figure as low as 12% in Sweden
- On average, less than a third (30%) of primary care physicians noted a lack of a referral system or mechanism to make referrals to social care services
- Around 40% of primary care physicians noted a lack of follow-up from social service organisations about the services patients received or needed.

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Notes

[1] For adults, WHO define overweight and obesity as having a BMI >=25Kg/m^2 and 30Kg/m^2, respectively. BMI is the most widely used proxy for body adiposity to assess population-level rates of overweight, as it is easily derived from a person's weight and height (i.e. weight (kg) divided by height in metres squared).

[2] There is no single definition of what constitutes being in a vulnerable group, however, in general it includes the following: lower incomes, lower education levels, living in rural/remote areas, or part of an ethnic minority group (OECD, 2022[32]).

[3] Loss of productivity is caused by absenteeism, presenteeism, disability and premature mortality.

[4] A diagrammatic overview of the framework is available using this reference (Leijten et al., 2018[14]).

[5] Similar to the concept of "integrated care", there is no single definition of "patient-centred care". Several other definitions exist, including those outlined (Goodwin, Stein and Amelung, 2021[18]).

3

OptiMedis, regionally based integrated care model

This chapter covers the OptiMedis integrated care model operating in certain regions in Germany (and is a “good practice” within the EU Joint Action on implementation of digitally enabled integrated person-centred care). The case study includes an assessment of the OptiMedis model of care against the five best practice criteria, policy options to enhance performance and an assessment of its transferability to other OECD and EU27 countries.

OptiMedis regionally based integrated care model: Case study overview

Description: The OptiMedis integrated care model emerged in 2005 following reforms in Germany to promote care co-ordination. The model of care, which operates in the west (state of Hesse) and south-west region (state of Baden-Württemberg) of Germany, aims to improve patient experiences and population health, while reducing per capita costs. A key feature of the care model is its “shared savings contract”, which incentivises the delivery of high-quality, preventative care. As part of this contract, positive differences between the money sickness funds receive from the country’s central payment authority and the mean costs of all insurees is shared between the sickness funds and OptiMedis (a healthcare management company).

Best practice assessment:

OECD best practice assessment of the OptiMedis integrated care model

Criteria	Assessment
Effectiveness 🏅	Implementing the OptiMedis integrated care model across Germany is estimated to lead to an increase of 146 441 life years (LYs) and 97 558 disability-adjusted life years (DALYs) by 2050 Transferring OptiMedis to the eligible population across EU27 countries is estimated to result in 9.7 LYs and 6.5 DALYs gained per 100 000 people on average per year between 2022 and 2050
Efficiency 🏅	Over the modelled period, 2022-50, the OECD-SPHeP NCD model estimates that OptiMedis would lead to cumulative health expenditure savings of EUR 3 470 per person Average annual health expenditure (HE) savings as a proportion of total HE is estimated at 4%, on average, across EU-27 countries
Equity	The OptiMedis model of care offers outreach services to patients through access to health coaches, healthcare navigators or access to a Health Kiosk. This Kiosk provides tailored health and social advice in multiple languages (currently only available in the City of Hamburg). Core features of the integrated care model aim to reduce inequalities, for example, by standardising care pathways. Given complex health needs are more prominent among disadvantaged groups, the integrated care model has the potential to disproportionately benefit such groups, given such patients voluntarily enrol.
Evidence-base	Studies evaluating the effectiveness and efficiency of OptiMedis used strong methods for data collection and analysis.
Extent of coverage	Approximately one-third of eligible residents are enrolled in the OptiMedis integrated care model (data for health professionals is not available)

Enhancement options: to enhance the performance of the OptiMedis model and other population-based integrated care models, policy makers could consider ways to better target patients at high-risk of complex health needs**.** This will allow patients to access preventative programs sooner leading to better health outcomes while lowering costs. Other policies include, but are not limited to, expanding programs targeting disadvantaged groups and applying more rigorous methodologies to future evaluation studies.

Transferability: The OptiMedis model exists in the west (state of Hesse) and south-west (state of Baden-Württemberg) of Germany, and there are discussions to expand it to other regions in the country. Any future implementations should incorporate the core features of the model, such as obtaining long-term contracts. Although not yet transferred to regions outside Germany, underlying features that support the model exist in most OECD countries – e.g. preventative care, case management, and electronic patient data sharing. Further, there are active discussions to transfer this model of care to Belgium and France.

Conclusion: OptiMedis is a population-based integrated care model operating in parts of Germany. The model has the potential to increase life years and disability-adjusted life years gained, while simultaneously reducing healthcare costs. Feedback from OptiMedis administrators indicate the model can be successfully transferred in other regions with different populations and health service arrangements.

Intervention description

This section outlines Germany's healthcare system, at a high level, followed by a description of the OptiMedis model.

Germany's healthcare system

Germany operates a compulsory social health insurance. In the late 19th century, Germany introduced the world's first social health insurance (SHI) system, built on the foundation of solidarity. Today, the majority of residents within the country are required to obtain SHI from one of the 103 sickness funds. However, those who earn over a certain income (i.e. EUR 62 550) and certain professionals (e.g. self-employed and civil servants) can opt out and purchase health insurance instead. As of 2020, 87% of residents are covered by SHI with the remaining 11% opting for private insurance (the remaining 2% are covered by special programs) (Blümel et al., 2020[1]).

Germany has a world-class healthcare system, but it is expensive. Residents living in Germany have access to universal health insurance, which covers a comprehensive set of benefits with minimal cost-sharing. For this reason, the healthcare system is highly regarded. Nevertheless, it is relatively expensive with health expenditure comprising 11.7%[1] of gross domestic product (GDP). Among OECD countries, this figure is only surpassed by the United States (16.8%) (OECD, 2020[2]).

Relatively high healthcare expenditure has not translated into better health outcomes. For example, as of 2019,[2] life expectancy in Germany reached 81.4 years, which ranks it 24th among 38 OECD countries. Further, around two-thirds (66%) of the population report being in good health, which is lower than the EU average of 69% (OECD/European Observatory on Health Systems and Policies, 2021[3]).

A lack of co-ordination is considered one of the key reasons Germany's healthcare system has not performed as well as expected. Germany's healthcare system is complex with the separation of legislative, planning and regulatory power across different sectors – i.e. ambulatory, inpatient, long-term care, and public health (for full details see (Blümel et al., 2020[1])). For this reason, the healthcare system lacks co-ordination, which negatively affects service delivery and therefore health outcomes. Another factor contributing to Germany's overall performance is its reliance on secondary care. As an example, hospital admissions for asthma and chronic obstructive pulmonary disease (COPD) are above the EU average in Germany, indicating lack of effective primary care treatment and self-management support, as well as a focus on secondary treatment (OECD/European Observatory on Health Systems and Policies, 2021[3]). Consequently, the estimated cost of avoidable hospital admissions is over eight times higher than the OECD30 average (USD 7.2 million versus USD 0.84 million per year) (OECD, 2020[4]).

Germany introduced various policies to improve care co-ordination in recent years. Given the difficulty in implementing large scale, structural changes to the German healthcare system, policy makers have instead opted to implement a series of reforms that encourage care co-ordination. This includes the 2004 Social Health Insurance Modernisation Act, which "introduced a legal framework for integrated care provision and strengthened primary care" (Amelung et al., 2017[5]). Following this Act, a number of voluntary integrated care contracts emerged, which patients had the option of joining. One of the integrated care models to emerge was the OptiMedis regionally based integrated care model (hereafter, the OptiMedis model), which is the focus of this case study.

The OptiMedis model

The regionally based integrated care model by OptiMedis emerged in 2005. The model is driven by regional networks involving physicians and other stakeholders and aims to bring together healthcare providers at all levels of a determined region into one integrated network, while assuming accountability for the health and healthcare of the region's population. People can voluntarily enrol with the model who then have access to a wide range of healthcare interventions, ranging from disease management programs to discounts for exercise facilities.

Further information on the model's objectives, target population, governance and payment system, and interventions provided are summarised below.

Objectives

The OptiMedis model promotes care co-ordination across all sectors with a focus on prevention and introduces evidence-based interventions to address identified healthcare needs. Through doing so, it aims to achieve the following four objectives (also referred to as the "Quadruple aim approach"):

- Improve patient experiences of care (quality and satisfaction)
- Improve the health of the population
- Reduce the per capita cost of healthcare
- Improve work/life balance for healthcare providers.

Target population

People of all ages, regardless of their disease history, can enrol in the OptiMedis model where it is offered. Given the model's focus on co-ordination, it is particularly beneficial to individuals living with one or multiple chronic conditions who require care from several health professionals.

Governance and payment model

The OptiMedis model involves the creation of a regional integrator, an institution in charge of managing the network integration with a physical presence in the region and legally constituted as an enterprise. Healthcare providers in partnership with the network participate in the regional integrator in the capacity of partners, owners or associates (depending on the particular context) together with OptiMedis AG, a German healthcare management company with an expertise in management support, business intelligence and health data analytics.

A key feature of the OptiMedis model is the payment system, which is based on a "shared savings contract". The contract is drawn between the integrated network on one side and sickness funds on the other. As part of this contract, positive differences between expected costs[3] and the real healthcare costs of the population the network is accountable for are considered "savings" and are shared between the integrated network and sickness funds.

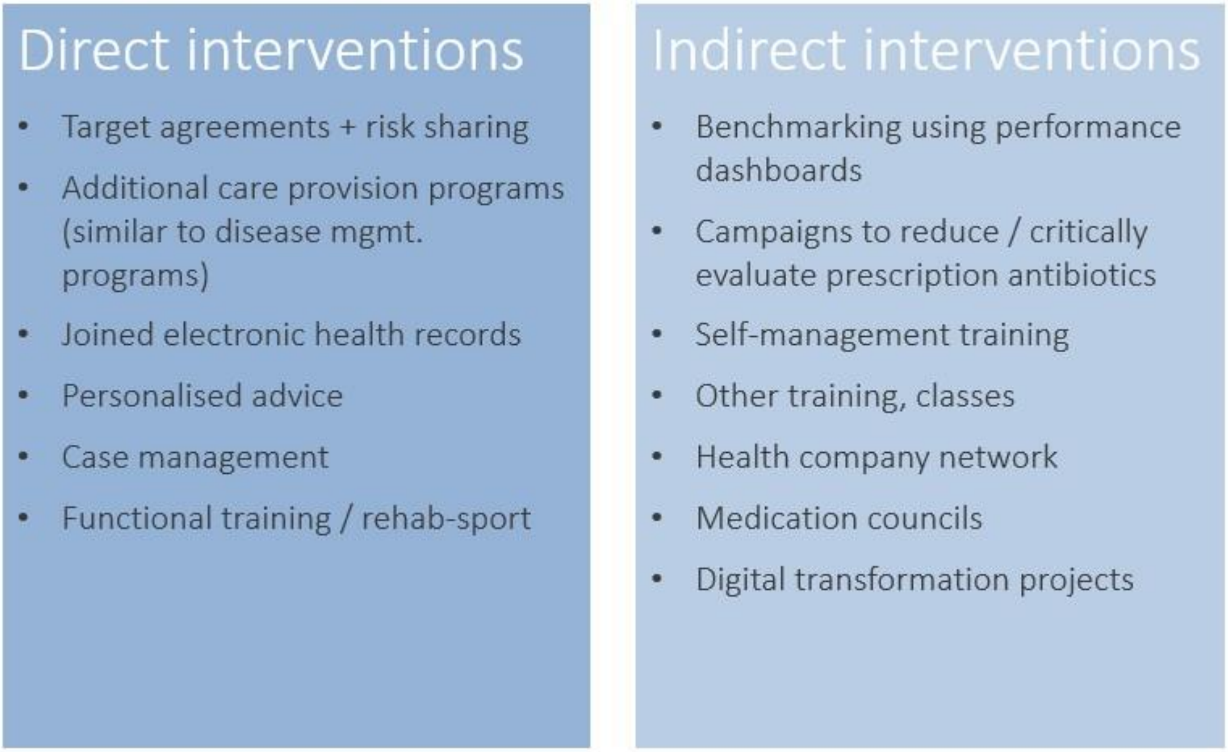
The share of savings received by the integrated network is used to finance integration efforts, including performance bonuses and operations of the regional integrator. Remaining profits are re-invested in the regional healthcare system.

To avoid an under provision of services as a way to generate savings, there are minimum quality standards that need to be complied with. The payment system, therefore, is designed so that there is a financial incentive to invest in delivering high-quality, efficient, preventative care.

Interventions provided

There are two types of value-creating interventions within the OptiMedis model: **direct interventions** for people that are enrolled within the model, and **indirect interventions**, directed at improving system efficiency through providers at all levels of care (i.e. primary, secondary, tertiary, and long-term care) that are part of the network and public health campaigns Figure 3.1). The latter are available for the entire population accounted for the by the integrated network.

Figure 3.1. Interventions provided by the OptiMedis model of care



Direct interventions

- Target agreements + risk sharing
- Additional care provision programs (similar to disease mgmt. programs)
- Joined electronic health records
- Personalised advice
- Case management
- Functional training / rehab-sport

Indirect interventions

- Benchmarking using performance dashboards
- Campaigns to reduce / critically evaluate prescription antibiotics
- Self-management training
- Other training, classes
- Health company network
- Medication councils
- Digital transformation projects

Each of the interventions listed are underlined by a common set of features, namely (The King's Fund, 2022[6]):

- Individual treatment plans and goal setting agreements between doctors and patients
- Enhancing patient self-management and shared decision-making
- Care planning based on the chronic care model, patient coaching and follow up care
- Providing the right care at the right time
- Overarching support through purposely designed system-wide electronic patient records and digital patient empowerment platforms. This is of particular interest given in Germany electronic sharing of patient data is relatively low (see Box 3.1).[4]

Box 3.1. Commonwealth Fund International Health Policy Survey of Primary Care Physicians

In 2019, the Commonwealth Fund surveyed 11 countries, including Germany, regarding the experience of physicians working in primary care. The questionnaire included several questions related to use of electronic patient data – results for Germany are summarised below:

- 12% of primary care physicians noted they are able to electronically exchange patient clinical summaries with doctors outside their practice
- 14% noted they are able to exchange lists of medications taken by a patient with doctors outside their practice
- 32% noted they are able to exchange laboratory and diagnostic test results with doctors outside their practice

For all three indicators, figures in Germany were the lowest among all surveyed countries.

Source: The Commonwealth Fund (2019[7]), "2 019 Commonwealth Fund International Health Policy Survey of Primary Care Physicians", https://www.commonwealthfund.org/sites/default/files/2019-12/PDF_2019_intl_hlt_policy_survey_primary_care_phys_CHARTPACK_12-10-2019.pdf,

OECD Best Practices Framework assessment

This section analyses the OptiMedis model against the five criteria within OECD's Best Practice Identification Framework – Effectiveness, Efficiency, Equity, Evidence-base and Extent of coverage (see Box 3.1 for a high-level assessment).

Box 3.2. Assessment of the OptiMedis model

Effectiveness

- Implementing the OptiMedis integrated care model across Germany is estimated to lead to an additional 146 441 life years (LYs) and 97 558 disability-adjusted life years (DALYs) by 2050
- Transferring OptiMedis to the eligible population across EU27 countries is estimated to result in 9.7 LYs and 6.5 DALYs gained per 100 000 people on average per year between 2022 and 2050

Efficiency

- Implementing the OptiMedis integrated care model across Germany is estimated to lead to cumulative health expenditure savings of EUR 3 470 per person by 2050
- Average annual health expenditure (HE) savings as a proportion of total HE is estimated at 4%, on average, across EU-27 countries

Equity

- The Health Kiosk offers tailored health and social support, for example on healthy living and employment services, and is offered in multiple languages (e.g. Arabic). In rural areas the Health Kiosk provides low-threshold health information and navigation.

- Core features of the OptiMedis model help reduce existing health inequalities, such as standardising care pathways across the whole population
- The OptiMedis model may disproportionally benefit patients with a lower socio-economic status given rates of morbidity are higher in this group

Evidence-base

- A study by Schubert et al. (2016[8]) measuring the impact of the OptiMedis model of care on mortality was used to estimate gains in effectiveness when scaling-up OptiMedis across Germany. This study used strong data collection methods and controlled for confounding factors, however, the control group was not randomised.

Extent of coverage

- According to data from the OptiMedis model operating in the region of Kinzigtal, approximately one-third of eligible residents voluntarily enrol with this model of care.

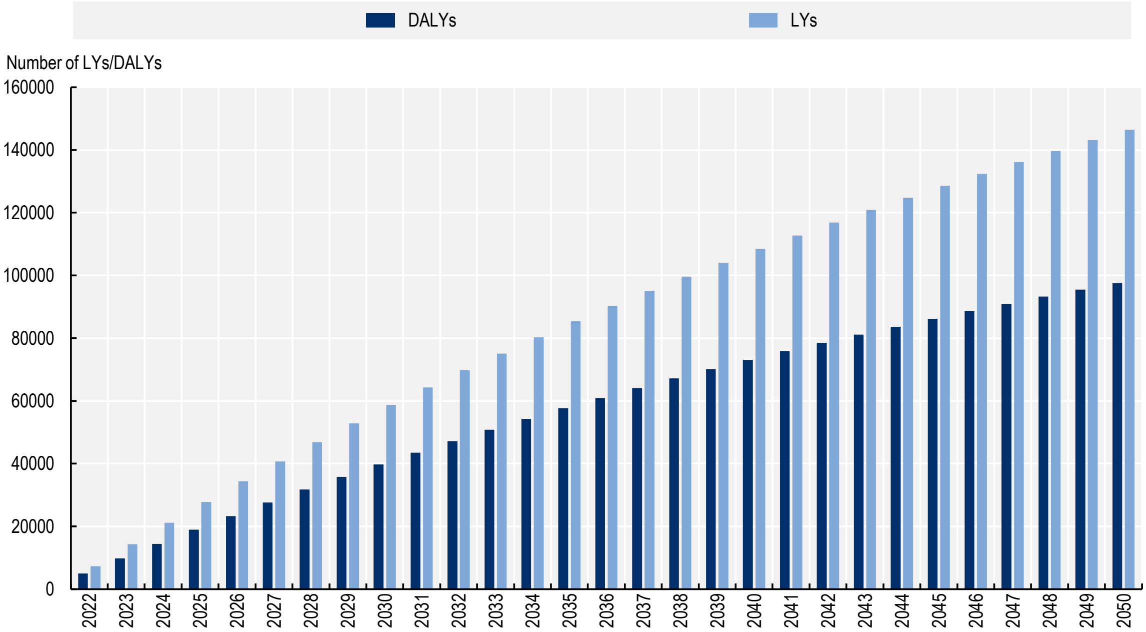
Effectiveness

This section on effectiveness presents the long-term health impact of the OptiMedis model in Germany as well as countries that are members of the OECD and EU27. The analysis relied on neural networks and microsimulation modelling by the OECD. Details on the methodology, including modelling assumptions, are in Annex 3.A.

Germany

Implementing the OptiMedis integrated care model across Germany is estimated to lead to an additional 146 441 life years (LYs) and 97 558 disability-adjusted life years (DALYs) by 2050.

Figure 3.2. Cumulative number of LYs and DALYs gained, 2022-50 – OptMedis, Germany

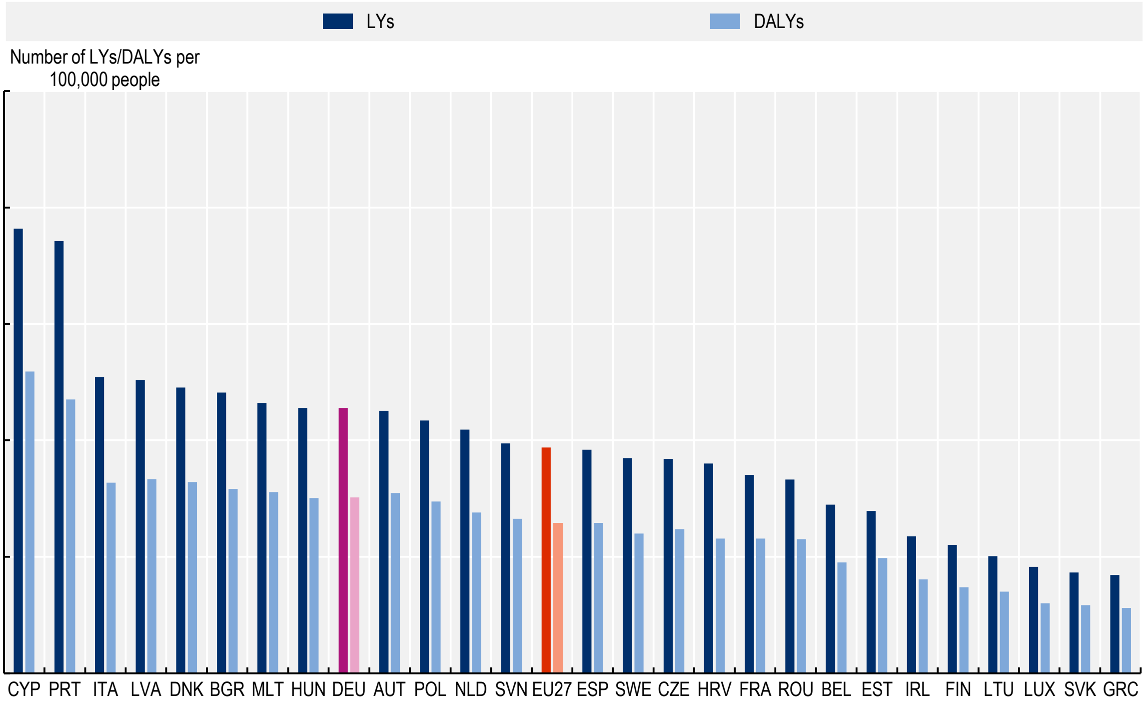


Source: OECD analysis based on neural networks and OECD's SPHeP-NCD microsimulation model.

EU-27 countries

Transferring OptiMedis to the eligible population across EU27 countries is estimated to result in 9.7 LYs and 6.5 DALYs gained per 100 000 people on average per year between 2022 and 2050 (Figure 3.3). OECD countries such as Portugal and Italy would experience the largest gain, while the effect is estimated to be lowest in Greece and the Slovak Republic.

Figure 3.3. LYs and DALYs gained per 100 000 people, 2022-50 – OptiMedis, EU27 countries



Source: OECD analysis based on neural networks and OECD's SPHeP-NCD microsimulation model.

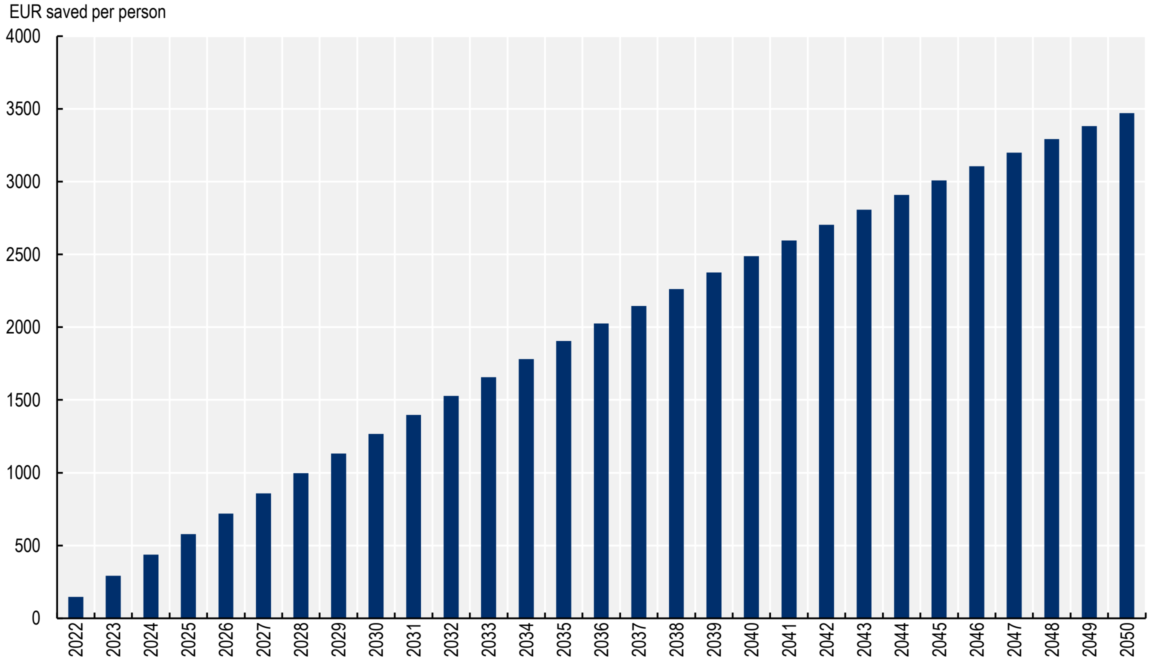
Efficiency

Like "Effectiveness", this section presents results for Germany followed by OECD and EU-27 countries.

Germany

Over the modelled period, 2022-50, the OECD-SPHeP NCD model estimates that OptiMedis would lead to cumulative health expenditure savings of EUR 3 470 per person (Figure 3.4).

Figure 3.4. Cumulative health expenditure savings per person, EUR, 2022-50 – OptiMedis, Germany

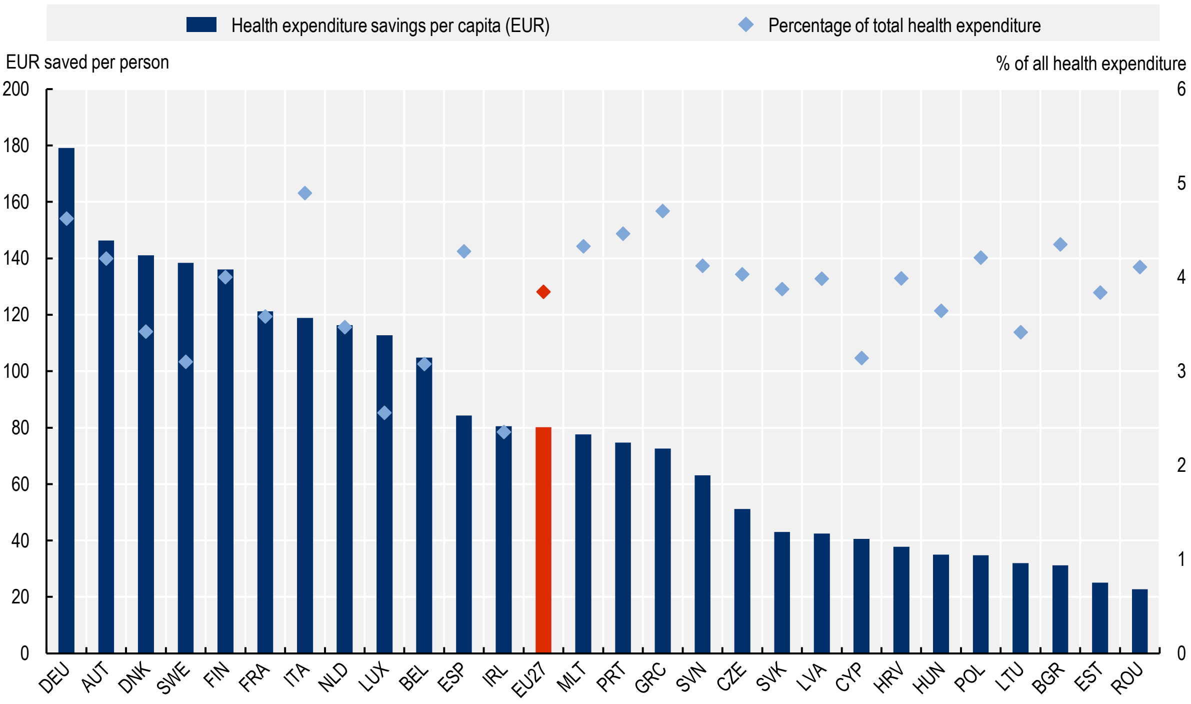


Source: OECD analysis based on neural networks and OECD's SPHeP-NCD microsimulation model.

EU-27 countries

Average annual health expenditure (HE) savings as a proportion of total HE is estimated at 4%, on average, across EU-27 countries. This translates into annual savings of EUR 80.14 for every person aged 20 years and over between 2022 and 2050, with figures ranging from EUR 23 in Romania to EUR 179 in Germany (Figure 3.5).

Figure 3.5. Health expenditure (HE) savings as a percentage of total HE and per capita (EUR), average 2022-50 – OptiMedis, EU27 countries



Note: Per capita costs reflect the population aged 20 years and over.
Source: OECD analysis based on neural networks and OECD's SPHeP-NCD microsimulation model.

Equity

Health Coaches, Healthcare Navigators, and the Health Kiosk are key interventions within the OptiMedis model, which aim to reduce health inequalities. The Health Kiosk was first introduced in the city of Hamburg, specifically in two boroughs where 70% of the population is comprised of migrants (compared to 13% across the whole country). The Health Kiosk caters to disadvantaged groups, such as migrants, by offering counselling services in a range of languages including Arabic, Farsi, Russian and Polish. At present, seven counsellors work within the Health Kiosk providing healthcare navigation and holistic counselling sessions related to health and social issues (e.g. nutrition, alcohol, smoking, employment and cultural integration). At present, the Health Kiosk only exists within Hamburg, however, a recent initiative aims to establish Health Kiosks in other cities, as well as in rural areas (where health topics are different, but low-threshold health information and navigation is equally important).

Core features of the OptiMedis model help reduce health inequalities. The primary objectives of the OptiMedis model are to improve patient experiences and population health, as well as reduce per capita costs. Features of the model designed to achieve these objectives also play a key role in reducing health inequalities, namely by:

- Offering care tailored to individual patient needs, including those from disadvantaged backgrounds
- Standardising care pathways across all patients thereby ensuring everyone receives the same service quality. Although standardised, the pathways can also be personalised to align with the patient's need (e.g. depending on osteoporosis risk, different physiotherapy sessions or supplements might be recommended).
- Offering all residents in the region access to the model, including all the interventions within it.

The OptiMedis model may disproportionally benefit patients with a lower socio-economic status given rates of morbidity are higher in this group. Socio-economic status is a key predictor of health status, including in Germany. Drawing upon OECD analyses, in Germany, those in the lowest income quintile are 1.3 times more likely to have multiple chronic conditions compared to those in the highest income quintile (OECD, 2019[9]). These results are supported by patient feedback, which found self-reported health was markedly lower for poorer populations (OECD/European Observatory on Health Systems and Policies, 2021[3]). Integrated care models that take into account individual patient needs and promote care co-ordination may therefore be particularly beneficial to multimorbid patients who are typically poorer. However, to benefit from OptiMedis services, vulnerable populations may be less likely to voluntarily enrol in this model of care due to, for example, lower levels of health literacy making it difficult to access and navigate the healthcare system. For example, in Germany, differences in screening rates between the highest and lowest income quintile for cervical, breast and colorectal cancer are 13, 2 and 6 percentage points, respectively (with rates higher for those in the top income quintile) (OECD, 2019[9]). Therefore, outreach models, such as Health Coaches, Healthcare Navigators or the Health Kiosk are of importance.

Evidence-based

Estimates regarding the effectiveness and efficiency of OptiMedis were calculated using neural networks and OECD's SPHeP-NCD microsimulation model. In-depth details of the microsimulation model are explained elsewhere: http://oecdpublichealthexplorer.org/ncd-doc/.

To estimate the health and economic gains from OptiMedis, OECD models relied on inputs from (Schubert et al., 2016[8]), which estimated the impact of OptiMedis on the mortality rate. This section assesses the quality of this study using the Quality Assessment Tool for Quantitative Studies developed by the Effective Public Health Practice Project (Effective Public Health Practice Project, 1998[10]) (Table 3.1). The assessment shows that the study by (Schubert et al., 2016[8]) used strong data collection methods and adequately controlled for confounding factors.

Table 3.1. Evidence-based assessment of OptiMedis

Assessment category	Question	Score (Schubert et al., 2016[8])
Selection bias	Are the individuals selected to participate in the study likely to be representative of the target population?	Very likely
	What percentage of selected individuals agreed to participate?	Not applicable (data collected from health insurance data)
Selection bias score:		*Moderate*
Study design	Indicate the study design	Longitudinal study with non-randomised control group
	Was the study described as randomised?	No
	Was the method of randomisation described?	Not applicable
	Was the method of randomisation appropriate?	Not applicable
Study design score:		*Moderate*
Confounders	Were there important differences between groups prior to the intervention?	Unclear
	What percentage of potential confounders were controlled for?	80-100% (controlled for age, gender, Charlson Index and multimorbidity
Confounders score:		*Strong*
Blinding	Was the outcome assessor aware of the intervention or exposure status of participants?	Yes
	Were the study participants aware of the research question?	No

Assessment category	Question	Score (Schubert et al., 2016[8])
Blinding score:		*Moderate*
Data collection methods	Were data collection tools shown to be valid?	Yes
	Were data collection tools shown to be reliable?	Yes
Data collection methods score:		*Strong*
Withdrawals and dropouts	Were withdrawals and dropouts reported in terms of numbers and/or reasons per group?	Not applicable
	Indicate the percentage of participants who completed the study?	Not applicable
Withdrawals and dropouts score:		*Not applicable*

Source: Effective Public Health Practice Project (1998[11]), "Quality assessment tool for quantitative studies", https://www.nccmt.ca/knowledge-repositories/search/14.

Extent of coverage

According to data form the region of Kinzigtal, approximately one-third of eligible residents are enrolled in the OptiMedis model. As outlined under the "Intervention description", around 50% of all residents living with the region of Kinzigtal receive health insurance through one of the two sickness funds that have contracts with GK Limited (i.e. approx. 35 000 people). Of these eligible residents, around one-third (i.e. 10 500) voluntarily enrolled in the OptiMedis integrated care model.

Data is not available to assess what proportion of eligible health professionals and providers enrol in the OptiMedis integrated care model. However, the gross number of professionals enrolled in the programme as of 2022 in the region of Kinzigtal are as follows:[5]

- 52 physicians and psychotherapists
- 20 clinics and nursing care centres
- 30 providers of nursing care and physiotherapy
- 50 associations
- 20 pharmacies
- 23 businesses participating in workplace health promotion programs.

Policy options to enhance performance

This section outlines policy options to enhance the performance of the OptiMedis model against each of the five best practice criteria. Policies target either OptiMedis administrators or higher level policy makers within the German healthcare system.

Enhancing effectiveness

Proactively identify high-risk patients who stand to benefit most from integrated care. Patients who are at high risk of developing complex health needs stand to benefit most from accessing preventative care offered as part of OptiMedis. Policy makers should therefore consider ways to proactively identify at-risk patients and direct them to OptiMedis prevention services. This will not only improve population health outcomes, but also economic outcomes by reducing demand for healthcare services and increasing productivity.

Enhancing efficiency

The shared savings contract is a key feature of the OptiMedis model (see “Intervention description”). For this reason, no recommendations on how to enhance efficiency are included in this report. However, it is acknowledged that any future expansion of the model may lead to efficiency savings, particularly in regard to “back of office” activities, such as data management, data analytics, development of care programmes, dashboard development, digital transformation projects, IT support and general administrative support (controlling). Further, as outlined under “Enhancing effectiveness”, proactively identifying patients who would benefit from OptiMedis prevention programs will reduce costs and boost productivity.

Enhancing equity

Expand the Health Kiosk to other eligible regions. As outlined under “Equity”, one of the key interventions to promote health equity under the OptiMedis integrated care model is the Health Kiosk. At present, the Health Kiosk only exists within the city of Hamburg, however, there are plans to expand it to other regions in the country. This proposal is highly recommended given disadvantaged groups, such as those with a migrant background, are at greater risk of developing complex health needs. Any transfers of the Health Kiosk, however, should be adapted to the needs of the local population. This requires a contextual analysis of the region covering factors such as population health needs, race/ethnicity structure, health literacy levels, utilisation patterns, structure and coverage of health services, and workforce skills. For further details on the types of contextual factors to consider before transferring an intervention, see OECD’s Guidebook on Best Practices in Public Health (OECD, 2022[12]).

Improve access to healthcare services for disadvantaged groups by promoting health literacy. Disadvantaged groups, such as those with a lower socio-economic status, are less likely to access necessary healthcare services (OECD, 2019[9]). For example, across the OECD, 74% of people in the highest income quintile have been screened for breast cancer compared to 63% among those in the lowest income quintile (OECD, 2019[9]). Although disadvantaged groups stand to benefit most the OptiMedis model, which incentivises high-quality, preventative care, they may be less likely to voluntarily enrol (however, it is noted that many people enrolled in the model of care after having visited a Health Kiosk). Programs that promote health literacy among disadvantaged groups may increase voluntarily enrolment rates (see Box 3.3 for further details).

Box 3.3. Building population health literacy

Recent analysis estimated that more than half of OECD countries with available data had low levels of HL. To address low rates of adult health literacy, OECD have outlined a four-pronged policy approach, which align:

- **Strengthen the health system role**: establish national strategies and framework designed to address HL
- **Acknowledge the importance of HL through research**: measure and monitor the progress of HL interventions to better understand what policies work
- **Improve data infrastructure***:* improve international comparisons of HL as well as monitoring HL levels over time
- **Strengthen international collaboration**: share best practice interventions to boost HL across countries.

Source: OECD (2018[13]), “Health literacy for people-centred care: Where do OECD countries stand?”, https://doi.org/10.1787/d8494d3a-en.

Enhancing the evidence-base

Listed below are recommendations to enhance the data collected as part of the OptiMedis programme. These suggestions are based on a review of current data collection protocols.

- Collect data from two identical treatment groups, i.e. control and experimental groups, up to a small statistical error (e.g. data on health status and utilisation). Ideally this would be achieved through a randomised control trial (RCT) given such studies are considered the "gold standard" for assessing the impact of an intervention. However, RCTs are not always plausible, for example due to high costs or difficulty achieving randomised participation. In that regard, OptiMedis has co-published a qualitative comparison of several economic evaluation methods for integrated care systems, which aims to find a balance between statistical power and practical feasibility (Pimperl et al., 2014[14]);
- Collect data simultaneously in several regions in order to improve data representativeness;
- Collect information about how the intervention is implemented (for example, what are the inclusion criteria; action plan for each health profile) to improve modelling capabilities;
- Elicit the theory of change underlying the interventions, ideally at the start of the initiative.

Enhancing extent of coverage

Consider setting targets on the proportion of patients who have enrolled in an integrated care programme. Providing integrated care centred on patient needs is widely recognised as best practice for treating patients with complex health needs. Despite this, population based integrated care models are not common across OECD countries, including Germany. To boost uptake in voluntary integrated care models, such as the OptiMedis model, policy makers could consider setting a target – i.e. the proportion of the population enrolled in an integrated care model.

Develop a multi-pronged recruitment strategy covering a range of different places, such as those outlined in Box 3.4.

Box 3.4. Policies to increase patient uptake in integrated care models

The following strategies have the potential to increase uptake in integrated care models:

- Collaborate with community-based organisations who work closely with eligible patients, in particular patients who stand to benefit most (e.g. patients with complex needs)
- Develop promotion material using plain, easy-to-understand languages
- Develop promotion material in a range of languages
- Develop an online resource hub where patients can obtain easy-to-understand information, such as how to enrol
- Collect data on the reason why individuals choose to enrol or why individuals un-enrol, and using this information, adapt the model accordingly
- Host outreach programs to providers in order to boost recruitment (a higher number of providers, will ultimately increase the number of patients enrolled)

Source: Center for Consumer Engagement in Health Innovation (2021[15]), "Person-Centered Enrollment Strategies for Integrated Care Toolkit", https://www.healthinnovation.org/resources/toolkits/person-centered-enrollment-strategies-for-integrated-care-toolkit.

Transferability

This section explores the transferability of the OptiMedis model and is broken into three components: 1) an examination of previous transfers; 2) a transferability assessment using publicly available data; and 3) additional considerations for policy makers interested in transferring this intervention.

Previous transfers

At present, the OptiMedis model has been implemented in three different regions, however, long-term experience and evaluations only exist for the Kinzigtal region of south-west Germany. There are active discussions to expand the model of care to other regions in the country.

In an integrated care handbook outlining the OptiMedis model, it was noted "that the results from the [model] can be successfully transferred and achieved elsewhere, including in regions that are different in population structure and health service organisation" (Amelung et al., 2021[16]). The report also outlined several core features of the OptiMedis model that should be replicated in future implementations, as well as implementation facilitators – see Box 3.5.

Box 3.5. The OptiMedis model: Core features and implementation facilitators

This box outlines core features of the OptiMedis model as well as implementation facilitators.

Core features

The following features are considered to be at the core of the OptiMedis model and should therefore be replicated when transferred to another region/country:

- **Consider which body would take on the role of the "integrator"** – i.e. the role of GK Limited, an integrated care management company. The integrator should be regionally based, owned partly by local providers, familiar with local services and plans.
- The **integrator needs to be supported by an organisation who can invest in the model of care**, engage in high-level negotiations, provide advanced health data analytics and whose goal is to pursue long-term goals (i.e. the role of OptiMedis).
- **Considerable investment at the beginning to set up organisational structures**, integrated stakeholders and design interventions. Funding is needed for at least three years given the delay in realising health benefits.
- Ensure there is **motivation to implement interventions that aim to improve population health**.
- The **population size covered by the model of care should be no larger than 100 000** per integrator unit to ensure networking among providers, local solutions, and the exchange of ideas among stakeholders.
- A **comprehensive information-technology package** and competencies regarding advanced health data analytics.
- A **culture of both co-operation and competition** through transparency and benchmarking.
- A **balanced payment system that supports the triple aim approach** and that is incorporated into the shared savings contract.
- An **innovative and friendly culture** to maximise relationships with stakeholders.
- **Long-term contracts (around 10 years) with purchasers** to ensure stability in regards to planning healthcare services and to incentivise long-term health promotion strategies.

Implementation facilitators

In addition to the model's core features, there are a few factors that will facilitate the implementation of this intervention, namely:

- A stable physician network
- Purchasers willing to share long-term savings
- A robust method to monitor costs and quality over time.

Source: Amelung et al. (2017[5]), "Handbook Integrated Care" and Amelung et al. (2021[16]), "Handbook Integrated Care", https://www.doi.org/10.1007/978-3-030-69262-9.

Finally, although regions outside Germany have not implemented the OptiMedis model, it should be noted that the underlying features that support the model exist across most OECD countries (e.g. the chronic care model, preventative care, case management, multidisciplinary care teams, electronic patient data sharing, and personalised care plans). Further, there are active discussions in regions of France

(Strasbourg) and Belgium (Germany speaking community) to transfer this model of care as part of the EU Joint Action on implementation of digitally enabled person-centred care (JADECARE).

Transferability assessment

The following section outlines the methodological framework to assess transferability and results from the assessment.

Methodological framework

A few indicators to assess the transferability of the OptiMedis model were identified (see Table 14.4). Indicators were drawn from international databases and surveys to maximise coverage across OECD and non-OECD European countries. Please note, the assessment is intentionally high level given the availability of public data covering OECD and non-OECD European countries.

Table 3.2. Indicators to assess transferability – OptiMedis model

Indicator	Reasoning	Interpretation
Sector context (healthcare system – all levels)		
Proportion of GPs who work in single-handed practices	The intervention is more transferable in countries where GPs feel comfortable working with other health professionals. This indicator is a proxy to measure the willingness of GPs to work in co-ordinated teams.	Low = more transferable High = less transferable
Proportion of physicians in primary care facilities using electronic health records	EHRs improve the ability of health professionals to provide integrated patient-centred care. Therefore, the intervention is more transferable in countries that utilise EHRs in primary care facilities.	↑ = more transferable
Proportion of hospitals using electronic patient records for inpatients	As above	↑ = more transferable
The extent of task shifting between physicians and nurses in primary care	This intervention promotes integrated care provided by multidisciplinary teams. Therefore, the intervention is more transferable in countries where physicians feel comfortable shifting tasks to nurses.	The more "extensive" the more transferable
The use of financial incentives to promote co-ordination in primary care	The intervention is more transferable to countries with financial incentives that promote co-ordination of care across health professionals.	Bundled payments or co-ordinated payment = more transferable
Economic context		
Primary healthcare expenditure as a percentage of current health expenditure	The intervention places a stronger emphasis on primary care, therefore, it is likely to be more successful in countries that allocate a higher proportion of health spending to primary care	↑ = more transferable
Prevention expenditure as a percentage of current health expenditure	The intervention places a stronger emphasis on prevention, therefore, it is likely to be more successful in countries that allocate a higher proportion of health spending on prevention	↑ = more transferable

Source: WHO (2018[17]), "Primary Healthcare (PHC) Expenditure as percentage of Current Health Expenditure (CHE)", https://apps.who.int/nha/database; Oderkirk (2017[18]), "Readiness of electronic health record systems to contribute to national health information and research", https://dx.doi.org/10.1787/9e296bf3-en; Schäfer et al. (2019[19]), "Are people's health care needs better met when primary care is strong? A synthesis of the results of the QUALICOPC study in 34 countries", https://doi.org/10.1017/S1463423619000434; Maier and Aiken (2016[20]), "Task shifting from physicians to nurses in primary care in 39 countries: a cross-country comparative study", https://doi.org/10.1093/eurpub/ckw098; OECD (2020[4]), *Realising the Potential of Primary Health Care*, https://doi.org/10.1787/a92adee4-en; OECD (2016[21]), "Health Systems Characteristics Survey", https://qdd.oecd.org/subject.aspx?Subject=hsc; European Observatory on Health Systems and Policies (2021[22]), "The Health Systems and Policy Monitor", https://eurohealthobservatory.who.int/countries/overview.

Results

Results from the analysis are outlined in Table 3.3 with a summary provided below:

- The proportion of countries whose GPs work in single-handed practices is lower among OECD and EU27 countries when compared to Germany – i.e. the proportion in Germany is “high” (>50%) compared to two-thirds of remaining countries with available data where the proportion is either “low” (<27%) or “medium” (28-50%). Similarly, levels of task-shifting between doctors and nurses is non-existent in Germany. Both results indicate relative to Germany, GPs in remaining OECD and EU27 countries are more likely to undertaken their work as part of a multidisciplinary team.
- Rates of electronic healthcare record (EHR) use, both in primary and secondary care, is similar in Germany when compared to the OECD and EU27 average. This result masks differences at the individual country level, for example, in Nordic countries such as Denmark, Iceland and Finland, EHR use is at 100% across the healthcare system compared to around a third or less in countries such as Japan and Poland. Countries where EHR use is relatively low may experience barriers to providing integrated care across given difficulties in sharing patient data.
- Financially, as a proportion of total health expenditure, Germany spends more on primary care and prevention than the average OECD/EU27 country. Germany also has financial incentives for delivering co-ordinated care, while many OECD/EUR27 countries do not.

Table 3.3. Transferability assessment by country (OECD and non-OECD European countries) – OptiMedis model

A darker shade indicates that the OptiMedis integrated care model is more suitable for transferral in that particular country

Country	% of single-handed GP practices	% of primary care physician offices using EHRs*	% hospitals using EHRs for inpatients	Extent of task shifting	Mechanism to pay primary care professionals	Primary Healthcare expenditure as % CHE	% CHE** on prevention (2018 or latest year)
Germany	**High**	**80**	**77**	**None**	**Co-ordinated payment**	**48**	**3.20**
Australia	Low	96	20	Extensive	Bundled	37	1.93
Austria	High	80	99	None	Co-ordinated payment	37	2.11
Belgium	High	n/a	n/a	Limited	Bundled	40	1.65
Bulgaria	High	n/a	n/a	None	Bundled	47	2.83
Canada	Low	77	69	Extensive	Bundled	48	5.96
Chile	n/a	65	69	n/a	No incentive	n/a	n/a
Colombia	n/a	n/a	n/a	n/a	No incentive	n/a	2.05
Costa Rica	n/a	n/a	n/a	n/a	No incentive	33	0.60
Croatia	n/a	03	n/a	Limited	No incentive	38	3.16
Cyprus	Low	n/a	n/a	Limited	No incentive	41	1.26
Czech Republic	High	n/a	100	None	No incentive	33	2.65
Denmark	Medium	100	100	Limited	Co-ordinated payment	38	2.44
Estonia	High	99	100	Limited	No incentive	44	3.30
Finland	Medium	100	100	Extensive	No incentive	46	3.98
France	n/a	80	60	None	Bundled	43	1.80
Greece	High	100	50	None	No incentive	45	1.27
Hungary	High	n/a	n/a	Limited	No incentive	40	3.04
Iceland	Low	100	100	Limited	Co-ordinated payment	35	2.68

Country	% of single-handed GP practices	% of primary care physician offices using EHRs*	% hospitals using EHRs for inpatients	Extent of task shifting	Mechanism to pay primary care professionals	Primary Healthcare expenditure as % CHE	% CHE** on prevention (2018 or latest year)
Germany	**High**	**80**	**77**	**None**	**Co-ordinated payment**	**48**	**3.20**
Ireland	Low	95	35	Extensive	No incentive	47	2.60
Israel	n/a	100	100	n/a	Co-ordinated payment	n/a	0.37
Italy	Medium	n/a	n/a	Limited	Bundled	n/a	4.41
Japan	n/a	36	34	n/a	No incentive	52	2.86
Korea	n/a	n/a	n/a	n/a	No incentive	57	3.48
Latvia	High	70	90	Limited	Bundled	39	2.58
Lithuania	Medium	n/a	n/a	Limited	No incentive	48	2.17
Luxembourg	Medium	n/a	n/a	None	No incentive	38	2.18
Malta	Medium	n/a	n/a	Limited	No incentive	62	1.30
Mexico	n/a	30	49	n/a	Co-ordinated payment	44	2.92
Netherlands	Medium	n/a	n/a	Extensive	Bundled	32	3.26
New Zealand	Low	95	100	Extensive	No incentive	n/a	n/a
Norway	Low	100	100	None	No incentive	39	2.45
Poland	Medium	30	10	None	No incentive	47	2.28
Portugal	Low	n/a	n/a	Limited	No incentive	58	1.68
Romania	Medium	n/a	n/a	None	No incentive	35	1.42
Slovak Republic	High	89	100	None	No incentive	n/a	0.77
Slovenia	High	n/a	n/a	Limited	No incentive	43	3.13
Spain	Low	99	80	Limited	No incentive	39	2.13
Sweden	Low	100	100	Limited	Co-ordinated payment	n/a	3.27
Switzerland	Medium	40	100	None	No incentive	40	2.63
Türkiye	Low	n/a	n/a	None	No incentive	n/a	n/a
United Kingdom	Low	99	100	Extensive	No incentive	53	5.08
United States	n/a	83	76	Extensive	No incentive	n/a	2.91

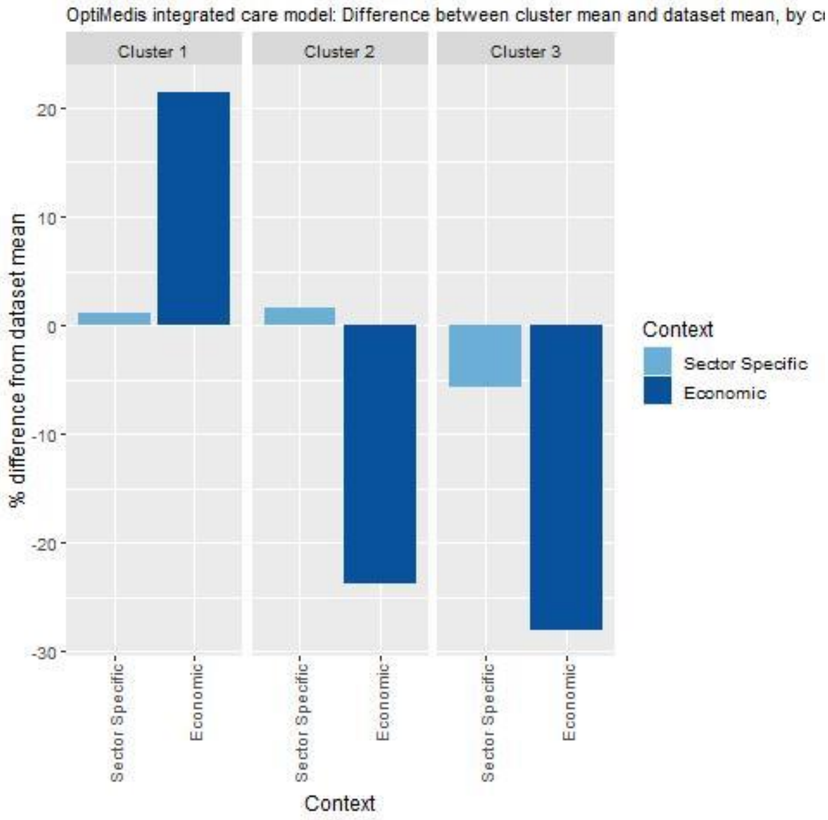
Note: n/a = not data available; *EHR = electronic health record; **CHE = current health expenditure.
Source: See Table 3.2.

To help consolidate findings from the transferability assessment above, countries have been clustered into one of three groups, based on indicators reported in Table 14.4. Countries in clusters with more positive values have the greatest transfer potential. For further details on the methodological approach used, please refer to Annex A.

Key findings from each of the clusters are below with further details in Figure 3.6 and Table 3.4:

- Countries in cluster one typically have healthcare systems that promote integrated care. Further, these countries spend relatively high amounts on primary care and prevention. This cluster includes Germany, where OptiMedis currently operates in certain regions.
- Countries in cluster two also have healthcare systems that promote integrated care. However, they spend relatively less on primary care and prevention, which may hinder long-term sustainability of integrated care models focused on avoiding or delaying complex health needs.
- Countries in cluster three should consider whether their healthcare systems are ready to implement population based integrated care models, and also whether such a model is affordable in the long-term.

Figure 3.6. Transferability assessment using clustering – OptiMedis model



Note: Bar charts show percentage difference between cluster mean and dataset mean, for each indicator.

Table 3.4. Countries by cluster – OptiMedis

Cluster 1	Cluster 2	Cluster 3
Bulgaria	Australia	Greece
Canada	Austria	Israel
Croatia	Belgium	Malta
Czech Republic	Cyprus	New Zealand
Estonia	Denmark	Portugal
Finland	France	Romania
Germany	Iceland	Slovak Republic
Hungary	Latvia	
Ireland	Norway	
Italy	Spain	
Japan	Sweden	
Lithuania		
Luxembourg		
Mexico		
Netherlands		
Poland		
Slovenia		
Switzerland		
United Kingdom		
United States		

Note: The following countries are not in the table below due to high levels of missing data: Chile, Colombia, Costa Rica, Korea and Türkiye.

New indicators to assess transferability

Data from publicly available datasets alone is not ideal to assess the transferability of public health interventions. Box 3.6 outlines several new indicators, or factors, policy makers could consider before transferring the OptiMedis integrated care model.

Box 3.6. New indicators, or factors, to consider when assessing transferability – OptiMedis model

In addition to the indicators within the transferability assessment, policy makers are encouraged to collect information for the following information points:

Population context

- What is the population's attitude towards receiving care from health professionals who are not doctors?
- What is the level of health literacy among patients? (i.e. are patients likely to engage in shared decision-making?)
- Is there a demand among the population to alter the way care is delivered?

Sector context (healthcare system – all levels)

- What integrated care models currently exist?
- Does the clinical information system support: a) sharing of patient data across health professionals? b) Sharing of patient data across healthcare facilities?
- What share of primary care physicians use electronic health records? (OECD, 2021[23])
- What proportion of the population who access healthcare have experience good care co-ordination? (OECD, 2021[23])
- Do health provider reimbursement schemes support co-ordinated care?
- Is there a stable network of physicians operating in the region?
- Are there purchasers operating in the region who are willing to share long-term savings?
- Is there capacity as well as the capability to monitor healthcare costs and quality over time?
- What is the level of patient data operability among healthcare providers?
- Do the healthcare system governance structures support the delivery of integrated care?

Political context

- Has the intervention received political support from key policy makers? (E.g. a national strategy to address rising rates of chronicity or policies that promote care co-ordination)
- Has the intervention received commitment from key decision-makers?

Economic context

- What is the cost of implementing and operating the intervention in the target setting and to whom?

Conclusion and next steps

Policy changes in Germany to promote care co-ordination led to the implementation of the OptiMedis model. Germany's healthcare system is complex due to the separation of legislative, planning and regulatory power across different sectors. In an effort to improve care co-ordination, the government implemented several policies including the 2004 Social Health Insurance Modernisation Act. Following on from this Act, OptiMedis implemented its regionally based population integrated care model in certain regions in Germany.

The OptiMedis model offers patients co-ordinated care across all health sectors with a focus on prevention. Insurees of any sickness fund that has a contract with OptiMedis can voluntarily enrol in the integrated care model. Those who enrol have access to all healthcare services plus additional interventions that promote care co-ordination and prevention. There is a shared savings contract exists between sickness funds and OptiMedis in order to incentivise high quality care. The difference is calculated by subtracting the money spent on patients from the amount sickness funds receive from the central payment authority.

OptiMedis leads to an improvement in health outcomes as well as cost savings based on modelling estimates. For example, OECD countries, on average, could expect to gain 9.7 LY and 6.5 DALYs per 100 000 people per year between years 2022 and 2050 by operating the OptiMedis model of care. From an efficiency point of view, OptiMedis has the potential to reduce health expenditure by an amount equivalent to 4% of their total spending on health.

To successfully transfer this model of care, OptiMedis administrators have outlined several core features and implementation facilitators. These include, but are not limited to, ensuring the population size is no longer than 100 000, fostering a culture of both co-operation and competition, and developing a comprehensive information-technology package that has the capability of undertaking advanced data analytics.

Box 3.7 outlines next steps for policy makers and funding agencies in regard to the OptiMedis model.

Box 3.7. Next steps for policy makers and funding agencies – OptiMedis

Next steps for policy makers and funding agencies to enhance the OptiMedis model are listed below:

- Consider policy options in this case study in order to enhance the overall performance of the OptiMedis model
- Share key findings from the case study with stakeholders to promote population-based integrated care models
- In particular, share tips on how to best transfer the intervention based on the model's core feature and implementation facilitators, as outlined in this case study.

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Annex 3.A. OptiMedis: Modelling assumptions and methodology

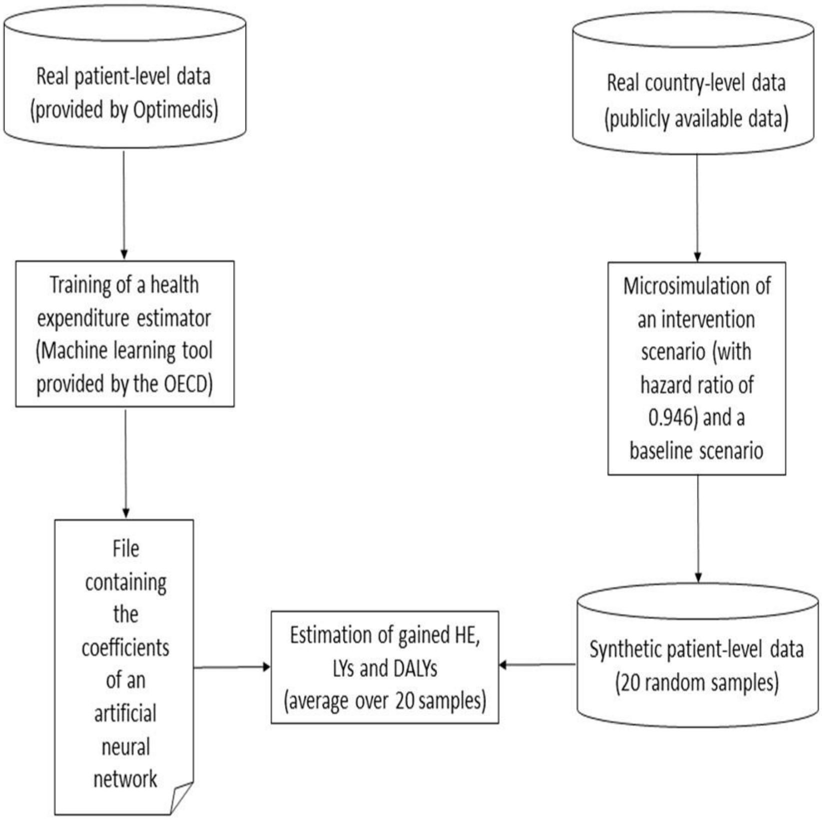
The table below outlines the assumptions and methodology used to model the effectiveness and efficiency of the OptiMedis integrated care model. The assumptions are broken down as follows: target group, exposure among the target group, effectiveness, timeframe, and costs.

Annex Table 3.A.1. Modelling assumptions

Model parameters	OptiMedis model inputs
Target group	Everyone aged 20 years and over with a non-communicable disease and/or injury (Schubert et al., 2016[8])
Exposure	The model assumes the whole target group are exposed to OptiMedis. It should be noted, however, that in the German region of Kinzigtal, only a third of those with access to OptiMedis voluntary enrolled.
Effectiveness	The model applied a hazard ratio of 0.946 (Schubert et al., 2016[8]).
Timeframe	Years 2022-50
Costs	No additional costs.

The methodology can be split into two logical and chronological parts. First, by means of a machine learning tool provided by the OECD Secretariat, OptiMedis has trained a neural network from its own real patient-level data and sent back the output file to the OECD Secretariat. This neural network has been designed to estimate the health expenditure from patients' characteristics (age, sex, diagnoses). Then, for each target country, the OECD Secretariat has simulated a set of 20 random synthetic patient-level data and computed the related health expenditure (HE), LYs and DALYs by means of the neural network and its own microsimulation model. The resulting HE, LYs and DALYs have been averaged over the 20 samples in order to get an accurate an estimate of these quantities.

Annex Figure 3.A.1. Modelling methodology



Notes

[1] Figures are from 2019 to avoid increases in spending due to COVID-19.

[2] As above.

[3] Expected costs are calculated according to the risk-adjusted funds received by the sickness funds to care for their contracted insurees from the central authority (Gesundheitsfonds).

[4] In the German region of Kinzigtal, Gesundes Kinzigtal (of which OptiMedis is a 33% shareholder) invested EUR 1 million to design an e-patient record. The record is compatible with IT systems in each practice, further patient data can be shared across practices. In GWMK, OptiMedis are in the process of implementing a large digital toolbox capable of sharing data between providers, patients and caregivers (i.e. ADLIFE Project).

[5] Note, figures frequently change.

4

Hospital-at-Home (H@H), Catalonia, Spain

This chapter covers the Hospital-at-Home (H@H) programme operating in Catalonia, Spain. The case study includes an assessment of H@H against the five best practice criteria, policy options to enhance performance and an assessment of its transferability to other OECD and EU27 countries.

Hospital-at-Home (H@H): Case study overview

Description: In 2006, Catalonia, a region in Spain, introduced its first Hospital-at-Home (H@H) programme. H@H offers patients acute, home-based care that would otherwise be delivered in a hospital setting. This service is designed to improve patient experiences and population health, while reducing the per capita cost of healthcare.

Best practice assessment:

OECD best practice assessment of H@H in Catalonia, Spain

Criteria	Assessment
Effectiveness and efficiency 🏅	Scaling-up H@H across the whole of Spain is estimated to lead to savings equal to EUR 6.03 per person, per year between 2023 and 2050. Average estimated savings across EU27 countries is similar to Spain at EUR 6.75, which equates to 0.004% of total health expenditure.
Equity	There is a risk H@H excludes those with unstable living environments thereby heightening existing health inequalities. Nevertheless, findings from the literature indicate these types of programmes can promote health equality given health professionals can more readily address a patient's social determinants of health.
Evidence-base	Results from Hernandez et al. (2023[1]) and Herranz et al. (2022[2]) provided inputs to model the health and economic impact of H@H. This study performs well against the Quality Assessment Tool for Quantitative Studies, in particular in terms of data collection methods used and the use of confounders to control for external factors.
Extent of coverage	There is a high level of acceptance and therefore uptake in Catalonia's H@H programme – around 82%. However, due to eligibility criteria, approximately 1.3% of patients admitted to hospital are eligible for H@H.

Enhancement options: Several policy options are available to enhance the performance of H@H against the five best practice criteria. These include, but are not limited to, adjusting reimbursement schemes to better reflect services provided by H@H programmes as well as strengthening community-based care to ensure socially vulnerable patients have access to H@H.

Transferability: Programmes similar to H@H exist in several OECD countries such as Australia, Canada, Germany and the United States. Based on feedback from H@H administrators and a review of the literature, there are several factors that facilitate the transfer of H@H. These include supportive leadership at the hospital level, a sophisticated health information system and a culture of care integration.

Conclusion: The H@H programme is designed to provide care to patients in their own home as opposed to a hospital setting. By doing so, it aims to improve experiences and outcomes, while reducing costs. Findings from this analysis indicate H@H aligns with many best practice criteria and has the potential to be transferred to other OECD and EU27 countries.

Intervention description

This section outlines the Hospital-at-Home (H@H) programme operating in Catalonia, Spain. The H@H programme was developed as part of the Catalan Open Innovation Healthcare Hub, which aims to support integrated care services for patients with chronic conditions. The section first describes the Catalan Open Innovation Healthcare Hub, and second, outlines how H@H fits within this broader initiative.

The Catalan Open Innovation Healthcare Hub

The Catalan Open Innovation Healthcare Hub (hereafter, the Hub) aims to provide all Catalonian residents with high-quality, integrated care services. At a high-level, the Hub combines a population-based approach to health with adaptive case management.

The Hub consists of five key building blocks – 1) health risk assessment, 2) promotion of healthy lifestyles, 3) vertical and horizontal integration, 4) innovative assessment and regulatory issues, and 5) digital support to integrated care services. Box 4.1 provides a high-level description of each block.

Box 4.1. The Catalan Open Innovation Healthcare Hub building blocks

This box outlines the five building blocks that make up the Catalan Open Innovation Healthcare Hub.

Block 1: Health risk assessment

The Hub includes a regional population-based health risk assessment tool, GMA (Adjusted Morbidity Groups). The GMA tool uses patient level data collected from the Catalan Health Surveillance System in order to stratify patients into different risk groups.

There are four risk groups ranging from lowest to highest complexity needs:

- GMA-1: 50% of the population who have the lowest healthcare needs
- GMA-2: 30% of the population
- GMA-3: 15% of the population
- GMA-4: 5% of the population who have the highest healthcare needs.

Block 2: Promotion of healthy lifestyles

Block 2 aims to foster healthy lifestyle behaviours in order to prevent multimorbidity. The key intervention within this block is the “Prehabilitation programme” (hereafter, Prehab). Prehab is a pre-operative intervention for high-risk patients aged 70 years and above undergoing major elective surgery. It aims to enhance functional capacity in order to reduce postoperative morbidity and accelerate recovery through improving aerobic capacity, nutritional balance, and psychological well-being.

Block 3: Vertical and horizontal integration

Block 3 consists of four evidence-based integrated care services: 1) programme for chronic and frail patients; 2) support for complex case management including home hospitalisation; 3) healthcare support programmes for nursing homes; 4) integrated are to avoid hospital admissions among subacute and frail patients. Home hospitalisation, also known as Hospital-at-Home (H@H) is the focus of this case study.

Block 4: Innovative assessment and regulatory issues

Block 4 includes three separate items: 1) healthcare planning and health delivery assessment, 2) regulatory issues regarding patients’ self-tracking data, and 3) regulatory aspects regarding data privacy and sharing.

Block 5: Digital support to integrated care

Block 5 facilitates digital operability across healthcare providers in the region. Several tools are available that promote digital operability – regional information exchange platform, primary care electronic medical record and electronic prescription, personal health folder, ICT tools that support adaptive case management and collaborative work, and cloud-based strategies.

Source: WP6 JADECARE (2020[3]), “Presentation of the original Good Practice: Catalan Open Innovation Hub on ICT-supported Integrated Care Services for Chronic Patients”.

The H@H programme operates within building block three, specifically, as a programme to promote care integration.

Hospital-at-Home (H@H) to promote care integration

Like many developed countries in the world, Spain, including the region of Catalonia, is experiencing an increase in the number of people living with complex health needs due to an ageing population and unhealthy lifestyle behaviours. Health Plans, which are developed in Catalonia every four years, include strategies to address the needs of complex health patients, for example, by prioritising new models of care.

As part of the 2006 Health Plan, the Regional Government of Catalonia prioritised the delivery of integrated care using the conceptual framework outlined within Chronic Care Model (Wagner et al., 1999[4]). One of the strategies to promote integrated care was to implement a Hospital-at-Home (H@H) programme, which was subsequently expanded in the 2011-15 and 2016-20 regional health plans (Gonzalez-Colom et al., 2023[5]). H@H is now a mainstream service operating among 27 providers in the region namely eight tertiary hospitals, twelve general hospitals and seven community hospitals.

The remainder of this section provides a description of H@H, as well as information on eligibility and objectives.

What is Hospital-at-Home (H@H)?

H@H is a service offering acute, home-based care within the comfort of the patient's home as opposed to in a hospital setting. The service aims to promote vertical care integration by bringing together hospital- and community-based care.

A patient admitted to H@H receives the standard hospital care. The patient is assessed in person daily by the H@H team, which consists of either a nurse or a nurse and a physician (according to the physician's discretion). Specifically, the registered nurse sees the patient within the first 24 hours of being sent home, with daily visits thereafter lasting around 40 minutes. The registered nurse has access to electronic patient data during their visit, further, they are in contact with the patient's physician at the hospital, via a dedicated application on a laptop. In addition, the patient's H@H team[1] meet daily to discuss the patient's progress and to decide when the patient can be discharged.

Interventions available at home include regular tests (e.g. blood and microbiology tests, clinical ultrasound, electrocardiogram), most of the intravenous and nebulised treatments, and oxygen therapy. A pathway for elective transfer back to the hospital (e.g. for additional tests not available at home) and an emergency transfer in case of clinical deterioration is also available.

Despite care being provided in the home, the hospital retains clinical, financial and legal responsibility for the patient.

Who is eligible for H@H?

Patients with acute or exacerbated chronic healthcare needs, as well as surgical patients, who meet the following criteria are eligible for H@H:

- Live at home in an area covered by the H@H programme
- Have a phone
- Have a stable living situation
- Have a carer.

Patients are not eligible if they are at high risk of severe clinical deterioration that cannot be treated at home based on medical judgement, are admitted into a short stay unit, and/or have a severe psychiatric disorder.

What are the objectives of H@H?

At a high-level, H@H aims to achieve the “Triple Aim” approach, which is to simultaneously improve patient experiences (quality and satisfaction), improve population health and reduce per capita costs of healthcare.

OECD Best Practices Framework assessment

This section analyses H@H against the five criteria within OECD’s Best Practice Identification Framework – Effectiveness, Efficiency, Equity, Evidence-base and Extent of coverage (see Box 4.2 for a high-level assessment).

Box 4.2. Assessment of H@H

Effectiveness and efficiency

- Scaling-up H@H across the whole of Spain is estimated to lead to savings equal to EUR 6.03 per person, per year between 2023 and 2050.
- Average estimated savings across EU27 countries is similar to Spain at EUR 6.75, which equates to 0.004% of total health expenditure.

Equity

- There is a risk H@H excludes those with unstable living environments thereby heightening existing health inequalities. Nevertheless, findings from the literature indicate these types of programmes promote health equality given health professionals have better access to information on the patient’s social determinants of health.

Evidence-base

- Results from Hernandez et al. (2023[1]) and Herranz et al. (2022[2]) provided inputs to model the economic impact of H@H. This study performs well against the Quality Assessment Tool for Quantitative Studies, in particular in terms of data collection methods used and the use of confounders to control for external factors.

Extent of coverage

- Previous studies have shown that over 80% of patients eligible for Catalonia’s H@H programme agree to participate indicating high levels of acceptance. However, only a small proportion (1.3%) of people who are admitted to hospital are eligible for H@H, which limits the reach of the intervention.

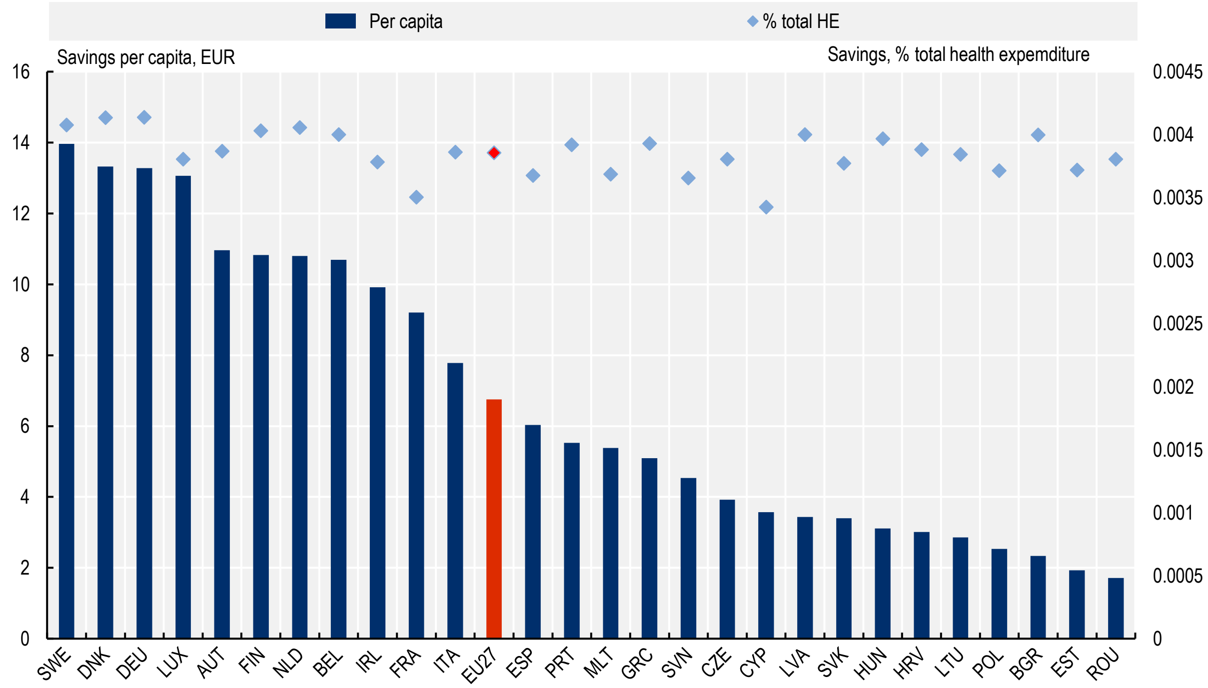
Effectiveness and efficiency

This section highlights key findings from a modelling exercise designed to estimate the economic impact of scaling-up H@H across Spain and transferring it to all other EU27 countries. The estimates were calculated using OECD’s SPHeP-NCD (Strategic Public Health Planning – noncommunicable diseases) model, which relied on real-world evidence on the cost impact of H@H as implemented in Catalonia, Spain. At a high-level, H@H has been shown to reduce the cost per episode of care by over EUR 1 000 when compared to usual care. Savings are generated from lower staffing, catering, infrastructure, and patient testing costs. Further details on modelling assumptions are in Annex 4.A.

Figure 4.1 outlines average savings, per capita, per year, over the period 2023-50 for all EU27 countries. On average, EU27 countries are estimated to save EUR 6.75 per person, per year up until 2050 as a result of the hospital-at-home programme. This figure equates to 0.004% of total health expenditure. It is estimated that Sweden would experience the greatest benefit with savings totalling EUR 13.97 per person, compared to EUR 1.72 in Romania.

Scaling-up H@H across the whole of Spain is estimated to lead to similar savings as the EU27 average – i.e. per capita annual savings of EUR 6.03, which equates to 0.004% of total health expenditure.

Figure 4.1. Average savings per capita and as a percentage total health expenditure, 2023-50 – H@H, EU27 countries



Source: OECD SPHeP-NCD model, 2022.

The analysis outlined above is focused on the economic impact given data availability. However, it is important to note that previous evaluations show H@H does not worsen health outcomes, and, in fact, has been shown to increase patient and caregiver satisfaction. For example, Hernández et al. (2018[6]) in their study evaluating H@H and early discharge (partial substitution of hospital care) in Catalonia, Spain, found the programmes did not lead to an increase in the mortality rate 30 days after discharge. Regarding satisfaction, 98% of patients reported that the treatment they received was “very good”, while 90% and 94% of patients and caregivers stated they would repeat the experience if needed, respectively (Hernández et al., 2018[6]). These findings are supported by the wider literature with a recent systematic review concluding that “HaH generally results in similar or improved clinical outcomes compared with inpatient treatment” (Leong, Lim and Lai, 2021[7]).

Equity

Certain H@H inclusion criteria may exacerbate existing health inequalities. As outlined under the "Intervention description", to be eligible for H@H, patients must have a stable social situation. This criterion therefore risks excluding socially vulnerable patients, such as those with a low socio-economic background. Further, people from a low socio-economic background may experience barriers to accessing healthcare, therefore it is less likely the healthcare system will identify these patients as eligible for H@H services. For example, across the OECD, 81% of those in the richest income quintile sought care from a doctor in the past three months compared to 75% of those in the poorest quintile, after adjusting for needs (OECD, 2019[8]).

Recent research indicates hospital-at-home programmes might have the potential to reduce health inequalities. As outlined above, research on hospital-at-home programmes and health inequalities is limited. In an effort to address this dearth in the literature, Siu et al. (2022[9]) analysed the impact of hospital-at-home programmes according to socio-economic status in the United States.[2] The authors found patients with Medicaid coverage[3] who accessed H@H were less likely to revisit the emergency department 30-days after discharge when compared to usual inpatient care. Findings from the analysis led the authors to conclude that "[H@H] is feasible for economically disadvantaged patients and that these patients may even have greater benefit from [H@H]". Further, they hypothesis that that patients with a low socio-economic status benefit from such programmes given health professionals can better address the patient's social determinants of health (e.g. food insecurity).

Evidence-based

Estimates regarding the effectiveness and efficiency of H@H were calculated using OECD's SPHeP-NCD microsimulation model. In-depth details of the model are explained elsewhere: http://oecdpublichealthexplorer.org/ncd-doc/.

To estimate the health and economic gains from Catalonia's Hospital-at-Home programme, the SPHeP-NCD model relied on inputs from Hernandez et al. (2023[1]). This section assesses the quality of this study using the Quality Assessment Tool for Quantitative Studies developed by the Effective Public Health Practice Project (Effective Public Health Practice Project, 1998[10]) (Table 4.1). In summary, the study is considered "strong" in terms of the data collection methods used as well as the use of confounders to control for external factors.

Table 4.1. Evidence-based assessment of Hospital-at-Home

Assessment category	Question	Score
Selection bias	Are the individuals selected to participate in the study likely to be representative of the target population?	Somewhat likely
	What percentage of selected individuals agreed to participate?	82%
Selection bias score: Moderate		
Study design	Indicate the study design	Prospective cohort study with an intervention and control group (one period only)
	Was the study described as randomised?	No
	Was the method of randomisation described?	Not applicable
	Was the method of randomisation appropriate?	Not applicable
Study design score: Moderate		
Confounders	Were there important differences between groups prior to the intervention?	No
	What percentage of potential confounders were controlled for?	80-100%

Assessment category	Question	Score
Confounders score: Strong		
Blinding	Was the outcome assessor aware of the intervention or exposure status of participants?	Yes
	Were the study participants aware of the research question?	Unknown
Blinding score: Weak		
Data collection methods	Were data collection tools shown to be valid?	Yes
	Were data collection tools shown to be reliable?	Yes
Data collection methods score: Strong		
Withdrawals and dropouts	Were withdrawals and dropouts reported in terms of numbers and/or reasons per group?	Not applicable (data collected at one point in time)
	Indicate the percentage of participants who completed the study?	Not applicable
Withdrawals and dropouts score: Not applicable		

Source: Effective Public Health Practice Project (1998[11]), "Quality assessment tool for quantitative studies", https://www.nccmt.ca/knowledge-repositories/search/14.

Extent of coverage

Studies indicate the participation rate among eligible patients is high, however, eligibility criteria restrict many patients from accessing H@H. A 2018 evaluation of Catalonia's H@H programme indicates there is a high level of acceptance of H@H among eligible patients (Hernández et al., 2018[6]). Specifically, of all eligible patients, 82% accepted to participate. Nevertheless, based on Hernandez et al. (2023[1]), Herranz et al. (2022[2]) and Gonzalez-Colom et al. (2023[5]), the proportion of the people admitted to hospital who are subsequently admitted to H@H is low at 1.3%. Feedback from programme administrators suggest this is due to the availability of virtual beds. Since the COVID-19 pandemic, the availability of virtual beds has grown thereby increasing the number of people accessing H@H services. A ratio of H@H admissions to all hospital admissions close to 5% has been suggested as a reasonable goal.

Policy options to enhance performance

This section outlines policy options to enhance the performance of H@H against each of the best practice criteria.

Enhancing effectiveness

Define what constitutes hospital care at home. In Catalonia's healthcare system, H@H is defined as a care modality in which hospital healthcare professionals provide active treatment to the patient at home, for a condition that would otherwise require the patient to be admitted to a healthcare facility. The 2020 consensus document (Servei Català de la Salut, 2020[12]) on H@H specifically indicates that H@H is not: i) care of patients with a low complexity profile not requiring hospital admission; ii) monitoring and control of palliative patients; iii) urgent home care visits; iv) home-based primary care support; nor, v) control of major ambulatory surgery or standard post-surgical follow-up without other complications. It is therefore important to clearly define and delineate between H@H and other home-based services offered in Catalonia.

Explore ways to adjust reimbursement schemes to factor in heterogeneity among H@H programmes. The type of services delivered by H@H programmes in Catalonia differ across the region. For example, some programmes offer basic services to treat older age, multimorbid patients while others offer specialised services such as bone marrow transplants. Despite significant differences in services delivered in the home, H@H reimbursement rates are standardised. To maintain high quality care in the home, reimbursement rates could be revised to take into account service heterogeneity – e.g. by offering different diagnostic-related group (DRG) payments within H@H that align with services provided, or reimbursement based on predictive models (Monterde et al., 2020[13]).

More broadly, policy makers should prioritise training that provides health professionals with the necessary skills to deliver hospital-at-home services, as well as invest in assistance technologies. Such as using electronic health records, uploading patient information, and communicating with patients online (Leong, Lim and Lai, 2021[7]).

Enhancing efficiency

Extending eligibility criteria to capture more patients can reduce the cost per patient. Policy makers could consider expanding the H@H programme to include more patients, for example by covering more types of care provided in the home. However, this should only be done if the quality of care and health outcomes are not adversely affected. Increasing the number of patients accessing H@H can reduce the per patient cost given fixed costs are spread over a large number of people.

A refined DRG system may also improve efficiency. As outlined under “Enhancing effectiveness”, a nuanced DRG system that takes into account different H@H services may improve efficiency given payments will better reflect service provision.

Enhancing equity

Strengthen community-based care to increase uptake among socially vulnerable patients. As outlined under “Equity”, socially vulnerable people may be excluded from accessing H@H given their living situation. For this reason, it is important to strengthen community-based services who can take on these patients (e.g. convalescent centres), as well as promote integration between hospital- and community-based services.

Stratify evaluation indicators by priority population groups. Despite wide-spread research on hospital-at-home programmes, including several randomised-controlled trials and systematic reviews, there remains little understanding as to whether such programmes affect population groups differently (Leff et al., 2022[14]). To determine whether Catalonia’s H@H programme reduces or widens existing health inequalities, future studies should stratify data according to priority population groups (e.g. by socio-economic status). Findings from such studies will play a key role in adapting H@H to better meet the needs of disadvantaged groups.

Improve access to healthcare services for disadvantaged groups by promoting health literacy. Disadvantaged groups, such as those with a lower socio-economic status, are less likely to access necessary healthcare services (OECD, 2019[8]). Although disadvantaged groups stand to benefit greatly from H@H, for example, due to higher rates of NCDs, they may be less likely to access the programme. Programmes that promote health literacy among disadvantaged groups may increase uptake in H@H among disadvantaged groups (see Box 4.3 for further details).

Box 4.3. Building population health literacy

Recent analysis estimated that more than half of OECD countries with available data had low levels of health literacy (HL). To address low rates of adult health literacy, OECD have outlined a four-pronged policy approach, which align:

- **Strengthen the health system role**: establish national strategies and framework designed to address HL
- **Acknowledge the importance of HL through research**: measure and monitor the progress of HL interventions to better understand what policies work
- **Improve data infrastructure***:* improve international comparisons of HL as well as monitoring HL levels over time
- **Strengthen international collaboration**: share best practice interventions to boost HL across countries.

Source: OECD (2018[15]), "Health literacy for people-centred care: Where do OECD countries stand?", https://doi.org/10.1787/d8494d3a-en.

Enhancing the evidence-base

Listed below are recommendations to enhance the data collected as part of the H@H programme. These suggestions are based on a review of current data collection protocols.

- Collect data from a high-quality study that, to the extent possible, replicates a randomised clinical trial to enable the most possible accurate comparisons
- Collect data during the intervention (e.g. utilisation of healthcare services, related costs) in addition to before and after the intervention
- Collect annual data after the intervention has concluded (e.g. utilisation of healthcare services, related expenditures) rather than on a monthly basis
- Collect information about how the intervention is implemented (for example, what are the inclusion criteria; action plan for each health profile) to improve modelling capabilities
- Compare the impact of H@H against other initiatives that aim to reduce healthcare costs without negatively affecting health outcomes and patient experiences (e.g. increase use of outpatient and primary care).

Enhancing the extent of coverage

As outlined under "Enhancing efficiency", consideration could be given to extending eligibility criteria as long as it is safe to do so. This would help increase the proportion of patients admitted to hospital who are eligible for H@H services.

Transferability

This section explores the transferability of H@H and is broken into three components: 1) an examination of previous transfers; 2) a transferability assessment using publicly available data; and 3) additional considerations for policy makers interested in transferring H@H.

Previous transfers

Several OECD and EU countries have implemented hospital-at-home programmes. As outlined in OECD's recent primary care report, healthcare systems increasingly provide "post-discharge care at home as an alternative to hospital-based care" (OECD, 2020[16]). Example countries include Australia, Canada, Germany, Israel, the United Kingdom, and the United States. This implies home-based care programmes, such as H@H, are transferable if tailored to the local context.

Several factors facilitate the transfer of hospital-at-home type programmes. Based on feedback from H@H administrators, key factors include:

- Strong and supportive leadership at the hospital level
- A culture of integrated care
- Reimbursement arrangements that incentivise care delivered in a home setting.

Transferability assessment

The following section outlines the methodological framework to assess transferability followed by results from the assessment.

Methodological framework

A few indicators to assess the transferability of H@H were identified (see Table 4.2). Indicators were drawn from international databases and surveys to maximise coverage across OECD and non-OECD European countries. Please note, the assessment is intentionally high level given the availability of public data covering OECD and non-OECD European countries.

Table 4.2. Indicators to assess transferability – Hospital-at-Home

Indicator	Reasoning	Interpretation
Sector specific context (hospital-, primary- and community-based care)		
Proportion of hospitals using electronic health records (EHRs) for inpatients	EHRs improve the ability of health professionals to provide integrated patient-centred care. Therefore, the intervention is more transferable in countries that utilise EHRs in secondary facilities.	↑ value = more transferable
The extent of task shifting between physicians and nurses in primary care	H@H is more transferable to settings with a culture of care integration	The more "extensive" the more transferable
% of tertiary institutions (public and private) that offer ICT for health (eHealth) courses	H@H is more transferable if health professional students receive eHealth training	↑ value = more transferable
% of institutions or associations offering in-service training in the use of ICT for health as part of the continuing education of health professionals	H@H is more transferable if health professionals have appropriate eHealth training	↑ value = more transferable
Economic context		
Secondary healthcare expenditure as a percentage of current health expenditure	The intervention is hospital-based therefore, it is likely to be more successful in countries that allocate a higher proportion of health spending to secondary care	↑ value = more transferable

Source: WHO (2015[17]), "Atlas of eHealth country profiles: The use of eHealth in support of universal health coverage", https://www.afro.who.int/publications/atlas-ehealth-country-profiles-use-ehealth-support-universal-health-coverage; Odenkirk (2017[18]), "Readiness of electronic health record systems to contribute to national health information and research", https://dx.doi.org/10.1787/9e296bf3-en; OECD (2021[19]), "OECD Health Statistics: health expenditure and financing"; Eurostat (2022[20]), "Database – Eurostat", https://ec.europa.eu/eurostat/data/database.

Results

Table 4.3 displays results from the transferability analysis at the country level, with key findings summarised below:

- Factors to determine if the sector (i.e. hospital- and community-based care) is ready for H@H show mixed results:
    - On a positive note, the proportion of hospitals who use electronic health records in hospitals is high (80% on average and in Spain), with many countries reporting 100% use. Nevertheless, this figure is as low as 10% in Poland.
    - Task shifting, which may reflect whether there is a culture of care integration, shows less positive results with very few countries reporting "extensive" task shifting between health professionals (i.e. 22% of countries with available data compared to the remaining 78% that reported "limited" or no task shifting).
    - Similarly, indicators measuring ICT training for health professionals show training does not form part of the formal curricula in most countries.
- Regarding expenditure, spending on secondary care (which is responsible for funding H@H) is similar in Spain to other countries with available data (around 25%).

Table 4.3. Transferability assessment by country (OECD and non-OECD European countries) – Hospital-at-Home

A darker shade indicates H@H is more suitable for transferral in that particular country

Country	% hospitals using electronic patient records for inpatients	Extent of task shifting from doctors to nurses in primary care	% of tertiary institutions that offer ICT for health (eHealth) courses	% of institutions or associations offering in-service training in the use of ICT for health as part of the continuing education of health professionals	Spending on secondary healthcare as a percentage of CHE*
Spain	**80**	**Limited**	**Low**	**Medium**	**25**
Australia	20	Extensive	Medium	High	31
Austria	99	None	Low	Low	32
Belgium	n/a	Limited	Low	Low	28
Bulgaria	n/a	None	Medium	Medium	37
Canada	69	Extensive	High	Low	16
Chile	69	n/a	Low	Low	n/a
Colombia	n/a	n/a	n/a	n/a	11
Costa Rica	n/a	n/a	Medium	Medium	39
Croatia	n/a	Limited	Low	Medium	20
Cyprus	n/a	Limited	Medium	Low	29
Czech Republic	100	None	Medium	n/a	24
Denmark	100	Limited	Medium	Very High	25
Estonia	100	Limited	Medium	Low	22
Finland	100	Extensive	Medium	Medium	22
France	60	None	n/a	n/a	25
Germany	n/a	None	n/a	n/a	26
Greece	50	None	Medium	Medium	42
Hungary	n/a	Limited	Low	n/a	27
Iceland	100	Limited	Very High	Very High	28
Ireland	35	Extensive	n/a	Low	25
Israel	100	n/a	High	Low	26
Italy	n/a	Limited	Low	High	27

Country	% hospitals using electronic patient records for inpatients	Extent of task shifting from doctors to nurses in primary care	% of tertiary institutions that offer ICT for health (eHealth) courses	% of institutions or associations offering in-service training in the use of ICT for health as part of the continuing education of health professionals	Spending on secondary healthcare as a percentage of CHE*
Spain	**80**	**Limited**	**Low**	**Medium**	**25**
Japan	34	n/a	n/a	n/a	27
Korea	n/a	n/a	n/a	n/a	25
Latvia	90	Limited	Low	Low	21
Lithuania	n/a	Limited	Medium	Low	27
Luxembourg	n/a	None	Low	Low	25
Malta	n/a	Limited	Very High	Very High	n/a
Mexico	49	n/a	Medium	Low	30
Netherlands	n/a	Extensive	High	High	19
New Zealand	100	Extensive	Medium	Very High	n/a
Norway	100	None	Low	Medium	26
Poland	10	None	High	Medium	35
Portugal	n/a	Limited	Low	Low	17
Romania	n/a	None	n/a	n/a	35
Slovak Republic	100	None	n/a	n/a	30
Slovenia	n/a	Limited	High	High	27
Sweden	100	Limited	Very High	Very High	20
Switzerland	100	None	Low	Very High	26
Türkiye	n/a	None	n/a	n/a	n/a
United Kingdom	100	Extensive	Medium	High	23
United States	76	Extensive	Low	Low	16

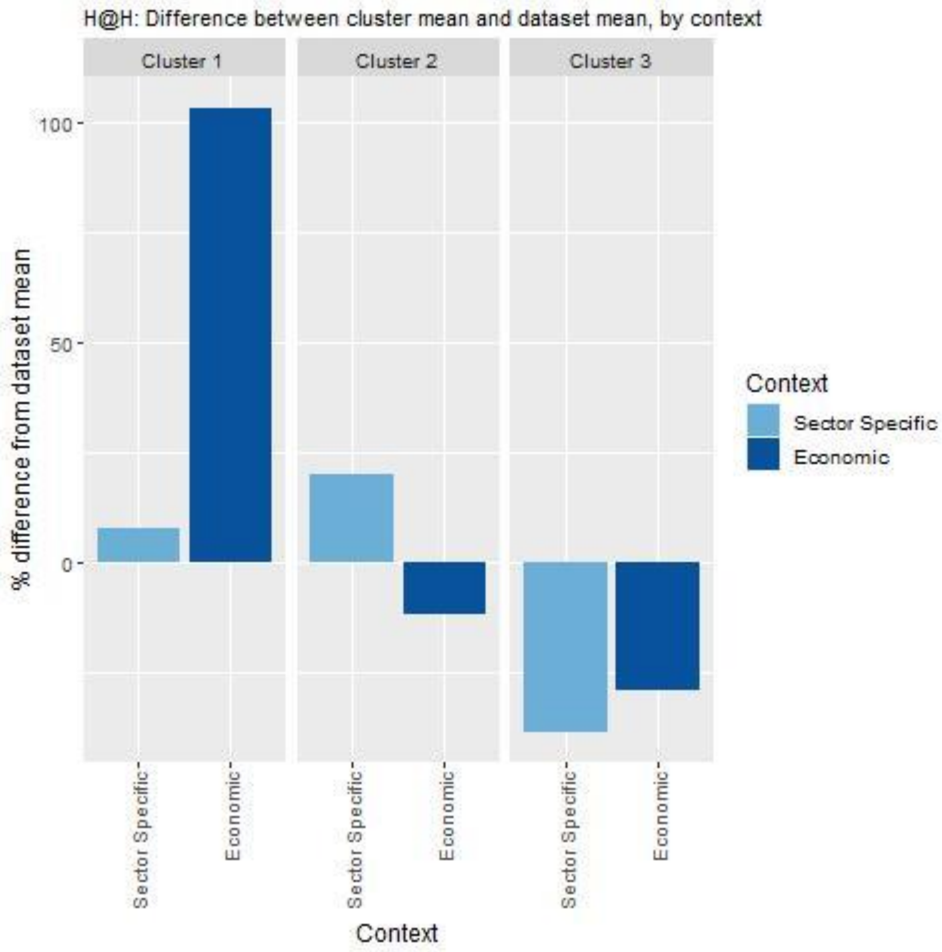
Note: *CHE = current health expenditure. n/a = no data available.
Source: See Table 4.2.

To help consolidate findings from the transferability assessment above, countries have been clustered into one of three groups, based on indicators reported in Table 14.4. Countries in clusters with more positive values have the greatest transfer potential. For further details on the methodological approach used, please refer to Best Practice case study guide.

Key findings from each of the clusters are below with further details in Figure 4.2 and Table 4.4:

- Countries in cluster one have a secondary-care and community-care sector amenable to hospital-at-home programmes. Further these countries typically spend more on secondary care, which is where funding for hospital-at-home programme is sourced.
- Countries in cluster two also have secondary-care and community-care sectors that are supportive of hospital-at-home programmes. However, on average, they spend less on secondary care indicating potential affordability issues. This cluster includes Spain, indicating high levels of spending on secondary care is not a pre-requisite for delivering acute, home-based care.
- Countries in cluster three should consider reviewing whether their healthcare sector has the digital capacity to successfully operate hospital-at-home programmes (e.g. use of EHRs to communicate patient data remotely).

Figure 4.2. Transferability assessment using clustering – Hospital-at-Home



Note: Bar charts show percentage difference between cluster mean and dataset mean, for each indicator.
Source: See Table 14.4.

Table 4.4. Countries by cluster – Hospital-at-Home

Cluster 1	Cluster 2	Cluster 3
Australia	Croatia	Austria
Bulgaria	Cyprus	Belgium
Costa Rica	Czech Republic	Canada
Greece	Denmark	Chile
New Zealand	Estonia	France
Poland	Finland	Hungary
	Iceland	Ireland
	Israel	Latvia
	Italy	Luxembourg
	Lithuania	Portugal
	Mexico	United States
	Netherlands	
	Norway	
	Slovak Republic	
	Slovenia	
	Spain	
	Sweden	
	Switzerland	
	United Kingdom	

Note: The following countries were omitted from the analysis due to high levels of missing data: Colombia, Germany, Japan, Malta, Korea, Romania and Türkiye.

New indicators to assess transferability

Data from publically available datasets alone is not ideal to assess the transferability of public health interventions. Box 4.4 outlines several new indicators policy makers could consider before transferring H@H.

Box 4.4. New indicators, or factors, to consider when assessing transferability – Hospital-at-Home

In addition to the indicators within the transferability assessment, policy makers are encouraged to collect information for the following indicators:

Population context

- Are patients accepting of receiving care in their homes?

Sector specific context (hospital-, primary- and community-based care)

- Do reimbursement models in primary and secondary care promote hospital-at-home type services?
- Do health professionals (e.g. registered nurses) have the skills and feel comfortable providing care in a patient’s home?
- Do electronic health records have the necessary functions to provide hospital care at home?
- Do payment and billing mechanisms support hospital care at home?
- Do healthcare professionals have the skills as well as the motivation to work as a team to deliver patient care?
- Are hospital- and community-based services well integrated?
- Are leadership groups within hospitals supportive of hospital-at-home type programmes?

- What proportion of the population live near a hospital?
- How suitable are patients' homes for hospital-at-home type care?

Political context

- Has the intervention received political support from key decision-makers? (E.g. a national strategy to address ageing and chronicity)
- Has the intervention received commitment from key decision-makers?

Economic context

- What is the cost of implementing and operating the intervention in the target setting and to whom?

Conclusion and next steps

A rise in the number of people living with complex health needs led to the implementation of Catalonia's H@H programme. H@H is a service offering patients acute, home-based care within the comfort of the patient's home as opposed to a hospital setting. H@H aims to improve patient experiences and population health, while reducing the per capita cost of healthcare.

H@H is estimated to lead to cost savings when scaled-up across Spain and transferred to other EU27 countries. On average, EU27 countries are estimated to save EUR 6.75 per person, per year up until 2050 as a result of the hospital-at-home programme. This figure equates to 0.004% of total health expenditure. These savings are similar to those estimated in Spain.

Several policy options are available to enhance the performance of H@H against the five best practice criteria. These include, but are not limited to, adjusting reimbursement schemes to better reflect services provided by H@H programmes and strengthening community-based care to ensure socially vulnerable patients can access H@H.

Hospital-at-home type programmes are more transferable to countries with certain characteristics. Feedback from H@H administrators and a review of the literature identified several factors that facilitate the transfer of hospital-at-home type programmes. These include having strong leadership at the hospital level, a culture of integrated care, reimbursement schemes that incentivise care delivery in the home, as well as a sophisticated health information system.

Box 4.5 summarises next steps for policy makers and funding agencies interested in H@H.

Box 4.5. Next steps for policy makers and funding agencies – Hospital-at-Home

Next steps for policy makers and funding agencies to enhance H@H are listed below:

- Review policy options in this case study to identify and prioritise health policy, for example, strengthening horizontal care integration
- Promote findings from this case study to countries who may be interested in transferring H@H to their local context

Annex 4.A. H@H: Modelling assumptions

Annex Table 4.A.1. Modelling assumptions

	Description
Target group	Everyone aged 18 years and over who has a modelled disease.
Exposure	It is assumed that 1.30% of the target group accesses the H@H programme. This assumption is based on Hernandez et al. (2023[1]) and Herranz et al. (2022[2]) hereby 441 of all 33 859 patients who were admitted to hospital accessed H@H
Effectiveness	None.
Costs	For each year the patient has the disease, costs should be decreased to 53.2% of the original cost. This is based on an upcoming paper by Hernandez et al.: • Cost in the intervention group: 1 078 (during the episode) + 261 (transitional period) = EUR 1 339 • Cost in the control group: 2 171 (during the episode) + 347 (transitional period) = EUR 2 518 • = 1 339 / 2 518 • 53.2% Further, it is assumed that 75% of yearly cost in the incidence year are due to the first 30 days. Therefore, the cost decrease is 53.2% * 75% = 40%
Timeframe	Years 2023-50.

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Notes

[1] A typical H@H team includes one co-ordinator (i.e. physician or nurse), several advanced practice nurses and physicians.

[2] The study population were aged 18 years and over with fee-for-service Medicare or had coverage from a private insurer that contracted for hospital-at-home services. Patients with Medicaid were dually eligible or had Medicaid Managed Care. Patients were eligible if they were admitted into one of four New York city hospitals with a medical diagnosis.

[3] Medicaid provides health coverage to millions of Americans, including eligible low-income adults, children, pregnant women, elderly adults, and people with disabilities.

5

Oulu's Self Care Service, Finland

This chapter covers the Finnish City of Oulu's Self Care Service (SCS), a patient-provider portal. The case study includes an assessment of SCS against the five best practice criteria, policy options to enhance performance and an assessment of its transferability to other OECD and EU27 countries.

Oulu's Self Care Service: Case study overview

Description: In 2011, the City of Oulu, Finland, scaled-up its digital patient-provider portal – the Self Care Service (SCS) – to all residents. SCS offers patients a range of online primary care services such as online appointment booking, messaging with professionals and ePrescriptions. SCS is tethered to each individual's electronic health record (EHR) to ensure health professionals have ready access to patient data. For health professionals, SCS provider guidelines and care pathways based on individual patient data. SCS is voluntary and free-of-charge.

Best practice assessment:

OECD best practice assessment of Oulu's Self Care Service

Criteria	Assessment
Effectiveness	SCS has improved access to healthcare services with number of users increasing by 235% between 2012-20. Evidence from the broader literature on patient portals revealed they improve medication adherence, and patient safety and empowerment, however, their impact on clinical outcomes is less clear.
Efficiency	SCS is estimated to have led to cost savings of EUR 5.12 million between years 2012 and 2016. Evidence supporting the hypothesis that patient portals reduce healthcare utilisation are currently limited.
Equity	SCS is designed to boost uptake among disadvantaged population groups – e.g. it is free of charge and has features that improve usability by people with a disability. Unless this aspect is specifically considered, digital health interventions can widen existing inequalities given the most in need groups are less likely to access such interventions.
Evidence-base	The impact of patient portals is supported by findings from systematic and umbrella reviews, however, individual studies are often of low- to moderate-quality.
Extent of coverage	Over one-third (34%) of Oulu's population actively use SCS, which is higher than the adoption rate of 23% estimated in a recent systematic review and meta-analysis.

Enhancement options: to *enhance effectiveness*, policy makers should continue efforts to boost population health literacy to ensure patients understand the information they receive and therefore appreciate the usefulness of SCS. To *enhance equity*, plans to expand the number of languages available on SCS should be prioritised given languages such as Dari and Somali are spoken by refuges who typically have worse health outcomes. To enhance *the evidence-base*, researchers should capitalise on the high-quality data stored within Finland's national EHR system by evaluating the impact of SCS on outcomes and healthcare utilisation. Several options to *enhance the extent of coverage* are available such as encouraging health professionals to promote SCS to patients.

Transferability: SCS has been transferred from Oulu to other Finnish municipalities. It has not been transferred to other countries, however, many OECD and EU countries allow patients to access their EHR via a patient portal (or have plans to). Results from the transferability assessment using publicly available data revealed SCS is most suited to other Nordic countries, which have digitally advanced healthcare systems.

Conclusion: SCS is a patient-provider portal offering residents of Oulu access to a wide-range of primary care services online. SCS is a global leader in this area, however, further enhancements are possible, as outlined in this case study. A high-level transferability assessment revealed Nordic countries are most suited to SCS, nevertheless, there is political interest among a number of countries to improve patient access to their data.

Intervention description

In 2011, the City of Oulu, Finland, scaled-up its digital patient-provider portal – the Self Care Service (SCS) – to all residents. This section details SCS's objectives, services, access and partnering organisation.

Objectives

SCS's objectives are four-fold and in general aim to address the challenges caused by an ageing population and rising rates of multimorbidity:

- **Improve access** to healthcare services through digital means
- **Improve patient outcomes and safety** by encouraging people to take care of their health, enhancing patient safety, and enabling the City of Oulu's chronic care model
- **Empower people** to take care of their own health thereby improving disease prevention and chronic disease management
- **Reduce pressure on healthcare services** by a) allowing patients to handle tasks independently thereby freeing up primary care professional resources and b) improving access to primary care thereby reducing demand on secondary/tertiary services.

Services

SCS is a voluntary digital patient-provider portal focused on primary care and to a lesser extent social care. SCS has three interfaces: 1) a citizen interface; 2) a primary care professional interface (for general practitioners (GPs) and nurses); and 3) maintenance interface (Lupiañez-Villanueva, Sachinopoulou and Thebe, 2015[1]). SCS services offered as part of the citizen interface are detailed in Box 5.1.

With the patient's consent, data collected through the citizen interface is linked to information within national EHRs, which are widely used across Finland. This ensures primary care professionals have ready access to all patient data. Patients can separately access their EHR via a national website (omakanta.fi).

Box 5.1. Oulu's Self Care Service – citizen interface services

The citizen interface includes a general knowledge and personal health directory. SCS services broken down by Ammenwerth et al.'s (2019[2]) patient-provider portal taxonomy are summarised below:

Access

- Access to primary care services
- View personal health records such as laboratory and x-ray results, vaccinations, medications and diagnoses
- In 2020, SCS expanded its services to allow users to book and receive results from a COVID-19 test

Request

- Book primary care appointments (e.g. for check-ups and laboratory and dental appointments)
- ePrescriptions (renewals)

Communicate

- Make contact with primary care and social service professionals for non-urgent queries given primary care professionals are available during office hours only

Share

- Home monitoring, for example, blood pressure, blood glucose, asthma, weight, sleep and alcohol consumption (several measurement devices can be linked to SCS or manually uploaded)

Manage

- Information on prevention such as well-being and treatment of illnesses (provided by Duodecim Medical Publications Ltd, a large medical publisher)

Education

- Risk measurement and weight control support, for example, through nutrition diaries
- Access to information on social claims and benefits (e.g. the types of benefits a person is eligible for)

The primary care professional interface connects professionals with patients. It provides professionals with tailored guidelines and care pathways based on individual patient information such as laboratory results. Further, primary care professionals can use the interface to contact social care when a patient has need of their services (Lupiañez-Villanueva, Sachinopoulou and Thebe, 2015[1]).

Partnering organisation

SCS is a public private partnership between the City of Oulu and CSAM, an eHealth company targeting Nordic countries. Specifically, SCS utilises CSAM S7 technology (for further details, see the following link: https://www.csamhealth.com/solutions/connected-healthcare/csam-s7/).

OECD Best Practice Framework assessment

This section analyses Oulu's SCS against the five criteria within OECD's Best Practice Identification Framework – Effectiveness, Efficiency, Equity, Evidence-base and Extent of coverage (see Box 5.2 for a high-level assessment of SCS). Further details on the OECD Framework can be found in Annex A.

Box 5.2. Assessment of the City of Oulu's Self Care Service

Effectiveness

- Between 2012 and 2020, the number of SCS users increased by 235%. On average, each user logs into the service between 5 to 10 times
- SCS has been a useful resource during the COVID-19 pandemic, with over 60 000 test results uploaded to the platform
- Systematic reviews on the impact of patient-provider portals show they positively affect behavioural outcomes (e.g. medication adherence) and empower patients. However, their impact on clinical outcomes is mixed.

Efficiency

- SCS is estimated to have saved over EUR 5 million between 2012 and 2016.
- In the broader literature, there is limited evidence to suggest patient portals reduce utilisation of healthcare services (e.g. hospitalisations).

Equity

- SCS was designed to maximise coverage including among disadvantaged populations such as those with a low socio-economic status – e.g. the service is free-of-charge and has features making it easy to use for those with a disability
- SCS is currently available in Finnish but there are plans to expand to other languages include Arabic, Dari and Somali, which are commonly spoken among refugees
- Despite processes to ensure disadvantaged population groups have access to SCS, there is a risk that groups with the greatest need for the service have the lowest level of access

Evidence-base

- Utilisation of SCS services was measured using routine data collected from patients. The data is accurate and reliable given it is stored in a sophisticated electronic health information system.
- The impact of patient portals on clinical outcomes, safety, empowerment and healthcare utilisation were drawn from several systematic and umbrella reviews including low, moderate and high quality studies.

Extent of coverage

- The proportion of Oulu citizens who logged into SCS grew from 11% to 34% between 2012 and 2020, which is higher than the mean patient portal adoption rate – 23% – estimated within a recent systematic review and meta-analysis
- The majority of users are women (60%) and a significant proportion (22%) are aged 65+
- The use of SCS amongst primary care professionals is also high given the country's focus on building a digitally literate health workforce

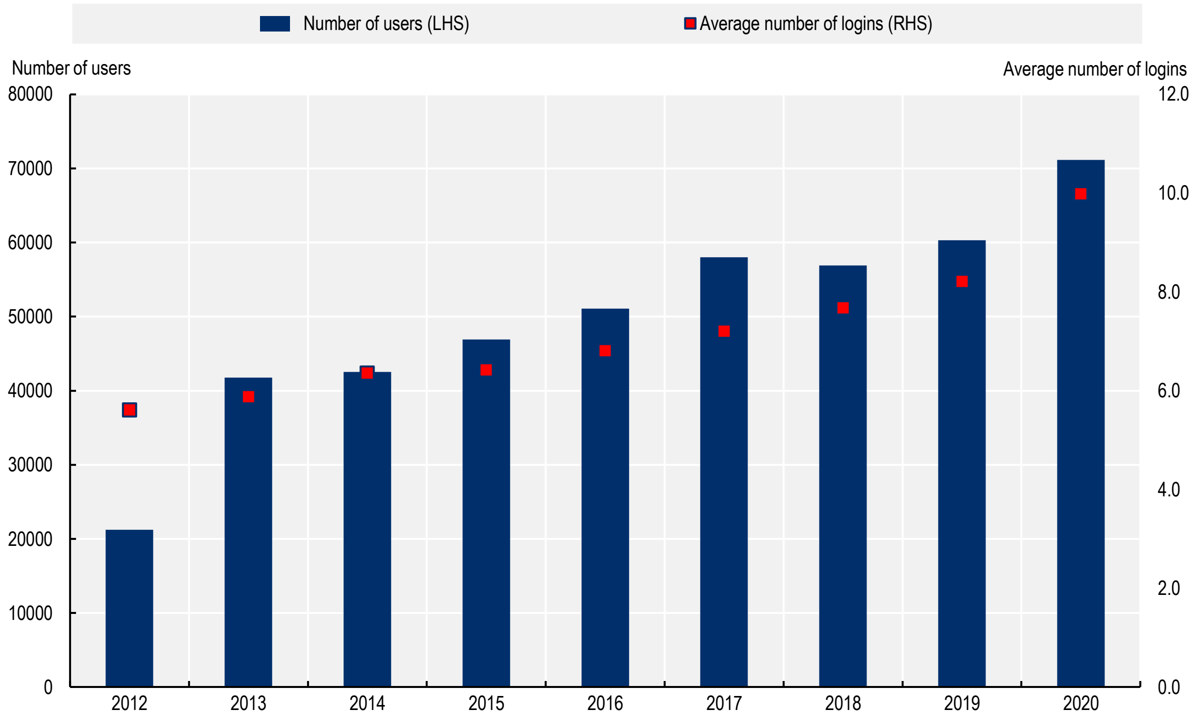
Effectiveness

The objectives of Oulu's SCS are to 1) improve access to healthcare, 2) improve patient outcomes and safety, 3) empower people and 4) reduce pressure on healthcare services. The remainder of this section explores SCS's performance against the first three objectives, while objective 4 is explored under "Efficiency".

The number of people accessing care through SCS has grown markedly, and has been a key resource during the COVID-19 pandemic

Between 2012 and 2020, the number of SCS users increased from 21 252 to 71 157 (a 235% increase) (Figure 5.1). (Details on the breakdown of SCS users – e.g. by gender and age – are explored under the criterion "Extent of Coverage"). The average number of logins per user also increased from 5.6 logins per year to 10 over the same period.

Figure 5.1. Number of SCS users and average number of logins, 2012-20



Note: LHS = left hand side axis. RHS = right hand side axis.
Source: Data provided by Oulu Self Care Service administrators.

Other findings related to healthcare access from SCS patients are summarised below:

- COVID-19 **tests**: between August 2020 and March 2021, 61 843 COVID-19 test results were uploaded onto SCS
- **Messages to health professionals**: since 2012, health professionals have received over 400 000 messages through the portal. Patients who use the messaging feature, on average, send between 1-3 messages per year.
- **ePrescriptions**: over 18 000 prescriptions were renewed online between 2012 and 2016. In 2017, Kanta, the national digital service for health and social care, overtook responsibility for this service.

Patient-provider portals improve medication adherence and patient safety, however, their impact on health outcomes is less clear

Data from SCS and national EHRs can be linked, therefore, it is possible for future studies to assess what impact SCS has on health outcomes and health expenditure. Given this information is not readily available, the following paragraph summarises the literature on the impact patient-provider portals have on psychological, behavioural and clinical outcomes.

In 2019, Han et al. (2019[3]) published results from a systematic review on the impact of patient portals on psychological, behavioural and clinical outcomes. Findings from the review concluded patient portals have a significant, positive impact on medication adherence and access to preventative services (e.g. papsmear tests and cervical cancer screening). On patient safety, there is moderate quality evidence indicating portals improve safety by allowing patients to request correction of errors, in particular, medication errors (Antonio, Petrovskaya and Lau, 2020[4]). Conversely, the impact of patient portals on psychological outcomes (e.g. healthy eating) and clinical outcomes (e.g. blood pressure, glycemic, cholesterol and weight control) is mixed. Regarding clinical outcomes, findings from Han et al. (2019[3]) align with recent systematic and umbrella reviews which conclude there is insufficient or low-strength evidence to support the positive impact of patient portals on clinical outcomes (Ammenwerth et al., 2019[2]; Antonio, Petrovskaya and Lau, 2020[4]).

Patient portals empower patients to take control of their health

Patient portals play a key role in delivering patient-centred care as they allow users to engage in shared decision-making and encourage patient self-management. Information on patient empowerment and Oulu's SCS is not available. In the broader literature, there is evidence supporting the hypothesis that patient portals "empower patients in shared decision making" and "encourage engagement in self-care and self-management" (Antonio, Petrovskaya and Lau, 2020[4]).

Efficiency

SCS led to an estimated savings of EUR 5 million between 2012-16, yet evidence in the broader literature is scarce

An analysis undertaken by SCS administrators estimated that between 2012 and 2016, the service led to cost savings of EUR 5.12 million. The calculation is based on the assumption that SCS reduces the time taken to deliver services and that each minute saved reduces costs by EUR 0.5.

Evidence on patient portal efficiency gains within the broader literature are summarised in Box 5.3.

Box 5.3. The efficiency of patient-provider portals: Findings from the literature

Patient-provider portals are associated with several efficiency gains. Patient portals can reduce inpatient and emergency care visits due to an improvement in preventative care, chronic disease management and medication adherence. They are also associated with short-term efficiency gains resulting from saved time (e.g. reduction in travel time for patients, reduced burden on caregivers) (Kruse et al., 2015[5]).

Despite potential savings, the literature on the efficiency of patient-provider portals is scarce, further, information that is available shows mixed results (Goldzweig et al., 2013[6]). A systematic review on the impact of patient-provider portals on efficiency/utilisation found that of the studies analysed:

- Three recorded no change in utilisation of healthcare services between portal users and nonusers
- One recorded a decrease in primary care visits and an increase in telephone visits for users
- One recorded an increase in utilisation of healthcare services after the introduction of a portal system (Goldzweig et al., 2013[6]).

Findings from Goldzweig et al. (2013[6]) are supported by a recent umbrella review of patient-provider portals, which concluded that the evidence supporting a link between portal use and hospitalisations emergency department visits, as well as office, primary, specialists or after-hours visits was low quality (Antonio, Petrovskaya and Lau, 2020[4]). Similarly, the review concluded there was only low quality evidence to support a reduction in provider workload and moderate strength evidence that portals had no impact on workload (Antonio, Petrovskaya and Lau, 2020[4]).

1. Of the remaining two studies, one examined medical adherence only while the other examined differences between two types of portals.

Equity

The SCS is free-of-charge and easy to use, but may be less accessible by disadvantaged population groups

Oulu is available free of charge to all citizens of Oulu who have access to the internet and a bank account or mobile phone. By not charging a fee, individuals from lower socio-economic status backgrounds are more likely to access the service. SCS also takes into account the needs of certain disadvantaged groups by providing services in a format that enhances usability for those with a disability. For example, the video platform has an easy to use function for people with chronic illnesses or a disability.

SCS is currently available in Finnish, the official language of the country, however, there are plans to expand to other languages, namely English, Arabic, Dari and Somali.

Despite processes to ensure disadvantaged population groups have access to SCS, like any digital health intervention, there is a risk that groups with the greatest need for the service have the lowest level of access. An umbrella review of patient portals in 2020 found patient portal users were more likely to have a higher income and education level, similarly those with lower health literacy and numeracy skills were less likely to be portal users (Antonio, Petrovskaya and Lau, 2020[4]). These findings align with OECD data for Finland which showed that 86% of people in the highest income quartile had used the internet to search for health related information in the past three months compared to 65% in the lowest income quartile (nevertheless, both of these figures are markedly higher than the EU average of 63% and 45%, respectively).

Evidence-base

The impact of patient-provider portals is supported by findings from systematic and umbrella reviews

As outlined under the "Intervention description", SCS has four key objectives. Evidence from SCS is available for two of these objectives – "improve access" and "reduce pressure on healthcare services". For the remaining two objectives – "improve patient outcomes and safety" and "empower people" – evidence was drawn from the broader literature on patient-provider portals.

The evidence-based criterion explores the quality of evidence used for each of these objectives, which includes systematic and umbrella reviews (see Box 5.4). For this reason, the *Quality Assessment Tool for Quantitative Studies* from the Effective Public Health Practice Project was not used as it is more suitable when assessing singular studies.

Box 5.4. Quality of evidence supporting patient-provider portals

Summarised below is the quality of evidence used to assess SCS's against its four key objectives.

Improve access

- Data on the number of users, logins, message and services received via SCS were measured using routine electronic data. The data is accurate and reliable given it is stored in a sophisticated electronic health information system.

Improve patient outcomes and safety

- The impact of patient-provider portals on outcomes and safety was assessed using information from three recent systematic or umbrella reviews:

- → Han et al. (2019[3]) undertook a systematic review to assess the impact of patient portals on patient outcomes. In total, 24 studies met the inclusion criteria, of which: 10 were RCTs (9 high quality and 1 medium quality); 7 were quasi-experimental (6 high quality and 1 low quality); 6 were cohort studies (4 high quality and 2 moderate quality); and 1 mixed-method study (high quality).
- → Atonio et al. (2020[4]) used an umbrella review to synthesis the "state of evidence" on patient-provider portals. Their study included 14 reviews, whose quality was assessed using GRADE and (Grading of Recommendations, Assessment, Development and Evaluations) and CERQual (Confidence in the Evidence from Review of Qualitative Research). The quality of evidence to assess behavioural outcomes (medication adherence and use of preventative services) was of moderate quality, while evidence on clinical outcomes was low-to-moderate quality.
- → Ammenwerth et al. (2019[2]) identified 10 RCTs from a systematic review of the literature on the impact of patient portals on empowerment and health outcomes. RCTs are considered the "gold standard" for evaluating the effectiveness of interventions.

Empower people

- Atonio et al.'s (2020[4]) umbrella review rated evidence supporting the impact of patient portals on patient empowerment as moderate-quality.

Reduce pressure on healthcare services

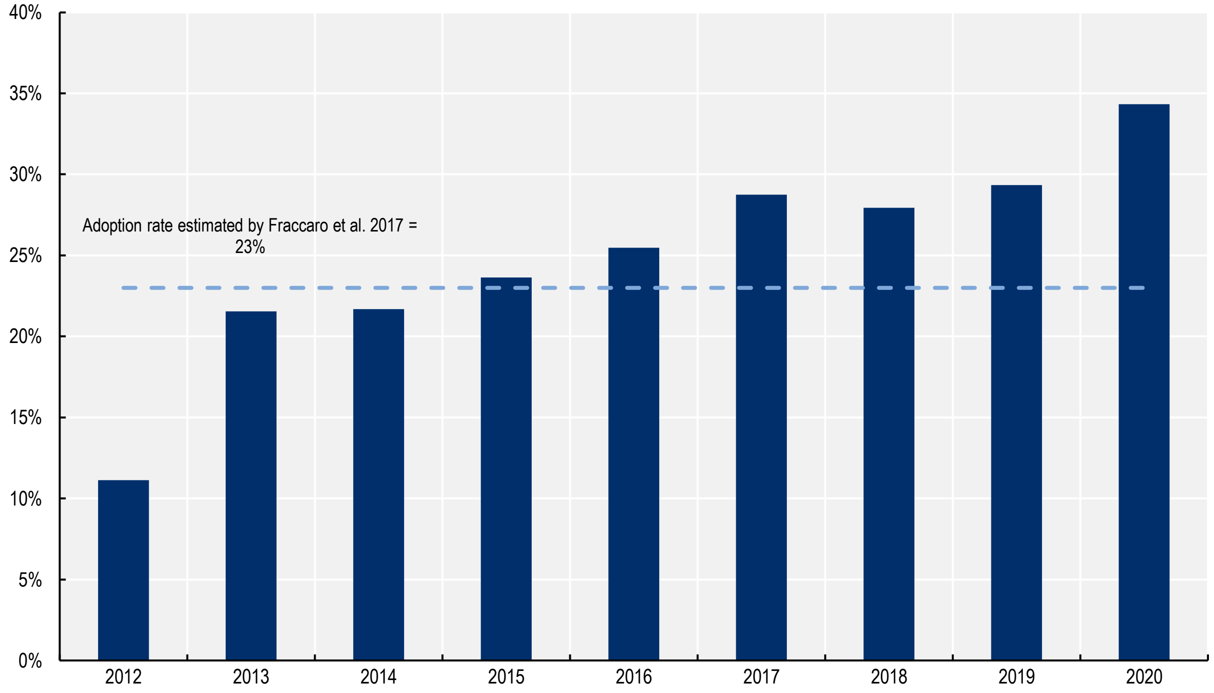
- A predictive study based on routine patient data was used to estimate savings generated from SCS. Several assumptions were used to perform the analysis, which is common when necessary information to calculate a precise figure is not available. Nevertheless, results should be interpreted cautiously.
- Goldzweig (2013[6]) used a systemic review to assess the impact of patient portals on health outcomes, satisfaction, efficiency and attitudes.
- Atonio et al. (2020[4]) rated evidence on the link between portal use and healthcare utilisation as low quality.

Extent of coverage

The mean adoption rate of SCS is higher than the average calculated in a recent systematic review and meta-analysis

The proportion of eligible Oulu citizens who logged into SCS has grown markedly since 2012 – from 11% to 34% (Figure 5.2). This is higher than the mean adoption rate of 23% estimated within a 2017 systematic review and meta-analysis of patient portals (Fraccaro et al., 2017[7]).

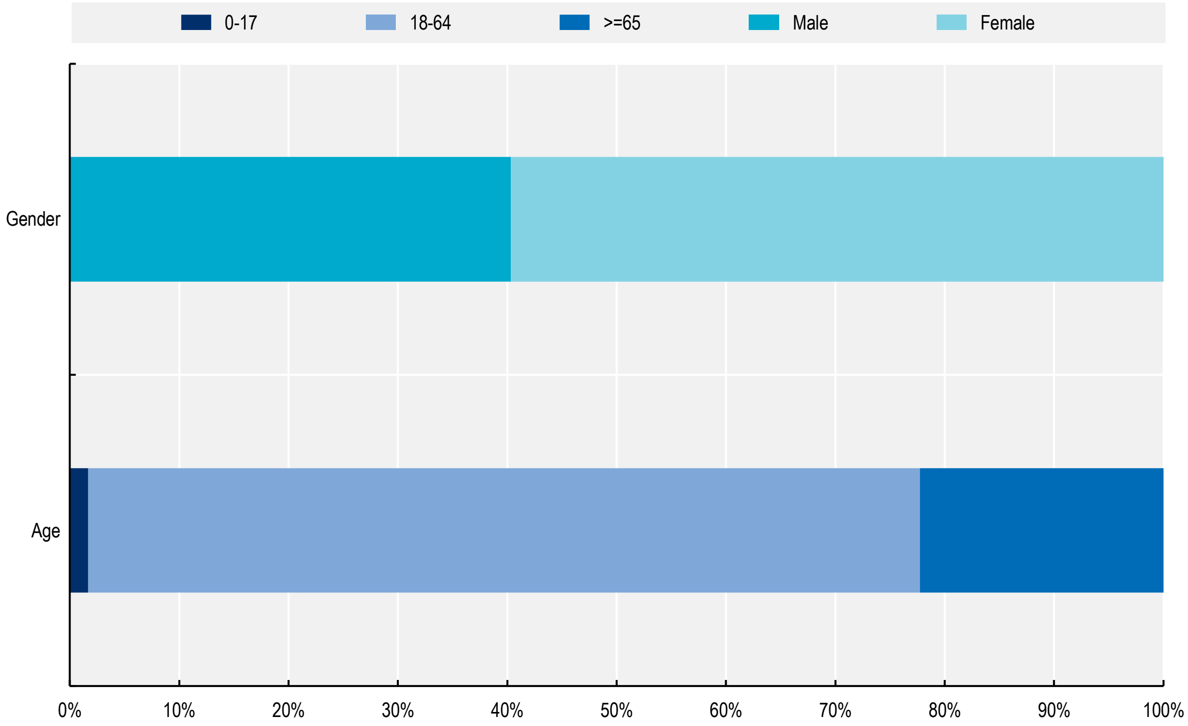
Figure 5.2. Adoption rate, 2012-20



Source: Data provided by Oulu Self Care Service administrators; Statistics Finland (2020[8]), "Key figures on population by Area, Information and Year, 1999-2020", https://www.stat.fi/index_en.html; Fraccaro et al. (2017[7]), "Patient portal adoption rates: A systematic literature review and meta-analysis", https://doi.org/10.3233/978-1-61499-830-3-79.

The majority of SCS users are women (60%), further a significant proportion are aged 65 years and over (22%) (Figure 5.3). Given people aged 65 years and over in Oulu comprise 16% of the population, these results indicate the older population are comfortable using digital technology to access healthcare (Statistics Finland, 2020[9]).

Figure 5.3. Breakdown of SCS users by age and gender – 2020



Source: Data provided by Oulu Self Care Service administrators.

Healthcare professionals in Finland are digitally literate resulting in high uptake of digital tools, including patient-provider portals

Finland has prioritised building a digitally literate health workforce. Digital health literacy is a core competency for health professionals working in Finland. For example, every university in Finland plans to provide nurses and medical students with streamlined digital health education – MEDigi. The aim of MEDigi is to harmonise and digitise national teaching to ensure medical graduates have the appropriate digital skills. Results from a recent eHealth survey in Europe reflect this commitment with Finland recording the third highest eHealth adoption rate amongst GPs (European Commission, 2018[10]).[1]

A digitally literate health workforce has led to a high uptake of SCS amongst professionals. As of 2020, over 600 primary care professionals use SCS,[2] most of which are either doctors or nurses. Between 2012 and 2020, the number doctors and nurses registered with SCS increased by 173% and 62%, respectively.

Policy options to enhance performance

Successful patient-provider portals are integrated with patient data (e.g. EHRs), provide clinical decision support tools, and offer secure messaging and ePrescriptions, all of which are features of Oulu’s SCS (Shaw, Hines and Kielly-Carroll, 2018[11]). Nevertheless, policy options to enhance the performance of Oulu’s SCS are available to SCS administrators and policy makers.

Enhancing effectiveness

Higher levels of population health and digital health literacy (HL) will help SCS achieve its objectives. HL refers to an "individual's knowledge, motivation and skills to access, understand, evaluate and apply health information" (OECD, 2018[12]). When people are health literate they are more likely to act on health information they receive, take greater responsibility for their own health, as well as engage in shared decision-making. Several interventions to boost HL levels exist in Finland including health education courses taught in schools, as well courses that teach participants basic skills on how to manage challenges associated with poor health (Evivo international programme) (OECD, 2018[12]). Relevant policy makers should continue efforts to boost HL drawing upon OECD's four-pronged policy approach (see Box 5.5).

Box 5.5. Building population health literacy

Recent analysis estimated that more than half of OECD countries with available data had low levels of HL. To address low rates of adult health literacy, OECD have outlined a four-pronged policy approach, which align:

- **Strengthen the health system role**: establish national strategies and framework designed to address HL
- **Acknowledge the importance of HL through research**: measure and monitor the progress of HL interventions to better understand what policies work
- **Improve data infrastructure***:* improve international comparisons of HL as well as monitoring HL levels over time
- **Strengthen international collaboration**: share best practice interventions to boost HL across countries.

Source: OECD (2018[12]), "Health literacy for people-centred care: where do OECD countries stand?", https://www.doi.org/10.1787/d8494d3a-en.

Enhancing efficiency

Efficiency is calculated by obtaining information on effectiveness and expressing it in relation to inputs used. Therefore, policies to boost effectiveness without significant increases in costs will have a positive impact on efficiency.

Enhancing equity

Execute plans to increase the number of languages available on SCS. In the City of Oulu, the proportion of people speaking a foreign language grew by 3.2 percentage points between 2000 and 2019 (1.2% to 4.4%) (Statistics Finland, 2019[13]). To ensure SCS is accessible by all residents, plans to expand the number of languages available on the service are encouraged – i.e. Arabic, Dari and Somali. These languages are frequently spoken by refugees (e.g. from Afghanistan and Somalia) who typically experience worse health outcomes and therefore have the most to gain from better access to care.

Support adoption of SCS among disadvantaged population groups. Certain disadvantaged population groups are less likely to access and therefore benefit from digital health interventions, such as patient-provider portals. Therefore, uptake of SCS among disadvantaged population groups should be a key priority. In Estonia, for example, patients with lower levels of digital literacy can receive training on how to use digital tools. Further, as part of its eHealth strategy, Estonia prioritises interventions that improve the skills needed to self-manage and self-educate using online solutions (OECD, 2019[14]).

Enhancing the evidence-base

Undertake an in-depth study into the impact of SCS on patient outcomes, and healthcare utilisation and costs. SCS is tethered to Finland's national EHR, which is one of the most advanced among OECD and EU countries (Oderkirk, 2017[15]). Administrators of Oulu's SCS are encouraged to capitalise on this advantage by evaluating the impact of SCS on healthcare outcomes and utilisation, and thus costs. Indicators of interest are summarised in Box 5.6, which could be compared between SCS users and non-users, for example, using propensity score matching (an econometric technique that creates an artificial control group by matching each SCS user with a non-user based on available characteristics).

Box 5.6. Indicators measuring the impact of patient-provider portals

This box lists example indicators to evaluate the impact of patient-provider portals, such as SCS. For example, this data would allow researchers to examine whether SCS increased use of primary services and the flow-on affect this has on secondary care use.

Outcomes

- Blood pressure control
- Cholesterol control
- Glycaemic control
- Weight (BMI)

Utilisation

- Use of preventative services (e.g. cancer screening, papsmear tests, blood pressure checks and vaccinations)
- Primary care visits
- Specialist visits
- Hospitalisations and average length of stay
- Emergency department visits

Enhancing extent of coverage

Encourage health professionals to promote SCS to patients. There are high levels of public trust in the health workforce; therefore, health professionals can play an important role in boosting uptake of SCS amongst patients. A way of encouraging adoption of digital tools is to make them available in provider settings and have "professionals demonstrate and support their use" (OECD, 2019[14]).

Promote SCS using a targeted approach. The more useful an intervention is perceived to be, the higher the uptake. The usefulness of SCS will differ across population groups: for example, being able to upload medical information from home is of high use to multimorbid patients, but of less concern to younger populations who may perceive online appointment bookings as SCS's key feature. For this reason, promotional activities should target different population groups.

Ensure SCS remains a trusted and non-burdensome tool for health professionals. Uptake of SCS among health professionals in Oulu is high. To maintain high levels of engagement, it is important that update and amendments to SCS (OECD, 2019[14]):

- Are evidence-based in order to maintain trust among health professionals and patients

- Include input and feedback from health professionals and patients, who are the end-users
- Do not negatively affect usability and continue to be integrated into current practice (i.e. the portal does not increase the workload of health professionals).

Improve access to children and teenagers. As specified by Oulu SCS administrators, better access for children and teenagers is needed – i.e. either with direct access or via their parents. This requires an update to current legislation and technical solutions to ensure privacy and safe access.

Boost population HL so that patients understand information presented and thus the usefulness of the service. Policy options to enhance HL are explored under "Enhancing effectiveness".

Transferability assessment

This section explores the transferability of SCS and is broken into three components: 1) an examination of previous transfers; 2) a transferability assessment using publicly available data; and 3) additional considerations for policy makers interested in transferring SCS.

Previous transfers

Oulu's SCS originally started as a pilot programme at one of Oulu's technology health centre in 2008. Following the success of the pilot, the programme was scaled-up across the whole of Oulu in 2011 and later transferred to the municipalities of Oulunkaari and Raahe (with some necessary adaptions).

SCS has not been transferred to another country, however, patient portals are common in OECD and EU countries – for example, based on a 2016 EHR survey, 12 (out of 15) OECD countries reported they have or are in the process of implementing an ICT system that gives people access to their own health data (OECD, 2019[14]).

Transferability assessment

The following section outlines the methodological framework to assess transferability and results from the assessment.

Methodological framework

Details on the methodological framework to assess transferability can be found in Annex A.

Several indicators to assess the transferability of SCS were identified (see Table 5.1). Indicators were drawn from international databases and surveys to maximise coverage across OECD and non-OECD European countries. Please note, the assessment is intentionally high level given the availability of public data.

Table 5.1. Indicators to assess transferability – Oulu's Self Care Service

Indicator	Reasoning	Interpretation
Population context		
% of individuals using the Internet for seeking health information in the last 3 months	SCS is more transferable to a country with a population comfortable seeking health information online	↑ value = more transferable
ICT Development Index*	SCS is more transferable to a country with a population living in a more digitally advanced country	↑ value = more transferable

Indicator	Reasoning	Interpretation
Sector context (primary care / digital care)		
% of tertiary institutions (public and private) that offer ICT for health (eHealth) courses	SCS is more transferable if health professional students receive eHealth training	↑ value = more transferable
% of institutions or associations offering in-service training in the use of ICT for health as part of the continuing education of health professionals	SCS is more transferable if health professionals have appropriate eHealth training	↑ value = more transferable
Legislation exists to protect the privacy of personally identifiable data of individuals, irrespective of whether it is in paper or digital format	SCS is more transferable to countries with legislation to protect patient data (i.e. patients are confident their data is secure)	'Yes' = more transferable
eHealth composite index of adoption amongst GPs**	SCS is more transferable to countries where GPs frequently use eHealth technologies	↑ value = more transferable
Proportion of physicians in primary care facilities using electronic health records (EHRs)	Patient portals are linked to information from EHRs, therefore, SCS is more transferable to countries where EHRs are used in primary care	↑ value = more transferable
Political context		
A national eHealth policy or strategy exists	SCS is more transferable if the government is supportive of eHealth	'Yes' = more transferable
A national health information system (HIS) policy or strategy exists	SCS is more likely to be successful if the government is supportive of improving health information systems	'Yes' = more transferable
Economic context		
% of funding contribution for eHealth programmes provided by public funding sources over the previous two years	SCS is more likely to be successful in a country whose government spends more on eHealth	↑ value = more transferable

Note: *The ICT development index represents a country's information and communication technology capability. It is a composite indicator reflecting ICT readiness, intensity and impact (ITU, 2020[16]). **The eHealth composite index of adoption amongst GPs is made up of adoption in regards to electronic health records, telehealth, personal health records and health information exchange (European Commission, 2018[10]).

Source: ITU (2020[16]), "The ICT Development Index (IDI): conceptual framework and methodology", https://www.itu.int/en/ITU-D/Statistics/Pages/publications/mis/methodology.aspx; OECD (2019[17]), "Individuals using the Internet for seeking health information – last 3 m (%) (all individuals aged 16-74)"; European Commission (2018[10]), "Benchmarking Deployment of eHealth among General Practitioners (2018)", https://op.europa.eu/en/publication-detail/-/publication/d1286ce7-5c05-11e9-9c52-01aa75ed71a1; WHO (2015[18]), "Atlas of eHealth country profiles: The use of eHealth in support of universal health coverage", https://www.afro.who.int/publications/atlas-ehealth-country-profiles-use-ehealth-support-universal-health-coverage; Odenkirk (2017[15]), "Readiness of electronic health record systems to contribute to national health information and research", https://dx.doi.org/10.1787/9e296bf3-en.

Results

The majority of countries with available data have developed a national eHealth policy and/or a national health information system policy indicating there is political support for digital health interventions, such as patient-provider portals (see Table 5.2). These policies are supported by government funding with 26 out of 35 countries (with available data) stating a "very high" (>75%) proportion of funding for eHealth comes from public sources.

Implementing a patient-provider portal, however, may require additional resources (time, financial, expertise) when compared to Finland, given the country is a digital health leader. For example:

- Finland recorded the highest proportion of people seeking healthcare online (76% versus the OECD/EU average of 54%) and the second highest eHealth adoption rate amongst GPs (2.64 composite score compared to the 2.1 average amongst European countries with available data)
- Between 25-50% of tertiary institutions and associations offer health professionals ICT training, both during training and as part of continuing education (i.e. a "Medium" proportion of institutions)
- 100% of primary care physician offices use electronic healthcare records compared to an average of 79% among countries with available data

- Finland has an ICT development index value of 8.1, which was one of the highest amongst examined countries.

Results from the transferability assessment indicate Nordic countries such as Denmark, Iceland and Sweden are suitable candidates for this intervention. This finding aligns with feedback from Oulu SCS administrators who stated that “Nordic Countries, most of which follow similar social and health strategies and have similar infrastructure and population characteristics (web use, technologically-experienced users even in older age groups) would be good candidates for adopting such a service” (Lupiañez-Villanueva, Sachinopoulou and Thebe, 2015[1]).

Table 5.2. Transferability assessment by country (OECD and non-OECD European countries) – Oulu's Self Care Service

A darker shade indicates SCS is more transferable for that particular country

Country	% individuals seeking health information online	ICT index value	% tertiary institutions offering eHealth training	% institutions offering in-service training in eHealth	Legislation to protect digital patient data	eHealth adoption amongst GPs (composite score)	% EHR use in primary care	National eHealth policy	National HIS* policy	% public funding for eHealth programs
Finland	**76**	**8.1**	**Medium**	**Medium**	**Yes**	**2.644**	**100**	**Yes**	**Yes**	**Very High**
Australia	42	8.2	Medium	High	n/a	n/a	96	Yes	No	Very High
Austria	53	7.5	Low	Low	Yes	1.914	80	No	Yes	Very High
Belgium	49	7.7	Low	Low	Yes	2.067	n/a	Yes	Yes	Very High
Bulgaria	34	6.4	Medium	Medium	Yes	1.809	n/a	Yes	Included in eHealth policy	Low
Canada	59	7.6	High	Low	Yes	n/a	77	Yes	No	Very High
Chile	27	6.1	Low	Low	Yes	n/a	65	Yes	Yes	Very High
Colombia	41	5.0	n/a	n/a	Yes	n/a	n/a	n/a	n/a	Very High
Costa Rica	44	6.0	Medium	Medium	Yes	n/a	n/a	Yes	Yes	Very High
Croatia	53	6.8	Low	Medium	Yes	2.18	3	Yes	Yes	Very High
Cyprus	58	6.3	Medium	Low	n/a	1.934	n/a	Yes	Included in eHealth policy	Very High
Czech Republic	56	7.2	Medium	n/a	Yes	2.063	n/a	No	Yes	Low
Denmark	67	8.8	Medium	Very high	Yes	2.862	100	Yes	Included in eHealth policy	Very High
Estonia	60	8.0	Medium	Low	Yes	2.785	99	Yes	Yes	Very High
France	50	8.0	n/a	n/a	n/a	2.054	80	n/a	n/a	n/a
Germany	66	8.1	n/a	n/a	n/a	1.941	n/a	n/a	n/a	n/a
Greece	50	6.9	Medium	Medium	Yes	1.785	100	Yes	Yes	Very High
Hungary	60	6.6	Low	n/a	Yes	2.028	n/a	No	No	Very High
Iceland	65	8.7	Very High	Very high	Yes	n/a	100	Yes	Yes	Very High
Ireland	57	7.7	n/a	Low	Yes	2.103	95	Yes	Yes	Low
Israel	50	7.3	High	Low	Yes	n/a	100	No	No	Very High
Italy	35	6.9	Low	High	Yes	2.185	n/a	Yes	Yes	Very High

Country	% individuals seeking health information online	ICT index value	% tertiary institutions offering eHealth training	% institutions offering in-service training in eHealth	Legislation to protect digital patient data	eHealth adoption amongst GPs (composite score)	% EHR use in primary care	National eHealth policy	National HIS* policy	% public funding for eHealth programs
Japan	n/a	8.3	n/a	n/a	Yes	n/a	36	Yes	Yes	n/a
Korea	50	8.8	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Latvia	48	6.9	Low	Low	Yes	1.826	70	Yes	Included in eHealth policy	Low
Lithuania	61	7.0	Medium	Low	Yes	1.647	n/a	Yes	Included in eHealth policy	High
Luxembourg	58	8.3	Low	Low	Yes	1.776	n/a	Yes	Yes	Very High
Malta	59	7.5	Very High	Very high	Yes	n/a	n/a	No	No	Very High
Mexico	50	4.5	Medium	Low	Yes	n/a	30	n/a	n/a	n/a
Netherlands	74	8.4	High	High	Yes	n/a	n/a	Yes	Included in eHealth policy	Very High
New Zealand	n/a	8.1	Medium	Very high	Yes	n/a	95	Yes	No	Low
Norway	69	8.4	Low	Medium	Yes	n/a	100	Yes	Yes	Very High
Poland	47	6.6	High	Medium	Yes	1.837	30	Yes	Yes	Very High
Portugal	49	6.6	Low	Low	Yes	2.118	n/a	No	Yes	High
Romania	33	5.9	n/a	n/a	Yes	1.788	n/a	Yes	n/a	n/a
Slovak Republic	53	6.7	n/a	n/a	n/a	1.756	89	n/a	n/a	n/a
Slovenia	48	7.1	High	High	Yes	1.998	n/a	No	No	Very High
Spain	60	7.5	Low	Medium	Yes	2.365	99	No	Yes	Very High
Sweden	62	8.5	Very High	Very high	Yes	2.522	100	Yes	No	Very High
Switzerland	67	8.5	Low	Very high	Yes	n/a	40	Yes	Included in eHealth policy	Low
Türkiye	51	5.5	n/a	n/a	Yes	n/a	n/a	No	No	Low
United Kingdom	67	8.5	Medium	High	Yes	2.517	99	Yes	Yes	Very High
United States	38	8.1	Low	Low	Yes	n/a	83	Yes	Yes	n/a

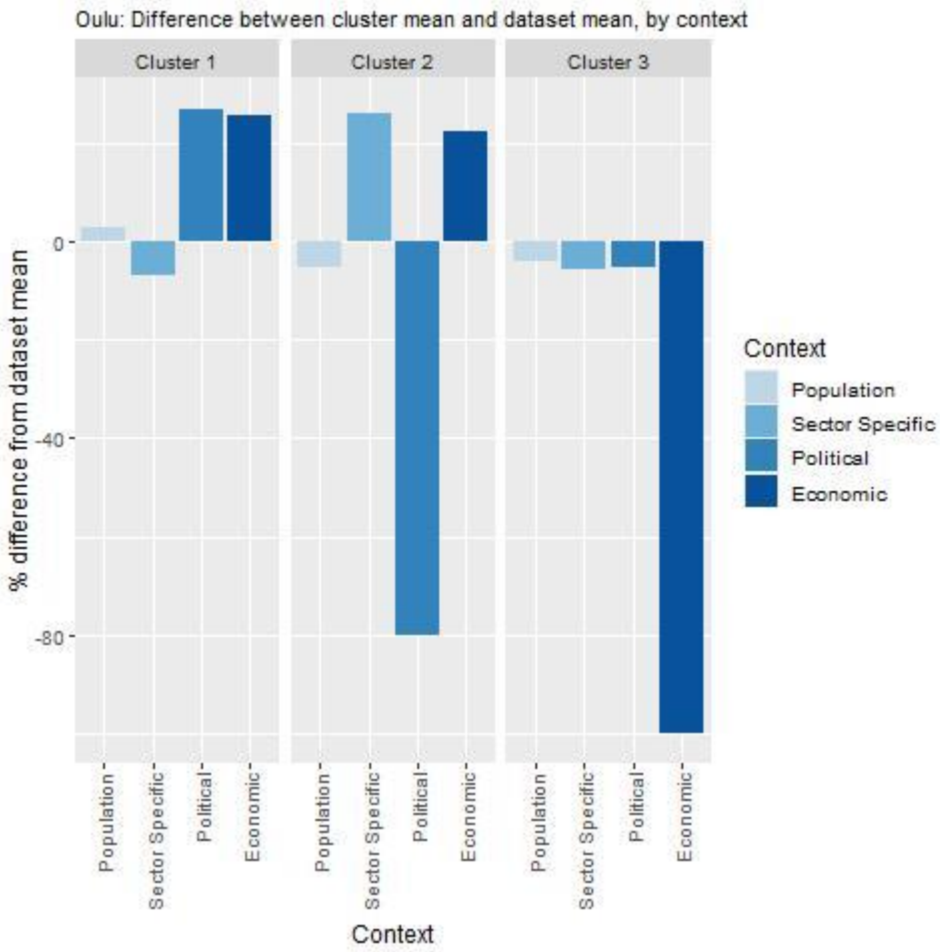
Note: *HIS = health information system. n/a = data is missing.
Source: See Table 5.1.

To help consolidate findings from the transferability assessment above, countries have been clustered into one of three groups, based on indicators reported in Table 5.1. Countries in clusters with more positive values have the greatest transfer potential. For further details on the methodological approach used, please refer to Annex A.

Key findings from each of the clusters are below with further details in Figure 5.4 and Table 5.3:

- Countries in cluster one have population, political, and economic arrangements in place to transfer Oulu's SCS, and are therefore good transfer candidates. Finland, which operates SCS, falls into this cluster.
- A high proportion of funding for eHealth programs comes from the government for countries in cluster two, indicating SCS is likely to be affordable in the long-run. Further, these countries have sector specific arrangements in place that support SCS such as a digitally health literate workforce. However, prior to transferring SCS, these countries should undertake further analysis to ensure SCS aligns with overarching political priorities, which is necessary for long-term sustainability.
- Countries in cluster are encouraged to undertake further analysis to ensure the right conditions are in place to support the transfer of SCS, in particular, to ensure the intervention is affordable in the long term.

Figure 5.4. Transferability assessment using clustering – Oulu's Self Care Service



Note: Bar charts show percentage difference between cluster mean and dataset mean, for each indicator.
Source: See Table 5.1.

Table 5.3. Countries by cluster – Oulu’s Self Care Service

Cluster 1	Cluster 2	Cluster 3
Australia	Hungary	Bulgaria
Austria	Israel	Czech Republic
Belgium	Malta	Ireland
Canada	Mexico	Latvia
Chile	Slovenia	New Zealand
Costa Rica	Spain	Switzerland
Croatia	Sweden	Türkiye
Cyprus		
Denmark		
Estonia		
Finland		
Greece		
Iceland		
Italy		
Lithuania		
Luxembourg		
Netherlands		
Norway		
Poland		
Portugal		
United Kingdom		
United States		

Note: Due to high levels of missing data, the following countries were omitted from the analysis: Colombia, France, Germany, Japan, Korea, Romania and the Slovak Republic.

New indicators to assess transferability

Data from publicly available dataset is not sufficient to assess the transferability of Oulu’s SCS. Therefore, Box 5.7 outlines several new indicators policy makers should consider before transferring SCS (or a similar patient-provider portal).

Box 5.7. New indicators, or factors, to consider when assessing transferability – Oulu's Self Care Service

In addition to the indicators within the transferability assessment, policy makers are encouraged to collect data for the following indicators:

Population context

- Do patients feel comfortable accessing healthcare online?
- Do patients have the skills to access healthcare online?
- What is the level of health literacy amongst patients?
- Does the population trust their personal health information will be used, stored and managed appropriately?

Sector specific context (primary care / digital care)

- Is patient data interoperable and integrated across different levels of care (including social care)?
- Is patient data co-ordinated across all levels of care? (i.e. there is a unique patient identifier)
- Are healthcare providers supportive of patient-provider portals?
- Do privacy laws support the integration of patient health data?
- Does the legal framework support public-private partnerships for eHealth?*

Political context

- Has the intervention received political support from key decision-makers?
- Has the intervention received commitment from key decision-makers?

Economic context

- What is the cost to national and local governments, various types of healthcare providers, patients, and other entities of implementing the intervention in the target setting?

Note: *This was a barrier for the City of Oulu where the legal framework forbid public funding for projects where public service providers worked with private companies.

Access

SCS services are available 24/7 and[3] free-of-charge to the residents of Oulu. To access SCS via a computer or mobile, users can login with their bank account details or a mobile code. Primary care professionals can access the SCS system by signing in using their organisation's patient record system or via their ID card. Similar to citizens, primary care professionals are not obliged to use SCS as part of their service.

Conclusion and next steps

SCS is a patient-provider portal designed to improve primary care. In 2011, the City of Oulu, Finland, expanded its patient-provider portal, SCS, to all residents. SCS is a tool used in primary care, which offers patients a range of online services such as online appointments, ePrescriptions, and messaging with health professionals. SCS provides primary care professionals with tailored guidelines and care pathways based on patient data obtained from their EHR, which is tethered to the portal. The objectives of SCS are to improve access to care; improve patient outcomes, safety and empowerment; and reduce pressure on the health system.

SCS improves access to care and is estimated to have reduced costs by over EUR 5 million. Between 2012 and 2020, the number of SCS users increased by 235%, with the average person logging into the service 10 times per year. Over the same period, users have sent over 400 000 messages to health professionals and received over 18 000 online prescriptions. SCS proved to be a key resource during the COVID-19 pandemic, with over 60 000 test results uploaded to the system (as of March 2021). Over years 2012-16, SCS is estimated to have saved EUR 5.12 million based on the assumption that SCS reduces the time taken to deliver services.

The design of SCS considers the needs of disadvantaged population groups, yet access barriers remain. SCS is available free-of-charge to residents of Oulu thereby improving access to individuals with a low SES. Further, SCS includes design features that improve usability for people with a disability. Nonetheless, like all digital health interventions, those most in need may experience access barriers, for example, due poor internet access.

Over one-third of the Oulu's population access SCS. Thirty-four percent of Oulu residents use SCS, which is above the mean patient portal adoption rate of 23% estimated in a recent systematic review and meta-analysis. For this reason, SCS performs particularly well against the "Extent of coverage" best practice criterion. Adoption is also high amongst health professionals, which is attributable to the country's focus on building a digitally literate health workforce.

SCS is a global leader in the area of patient portals, yet there are opportunities to enhance its performance. To enhance effectiveness, boosting levels of population HL and digital HL will help patients better understand the information uploaded to SCS, act on that information and take greater responsibility for their own health. To reduce health inequalities, SCS administrators should prioritise plans to expand the number of languages available, in particular those spoken by refugees in the country. To enhance the evidence base, researchers should take advantage of Finland's rich data source and evaluate the impact of SCS on patient outcomes and utilisation of healthcare services. To enhance the extent of coverage, several options are available including efforts to encourage professionals to promote SCS to their patients.

Results from the transferability assessment indicate Nordic countries are suitable candidates for SCS. Based on publicly available indicators, countries most suited to transfer SCS (or a similar patient portal) are located in Europe's Nordic region. Nonetheless, there is clear political will to implement patient portals as evidenced by a recent OECD survey showing 80% of countries have or have plans to make individual patient data available via a portal.

Next steps for policy makers and funding agencies interested in SCS are provided in Box 5.8.

Box 5.8. Next steps for policy makers and funding agencies – New indicators, or factors to consider, when assessing transferability

Next steps for policy makers and funding agencies to enhance SCS are listed below:

- Support policy efforts to boost population health literacy and digital health literacy
- Support future evaluations of SCS which draw upon patient data collected as part of Finland's national EHR
- Promote findings from the SCS case study to better understand what countries/regions are interested in transferring the intervention (or a similar patient portal).

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Notes

[1] eHealth adoption was measured using a composite indicator reflecting use of electronic health records, telehealth, personal health records and health information exchange.

[2] In addition to digital health literacy training provided to all health professionals in Finland, those working in the City of Oulu receive 1 to 2 hour training session on how to use SCS.

[3] Online interaction with primary care professionals is only available during office hours.

6

Integrated care model for multimorbid patients, the Basque Country, Spain

This chapter covers the integrated care model for multimorbid patients in the Basque Country, Spain. The case study includes an assessment of the model against the five best practice criteria, policy options to enhance performance and an assessment of its transferability to other OECD and EU27 countries.

Integrated care model for multimorbid patients: Case study overview

Description: As part of the strategy for chronicity in the Basque Country, Spain, an integrated care model was implemented. The model includes a comprehensive baseline assessment; individualised care plans; care from a multidisciplinary team; co-ordinated hospital discharge; patient empowerment programs; and a strong health information system. Eligible patients are identified through a sophisticated risk stratification system, which covers 100% of the population.

Best practice assessment:

OECD Best Practice assessment of the integrated care model in the Basque Country, Spain

Criteria	Assessment
Effectiveness 🏅	The integrated care model increases contacts with the primary care system and reduces hospitalisations, however, its impact on health outcomes is inconclusive
Efficiency 🏅	Mean total healthcare costs are up to 5% lower for those accessing the integrated care model
Equity	The risk stratification tool used to identify eligible patients covers the entire population, including those in priority population groups Research indicates the integrated care model may reduce health inequalities between the most and least deprived, given more deprived groups experienced a greater fall in hospital use
Evidence-base	Studies evaluating the impact of the integrated care model use strong data collection methods and control for relevant confounders. The overall study design however is weakened by the fact that organisations were not randomly allocated into intervention and control groups.
Extent of coverage	As mentioned, all eligible patients are identified through the risk stratification tool, however, information on uptake among the eligible population is not available

Enhancement options: the Basque Country's integrated care model aligns with general recommendations on how to deliver care to chronically ill patients. Therefore, policies to enhance the structure of the intervention are not given. Nevertheless, options to enhance performance against the best practice criteria exist – for example, by improving digital health literacy among the older population and ensuring sufficient resources to cover the additional activities carried out by healthcare professionals. Further, the internal validity of evaluations would be enhanced by randomising participating organisations and using data from all patients, extending the follow-up period and stratifying data by priority population groups.

Transferability: Integrated care models comparable to the Basque Country´s exist in several European regions as part of a European Commission CareWell Project. The intervention will be extended to a further nine regions under the Joint Action on implementation of Digitally Enabled integrated person-centred Care (JADECARE) (2020-23).

Conclusion: The Basque Country's integrated care model for multimorbid patients has been shown to have a favourable impact on healthcare utilisation. By using a sophisticated risk stratification tool, all eligible patients, regardless of background, are identified. Nevertheless, data on uptake and impact across different population groups is not available, therefore, it is unclear what impact the model has on health inequalities. Although the model was designed in line with general recommendations for treating chronically ill patients, options are available to enhance the intervention's performance. Finally, comparable models exist in several European regions highlighting its transfer potential.

Intervention description

Rising rates of multimorbidity in the Basque Country, Spain, prompted the government to implement a strategy for addressing chronicity. An ageing population partnered with poor lifestyle habits have contributed to a rising number of people living with multiple chronic conditions. Multimorbid patients require care from several health professionals working at different levels of care, therefore, it is important patients receive integrated, co-ordinated care centred around their needs. In response to challenges posed by multimorbidity, in 2010 the Basque Country's Department of Health launched the "Strategy to tackle the challenges of chronicity" (Ministry of Health and Consumer Affairs, 2010[1]). The aim of the strategy is to "re-orient the health system toward an integrated care model" that is patient-centred (the CareWell Group, 2018[2]).

The Basque Country has implemented a multi-pronged approach for providing integrated care to multimorbid patients. In line with the strategy for chronicity, the Basque Health Service developed an integrated care model for multimorbid patients.[1] The model consists of several key characteristics designed to improve care quality:

- Comprehensive baseline assessment performed by a team of health professionals
- Development of an individualised therapeutic plan
- Care delivered by a multidisciplinary care team
- Co-ordinated hospital discharge
- Patient empowerment programs to support self-management
- Support from a strong health information system (see Box 6.1 for further details on characteristics 3 to 6).

Box 6.1. Characteristics of Basque's integrated care model for multimorbidity

This box outlines in further detail characteristics 3 to 6 of the integrated care model for multimorbid patients in the Basque Country, Spain.

Care delivered by a multidisciplinary care team

Several health professionals are involved in caring for multimorbid patients. In addition to a general practitioner (GP), specialists and social workers, the team includes a:

- Care manager (usually a primary nurse) who is responsible for case management
- Referent internist who supports decisions made at the primary care level as well as co-ordinating specialists involved in treating the patient in hospital
- Hospital liaison nurse (explained below).

Co-ordinated hospital discharge

The hospital liaison nurse and the primary care nurse work together to co-ordinate care when the patient is discharged from hospital. This includes following up with the patient 1-2 days post-discharge as well as monthly telephone calls by the primary care nurse to identify early detection of deterioration.

Patient empowerment programs

The model aims to improve patient self-management by offering KronikOn, a patient empowerment programme. KronikOn provides frail, older patients with 20-30min educations sessions led by nurses with the aim of helping patients better understand their condition and how to manage it.

Support from a strong health information system

The integrated care model is supported by a strong health information system (HIS). Key features of the HIS include:

- Unified electronic health records (EHR) accessible to all health professionals
- ePrescription (integrated into the EHR)
- Personal health folder where patients can access information on their medical history as well see upcoming appointments; surgery waiting lists; upload information from self-tracking programs; and communicate with health professionals.

Osarean (remote Osakidetza2)

OSAREAN is a multi-channel Health Service Centre that enhances accessibility and continuity by increasing the number of ways in which the public can interact with the health system. It includes the Personal Health Folder, 24x7 eHealth Call Center, patient tele-monitoring, web appointments, Osakidetza portal and app, online inter-consultations, and telephone visits.

Source: WP5 Jadecare (2020[3]), “Presentation of the original good practice – Basque health strategy in ageing and chronicity: integrated care”.

A sophisticated risk stratification system identifies patients who are eligible to access the integrated care model. Risk stratification is a well-known tool to deploy large-scale integrated care services. In the Basque Country, a risk stratification tool has been operating since 2012 to assist health professionals identify patients eligible for the multimorbid integrated care model – i.e. Johns Hopkins Adjusted Clinical Groups Predictive Model (ACG-PM). ACG-PM uses patient data to predict utilisation of healthcare services (a proxy measure for patient morbidity) over the next 12 months (see Box 6.2). Each patient receives a Predictive Index (PI) score that reflects their expected use of healthcare services relative to the average citizen in the Basque Country. For example, a PI score of four indicates the patient’s predicted use of healthcare services is four times the average citizen. Health professionals can access a patient’s PI score via the electronic health record (EHR) system – EHRs in the Basque Country cover 100% of the population and are interoperable across different levels of care.

Box 6.2. Data used to generate Predictive Index scores

The Predictive Index (PI) score generated by the Johns Hopkins Adjusted Clinical Groups Predictive Model (ACG-PM) relies on several data sources including primary care EHRs, and hospital and specialist outpatient care databases. The types of data collected from these sources include:

- Socio-demographic factors including age and gender
- Socio-economic data
- Disease diagnoses
- Prescriptions
- Prior healthcare utilisation.

PI scores are generated every two years, which is one of its limitations – i.e. the patient’s condition in real-time may not accurately reflect the PI generated two years prior.

Source: WP5 Jadecare (2020[3]), “Presentation of the original good practice – Basque health strategy in ageing and chronicity: integrated care”.

OECD Best Practices Framework assessment

This section analyses the Basque Country's integrated care model for multimorbidity patients against the five criteria within OECD's Best Practice Identification Framework – Effectiveness, Efficiency, Equity, Evidence-base and Extent of coverage (see Box 6.3 for a high-level assessment). Further details on the OECD Framework can be found in Annex A.

Box 6.3. Assessment of the Basque Country's integrated care model for multimorbid patients

Effectiveness 🏅

- The integrated care model increases patient contacts with the primary care system and reduces hospitalisations
- In general, patients, providers and carers are satisfied with the integrated care model and believe it has improved the quality of care delivered
- The impact of the integrated care model on health outcomes (e.g. BMI) is inconclusive

Efficiency 🏅

- Mean total healthcare costs were 5% lower for those who received the integrated care model compared to a control group
- A budget impact analysis of the integrated model estimated that the integrated care model would reduce the growth in healthcare costs by 4 percentage points

Equity

- The risk stratification tool can identify all patients who are eligible for the integrated care model, including patients in priority population groups
- Research indicates the integrated care model may reduce health inequalities between the most and least deprived, given more deprived groups experienced a greater fall in hospital use
- Multimorbidity disproportionality affects more deprived patients, therefore, the integrated care model has the potential to reduce health inequalities

Evidence-base

- Studies evaluating the impact of the integrated care model used strong data collection methods and controlled for relevant confounders. Healthcare organisations however weren't randomly allocated to intervention and control groups, which is a study design weakness.

Extent of coverage

- The risk stratification tool used to identify eligible patients covers 100% of the population – data from 2019 identified over 69 000 eligible patients
- Information on the proportion of eligible patients who enrolled in the integrated care model is not available

Effectiveness

The Basque Country's integrated care model increases primary care contacts and reduces hospitalisations. A primary objective of the Basque Country's integrated care model is to keep patients in a stable condition for longer. This is measured by comparing utilisation of healthcare services between those who have and have not accessed the integrated care model. Results from recent studies show patients who access this model of care are more likely to access primary care and less likely to be hospitalised:

- Mateo-Abad et al. (2020[4]) using data from a control and intervention group found those in the latter:
    - had a higher number of contacts with their GP (via phone) per year (6.7 versus 3.6 in the control group, p=0.002) (results for face-to-face visits were not statistically significant)
    - had a lower number of hospitalisations per year (1.6 versus 2.3 in the control group, p=0.008)
    - had a lower number of emergency visits per year (0.3 versus 1.3 in the control group, p<0.001)
    - [These results align with a similar study by Mateo-Abad et al. (2020[5]), which included data from five other European regions operating comparable models.][2]
- Soto-Gordea et al. (2018[2]) also using data from a control and intervention group found those in the latter:
    - were twice as likely to make contact with primary care
    - had 7% more contacts with primary care
    - had a 9% lower probability of being hospitalised
    - recorded a 4% lower hospitalisation rate.

Patient and provider experiences of the integrated care model are largely positive. Healthcare professionals, patients and carers who participated in the integrated care model provided largely positive feedback – for example, health professionals felt more alert and watchful, while patients felt they received more co-ordinated care and that management of information improved (Mateo-Abad et al., 2020[4]). Qualitative feedback from patients in a study examining the same model of care across multiple regions in Europe[3] however recorded mixed results – for example, patients felt health professionals understood them better, yet they also felt less supported from health and social institutions (Mateo-Abad et al., 2020[5]).

The impact of the integrated care model on clinical outcomes is inconclusive. Impact evaluations undertaken by Mateo-Abad & colleagues in the Basque Country, Spain, (2020[4]) and in multiple European regions (2020[5]) found no statistically significant differences in clinical outcomes between the intervention and control group (e.g. BMI, blood glucose, HbA1c levels).

Efficiency

The integrated care model reduced mean total healthcare costs. A study undertaken by Soto-Gordoa et al. (2018[2]) found mean total healthcare costs for patients in the intervention group was 5% lower than in the control group. This supports a previous budget impact analysis, which predicted that the integrated care model would reduce the rate at which healthcare costs grow (see Box 6.4).

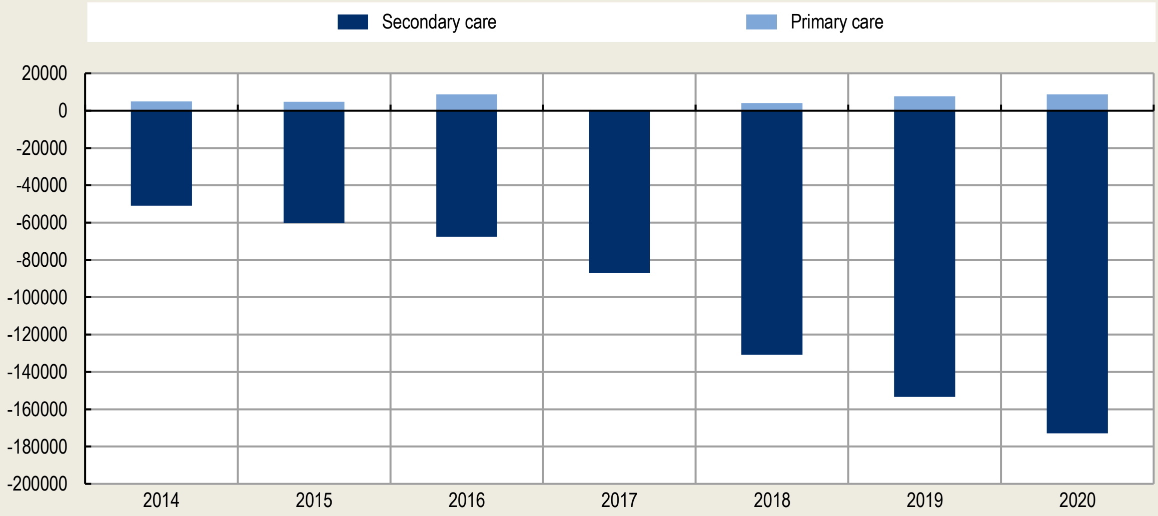
Box 6.4. Results from a budget impact analysis scenario analysis (2013-20)

Soto-Gordoa et al. (2017[6]) estimated healthcare costs over the period 2013-20 under two scenarios in the Basque country:

- **Baseline scenario** where there are no changes to the delivery of care for multimorbid patients.
- **Intervention scenario** where the integrated care model for multimorbid patients reduces unstable conditions for eligible patients by an annual rate of 2%.

The analysis estimated that the intervention scenario reduces the rate at which healthcare costs grow by 4 percentage points (i.e. 19% versus 23% or by EUR 684 066) between 2013 and 2020 (Figure 6.1).

Figure 6.1. Estimated impact of the integrated care model on healthcare expenditure – scenario analysis (2013-20)



Note: The figures are not cumulative, rather they represent estimated annual changes in expenditure. The baseline year is 2013.
Source: Soto-Gordoa (2017[6]), "Incorporating Budget Impact Analysis in the Implementation of Complex Interventions: A Case of an Integrated Intervention for Multimorbid Patients within the CareWell Study", https://doi.org/10.1016/j.jval.2016.08.002.

Equity

The Basque Country's risk stratification tool identifies all eligible patients, including those from disadvantaged population groups. The risk stratification tool used to identify patients eligible for the integrated care model covers 100% of the Basque Country population. This ensures all disadvantaged population groups are captured, including those who may have otherwise experienced barriers to access.

Research suggests the integrated care model may reduce health inequalities between men and women and socio-economic groups. Sorto-Gordoa et al. (2019[7]) using an intervention and control group measured inequalities in healthcare access using data on patient participation in the integrated care model and contacts with primary care. Results from the analysis found compared to the control group:

- Women and men in the intervention group who are most deprived had a lower probability of hospitalisation ($p < 0.05$)

- Women in the intervention group who are most deprived had a higher probability of a primary care contact, albeit marginally ($p < 0.05$).

Multimorbidity disproportionally affects patients with a lower socio-economic status, indicating the integrated care model may reduce inequalities. Socio-economic status is a key predictor of health status, for example, analysis of Eurostat data by OECD found men in the most deprived group are 1.5 times more likely to be obese than those in the least deprived group, with this figure increasing to 1.9 for women (OECD, 2019[8]). Poor lifestyle behaviours contribute to higher rates of multimorbidity, which is reflected by data from Basque Country. For example, a study by Orueta et al. (2014[9]) found that in the Basque Country, the least deprived were less likely to have two or more chronic diseases compared to the most deprived (20.4% versus 23.6% of people). By developing a model to improve the level of care delivered to patients with multimorbidity, health inequalities can be reduced, however, a specific analysis examining this topic is not available.

Evidence-base

Strong data collection methods and controls for confounding factors enhance the quality of studies evaluating the impact of integrated care model in the Basque Country, Spain. This section describes the quality of evidence supporting the effectiveness, efficiency and equity of the integrated care model – i.e. studies undertaken by Mateo-Abad et al. (2020[4]), and Soto-Gordea et al. (2018[2]) and (2019[7]). A summary of the study designs used in both evaluations are below, with further details in Table 6.1:

- In their impact evaluation, Mateo-Abad and colleagues (2020[4]) employed a quasi-experimental study including an intervention and control group (n=101 and n=99, respectively). Generalised regression models, which controlled for relevant confounders, were used to measure differences in healthcare utilisation between the groups based on routine administrative data. Patients weren’t randomly allocated into the intervention or control group, therefore it is unclear if those who agreed to participate accurately represent the target population.
- Soto-Gordea and colleagues (2018[2]) relied on retrospective data from routine administrative datasets in their evaluation, which included an intervention and control group. Data for the intervention group was based on 2014 data (n=4 225) while the control group was based on 2012 data (n=3 558). To minimise selection bias between groups, the authors employed propensity score matching[4] based on data such as age, gender, morbidity and previous hospitalisations. Differences between the intervention and control group were presented as odds ratios, which controlled for sociodemographic and clinical data.
- Soto-Gordea and colleagues (2019[7]) used a retrospective observational study including an intervention and control group to assess the impact of the integrated care model on health inequalities (namely by gender and socio-economic status). The analysis relied on routine administrative datasets from over 16 000 patients (n=8 364 and n=8 239 in the intervention and control group, respectively). Patients weren’t randomly allocated into the intervention or control group, therefore it is unclear if those who agreed to participate accurately represent the target population.

Table 6.1. Evidence-based assessment – the Basque Country's integrated care model

Assessment category	Question	Score for Mateo-Abad et al. (2020[4])	Score for Soto-Gordea et al. (2018[2])	Score for Soto-Gordoa et al. (2019[7])
Selection bias	Are the individuals selected to participate in the study likely to be representative of the target population?	Can't tell (a limitation of this study is that it is not randomised and therefore it is unclear if the participants reflect the target population)	Yes	Can't tell (a limitation of this study is that it is not randomised and therefore it is unclear if the participants reflect the target population)
	What percentage of selected individuals agreed to participate?	71%	N/A	N/A
Selection bias score:		*Weak*	*Strong*	*Weak*
Study design	Indicate the study design	Quasi-experimental study design using data from intervention and control group	Retrospective observational cohort study with an intervention group and a historical control group	Retrospective observational study using an intervention and control group
	Was the study described as randomised?	No	No	No
	Was the method of randomisation described?	N/A	N/A	N/A
	Was the method of randomisation appropriate?	N/A	N/A	N/A
Study design score:		*Moderate*	*Moderate*	*Moderate*
Confounders	Were there important differences between groups prior to the intervention?	Yes (the intervention group had a marginally higher starting BMI level)	Yes (statistically significant difference in the mean age, albeit marginal, and prevalence of different disease combinations)	Yes (the intervention group was older and utilised a greater level of healthcare services)
	What percentage of potential confounders were controlled for?	80-100% (age, gender, baseline BMI and comorbidity index)	80-100% (gender, age and certain clinical variables)	80-100% (gender, age, healthcare service use, socio-economic status)
Confounders score:		*Strong*	*Strong*	*Strong*
Blinding	Was the outcome assessor aware of the intervention or exposure status of participants?	Can't tell	N/A (retrospective data)	N/A (retrospective data)
	Were the study participants aware of the research question?	Can't tell	N/A	N/A
Blinding score:		*Weak*	*N/A*	*N/A*
Data collection methods	Were data collection tools shown to be valid?	Yes (data collected from routine administrative data)	Yes (data collected from routine administrative data)	Yes (data collected from routine administrative data)
	Were data collection tools shown to be reliable?	Yes	Yes	Yes

Assessment category	Question	Score for Mateo-Abad et al. (2020[4])	Score for Soto-Gordea et al. (2018[2])	Score for Soto-Gordoa et al. (2019[7])
Data collection methods score:		*Strong*	*Strong*	*Strong*
Withdrawals and dropouts	Were withdrawals and dropouts reported in terms of numbers and/or reasons per group?	Yes	N/A (retrospective data)	N/A (retrospective data)
	Indicate the percentage of participants who completed the study?	87.5% (mainly due to deaths)	N/A	N/A
Withdrawals and dropouts score:		*Strong*	*N/A*	*N/A*

Note: N/A = not applicable.
Source: Effective Public Health Practice Project (1998[10]), "Quality assessment tool for quantitative studies", https://www.nccmt.ca/knowledge-repositories/search/14.

Extent of coverage

The risk stratification tool used to identify eligible patients covers the entire Basque Country population. The entire population in the Basque Country are stratified into risk groups every two years using ACG-PM (risk stratification model). ACG-PM can therefore identify all patients eligible to receive the integrated care model for multimorbidity (which is offered in all primary care centres and hospitals). For this reason, risk stratification tools are essential for deploying large-scale integrated care interventions. According to data from 2019, over 69 000 people in the Basque Country were eligible for the integrated care model. Information on the proportion of eligible people who enrolled in the integrated care model is not known.

Policy options to enhance performance

Enhancing effectiveness

Options to change the design of the integrated care model in order to enhance effectiveness are not given as the model aligns with general recommendations on how to deliver care to chronically ill patients. Wagner et al.'s. (1996[11]) Chronic Care Model (CCM) is the most "well-known and widely applied" framework for population-based integrated care models (WHO Europe, 2016[12]). CCM outlines six key elements for delivering care to chronically ill patients, which are known to have a positive impact on outcomes, care quality and cost savings. A summary comparing the key elements of CCM against the Basque Country's integrated care model – Table 6.2 – reveal the model in the Basque Country aligns with current recommendations. For this reason, there are no recommendations to alter the design of the Basque Country's integrated care model in order to enhance effectiveness.

Table 6.2. Features of the Basque Country's integrated care model compared to general recommendations for integrated care models targeting multimorbid patients

Recommendation	Applied in the Basque Country model	Notes[1]
Self-management support to ensure the patient and family members have the skills and confidence to manage their condition	✓	The model includes several patient empowerment programs. For example, KronikOn offers patients four 20-30min education sessions led by nurses.
Strong delivery system involving a multidisciplinary care team, case management and regular follow-up	✓	The model is delivered by a multidisciplinary team involving a GP, specialists, social workers, care manager, a reference internist and a hospital liaison nurse. The hospital liaison nurse is responsible for following-up with patients post hospital discharge.
Decision support based on evidence-based guidelines	✓	Care for patients is tailored to the specific needs of patients and is based on latest available evidence (i.e. clinical guidelines). However, final decisions on care are made by individual clinicians. .
Clinical information systems that provide care teams with feedback, reminders and individual and population based information for care planning purposes	✓	The model identifies eligible patients via a sophisticated population risk-stratification tool which uses routine healthcare data. Further, the care team have access to a patient's health information via their EHR, which covers 100% of the population. Patient's also have access to their EHR as well as a personal health folder to see upcoming appointments and to communicate with their care team, for example, the eHealth Call Center (run by trained nurses) offers 24x7 care)

Note: The recommendations are based on the Wagner et al.'s (1996[11]) Chronic Care Model. This model includes six key elements for delivering high quality care to chronically ill patients, however, only four are mentioned given two relate to the context or setting in which the model is delivered (and are therefore outside the control of intervention administrators).

1. See "Intervention description" for further information.

Source: Struckmann et al. (2018[13]), "Relevant models and elements of integrated care for multi-morbidity: Results of a scoping review", https://doi.org/10.1016/j.healthpol.2017.08.008; Wagner et al. (1996[11]), "Organizing Care for Patients with Chronic Illness", https://doi.org/10.2307/3350391.

Building patient digital health literacy will improve patient-provider communication and collaboration. Mateo-Abad et al. (2020[4]) in their review of the Basque Country's integrated care model interviewed professionals on their perceptions of this new model of care, including the use of ICT. Overall professionals felt ICT tools were useful but limited when interacting with patients given their level of technical experience. For this reason, it is important to promote policies that build patient digital health literacy, particularly among older populations who are less familiar with digital tools but who stand to benefit most.

Ensure sufficient resources for healthcare professionals in order to avoid burnout. Mateo-Abad et al.'s (2020[4]) review also found primary care professionals felt the integrated care model increased their workload, particularly among nurses who were now responsible for leading weekly education sessions and following-up with patients more regularly. To avoid declining motivation levels among primary care professionals, an increase in the level of human resources may be necessary in order to perform additional activities required under the integrated care model.

Enhancing efficiency

Efficiency is a measure of effectiveness in relation to inputs used. Therefore, interventions that increase effectiveness without significant increases in costs, or reduce costs while keeping effectiveness at least constant, have a positive effect on efficiency.

Enhancing equity

Stratify evaluation indicators by priority population groups. The impact of the Basque Country's integrated care model is well documented in high-quality research studies using intervention and control groups. Results, however, are not available by all key priority population groups such as ethnic minorities. Future research studies would benefit from stratifying data according to priority population groups, with findings used to adapt the model in order to reduce health inequalities. However, even if such information were available, it would only allow for an assessment of the effect on equity among participating patients. Therefore, it is also important to collect information on the characteristics of eligible patients who do and do not participate in the integrated care model. Given certain priority population groups – such as low SES – typically have less access to care, this information could be used to tailor future recruitment strategies.

Use available data to understand take-up of the integrated care model among different socio-economic groups. The risk adjustment model (ACG-PM) (see "Intervention description") used to identify eligible patients include a socio-economic deprivation index. This index can be used to understand take-up of the integrated care model among eligible participants across different socio-economic groups. Such information can help administrators identify differences in uptake and adapt recruitment strategies accordingly.

Enhancing the evidence-base

The evidence supporting the Basque Country's integrated care model is strong in many aspects, nevertheless opportunities for improvement exist. As outlined under "Evidence-base" the two studies evaluated the impact of the Basque Country's integrated care model are strong in many areas – for example, both studies have an intervention and control group, controlled for relevant confounders and used high-quality data collection methods (Mateo-Abad et al., 2020[4]; the CareWell Group, 2018[2]). However, the internal validity of future studies could be improved by:

- Randomising healthcare organisations into intervention and control groups, to ensure study participants reflect the target population. Typically, randomising occurs at the patient level, however, this is likely to be very difficult in the Basque Country given the health system structure.
- Collecting data over a longer follow-up period – at present, data measuring the impact of the integrated care model is based on follow-up data between 9-12 months.
- Using administrative and clinical data base data from all patients who comply with a study's inclusion criteria.

Enhancing extent of coverage

As outlined under "Enhancing equity", the characteristics of eligible participants who do and do not participate in the integrated care model is not known. This information is important for tailoring recruitment strategies to maximise the number of eligible patients benefiting from this new model of care.

Transferability

This section explores the transferability of Basque Country's integrated care model and is broken into three components: 1) an examination of previous transfers; 2) a transferability assessment using publicly available data; and 3) additional considerations for policy makers interested in transferring an integrated care model.

Previous transfers

Integrated care models targeting multimorbid patients are common in OECD and EU countries. The rising number of people living with two or more chronic conditions has prompted countries to implement integrated, patient-centred models of care. For example:

- OECD's report on primary care (2020[14]) identified 17 member countries which have developed "new models of primary care",[5] that deliver integrated care to patients.
- The European Commission funded ICARE4U project aimed at improving care for multimorbid patients identified 101 models of integrated care across 24 European countries, of which 40% target those aged 65+ (Melchiorre et al., 2020[15]).

The Basque Country's integrated care model exists in several European countries, and will continue to expand as part of JADECARE. The European Commission co-funded the CareWell project designed to promote the integration of care in several European regions (ended in 2017). As part of the project, the integrated care model outlined in this case study was implemented alongside comparable models in Zagreb (Croatia), Lower Silesia (Poland), Veneto (Italy), Puglia (Italy) and Powys (United Kingdom) (see Box 6.5). As part of the Joint Action on implementation of digitally enabled integrated person-centred care (JADECARE) (2020-23), nine European regions[6] will transfer elements of the Basque Country's model of integrated care.

Box 6.5. CareWell Project

As part of the CareWell Project, administrators from the Basque Country's integrated care model worked with partnering regions according to a common framework based on two elements: 1) care co-ordination and communication between health providers and 2) patient empowerment and home-based care, all supported by ICT-based platforms.

As part of the Project, eight integrated care related service procedure areas (e.g. self-management, multidisciplinary teams) and 12 ICT tools for integrated care support (e.g. electronic health record, electronic prescription) were identified.

Based on a self-assessment exercise, each region chose which service procedures and ICT tools to implement to improve care integration.

Source: Mateo-Abad et al. (2020[5]), "Impact Assessment of an Innovative Integrated Care Model for Older Complex Patients with Multimorbidity: The CareWell Project", https://doi.org/10.5334/ijic.4711.

Transferability assessment

The following section outlines the methodological framework to assess transferability and results from the assessment.

Methodological framework

Details on the methodological framework to assess transferability can be found in Annex A.

Several indicators to assess the transferability of the Basque Country's integrated care model were identified (Table 6.3). Indicators were drawn from international databases and surveys to maximise coverage across OECD and non-OECD European countries. Please note, the assessment is intentionally high level given the availability of public data covering OECD and non-OECD European countries.

Table 6.3. Indicators to assess transferability – the Basque Country's integrated care model

Indicator	Reasoning	Interpretation
Population context		
% of older individuals who sought health information online in the past 3 months	The intervention utilises digital tools to engage with participants, for example, the personal health folder	↑ value = more transferable
Sector context (primary and secondary care)		
Proportion of GPs who work in single-handed practices	The intervention is more transferable in countries where GPs feel comfortable working with other health professionals. This indicator is a proxy to measure the willingness of GPs to work in co-ordinated teams.	Low = more transferable High = less transferable
Proportion of physicians in primary care facilities using electronic health records	EHRs improve the ability of health professionals to provide integrated patient-centred care. Therefore, the intervention is more transferable in countries that utilise EHRs in primary care facilities.	↑ = more transferable
Proportion of hospitals using electronic patient records for inpatients	As above	↑ = more transferable
The extent of task shifting between physicians and nurses in primary care	This intervention promotes integrated care provided by multidisciplinary teams. Therefore, the intervention is more transferable in countries where physicians feel comfortable shifting tasks to nurses.	The more "extensive" the more transferable
The use of financial incentives to promote co-ordination in primary care	The intervention is more transferable to countries with financial incentives that promote co-ordination of care across health professionals.	Bundled payments or co-ordinated payment = more transferable
Economic context		
Primary healthcare expenditure as a percentage of current health expenditure	The intervention places a stronger emphasis on primary care, therefore, it is likely to be more successful in countries that allocate a higher proportion of health spending to primary care	↑ = "more transferable"

Source: WHO (2018[16]), "Primary Health care (PHC) Expenditure as percentage Current Health Expenditure (CHE)", https://apps.who.int/nha/database; Oderkirk (2017[17]), "Readiness of electronic health record systems to contribute to national health information and research", https://dx.doi.org/10.1787/9e296bf3-en; Schäfer et al. (2019[18]), "Are people's health care needs better met when primary care is strong? A synthesis of the results of the QUALICOPC study in 34 countries", https://doi.org/10.1017/S1463423619000434; Maier and Aiken (2016[19]), "Task shifting from physicians to nurses in primary care in 39 countries: a cross-country comparative study", https://doi.org/10.1093/eurpub/ckw098; OECD (2020[14]), *Realising the Potential of Primary Health Care*, https://doi.org/10.1787/a92adee4-en; OECD (2016[20]), "Health Systems Characteristics Survey", https://qdd.oecd.org/subject.aspx?Subject=hsc; European Observatory on Health Systems and Policies (2021[21]), "The Health Systems and Policy Monitor", https://eurohealthobservatory.who.int/countries/overview.

Results

Results from the transferability assessment are summarised below, with country-level details available in Table 6.4. Due to data constraints, the "owner" setting is Spain, as opposed to the Basque Country, which is limitation of the analysis.

- The proportion of GPs who work in single practices is mixed among potential transfer countries. These results indicate GPs in some countries would readily accept working in a multidisciplinary team and others not.
- Use of EHRs are relatively high in Spain, including the Basque Country, compared to the average of all countries at 99% and 79%, respectively. EHRs are an important for stratifying the population into risk groups in order to identify eligible patients.
- The integrated care model is supported by a strong HIS, which includes online support tools for patients. In Spain, approximately 4 in 10 older people use the internet to seek health information, which is marginally higher than the average of countries with available data (37%). Levels of internet use for health related reasons is generally highest in Nordic countries such as Denmark,

Finland, Iceland and Norway. In these countries, over half of all adults seek health information online.

- Most countries do not employ financing methods that incentivise integrated care, including Spain: among examined countries, 19% and 16% have bundled payments and financial incentives for co-ordinated care, respectively.

Table 6.4. Transferability assessment by country (OECD and non-OECD European countries) – the Basque Country’s integrated care model

A darker shade indicates that the Basque country’s integrated care model is more suitable for transferral in that particular country

Country	% older people using the internet for health information	% GPs in single practices	% PC* using EHRs	% hospitals using EHRs	Task shifting in PC*	Financial incentives	Primary expenditure percentage CHE**
Spain	**41**	**Low**	**99**	**80**	**Limited**	**No incentive**	**39**
Australia	n/a	Low	96	20	Extensive	Bundled	37
Austria	32	High	80	99	None	Co-ordinated payment	37
Belgium	37	High	n/a	n/a	Limited	Bundled	40
Bulgaria	12	High	n/a	n/a	None	Bundled	47
Canada	n/a	Low	77	69	Extensive	Bundled	48
Chile	n/a	n/a	65	69	n/a	No incentive	n/a
Colombia	n/a	n/a	n/a	n/a	n/a	No incentive	n/a
Costa Rica	n/a	n/a	n/a	n/a	n/a	No incentive	33
Croatia	18	n/a	3	n/a	Limited	No incentive	38
Cyprus	36	Low	n/a	n/a	Limited	No incentive	41
Czech Republic	41	High	n/a	100	None	No incentive	33
Denmark	56	Medium	100	100	Limited	Co-ordinated payment	38
Estonia	32	High	99	100	Limited	No incentive	44
Finland	60	Medium	100	100	Extensive	No incentive	46
France	39	n/a	80	60	None	Bundled	43
Germany	55	High	n/a	n/a	None	Co-ordinated payment	48
Greece	20	High	100	50	None	No incentive	45
Hungary	42	High	n/a	n/a	Limited	No incentive	40
Iceland	56	Low	100	100	Limited	Co-ordinated payment	35
Ireland	40	Low	95	35	Extensive	No incentive	47
Israel	n/a	n/a	100	100	n/a	Co-ordinated payment	n/a

Country	% older people using the internet for health information	% GPs in single practices	% PC* using EHRs	% hospitals using EHRs	Task shifting in PC*	Financial incentives	Primary expenditure percentage CHE**
Italy	27	Medium	n/a	n/a	Limited	Bundled	n/a
Japan	n/a	n/a	36	34	n/a	No incentive	52
Korea	n/a	n/a	n/a	n/a	n/a	No incentive	57
Latvia	28	High	70	90	Limited	Bundled	39
Lithuania	31	Medium	n/a	n/a	Limited	No incentive	48
Luxembourg	46	Medium	n/a	n/a	None	No incentive	38
Malta	34	Medium	n/a	n/a	Limited	No incentive	62
Mexico	n/a	n/a	30	49	n/a	Co-ordinated payment	44
Netherlands	67	Medium	n/a	n/a	Extensive	Bundled	32
New Zealand	n/a	Low	95	100	Extensive	No incentive	n/a
Norway	52	Low	100	100	None	No incentive	39
Poland	25	Medium	30	10	None	No incentive	47
Portugal	19	Low	n/a	n/a	Limited	No incentive	58
Romania	17	Medium	n/a	n/a	None	No incentive	35
Slovak Republic	39	High	89	100	None	No incentive	n/a
Slovenia	30	High	n/a	n/a	Limited	No incentive	43
Sweden	44	Low	100	100	Limited	Co-ordinated payment	n/a
Switzerland	57	Medium	40	100	None	No incentive	40
Türkiye	11	Low	n/a	n/a	None	No incentive	n/a
United Kingdom	45	Low	99	100	Extensive	No incentive	53
United States	n/a	n/a	83	76	Extensive	No incentive	n/a

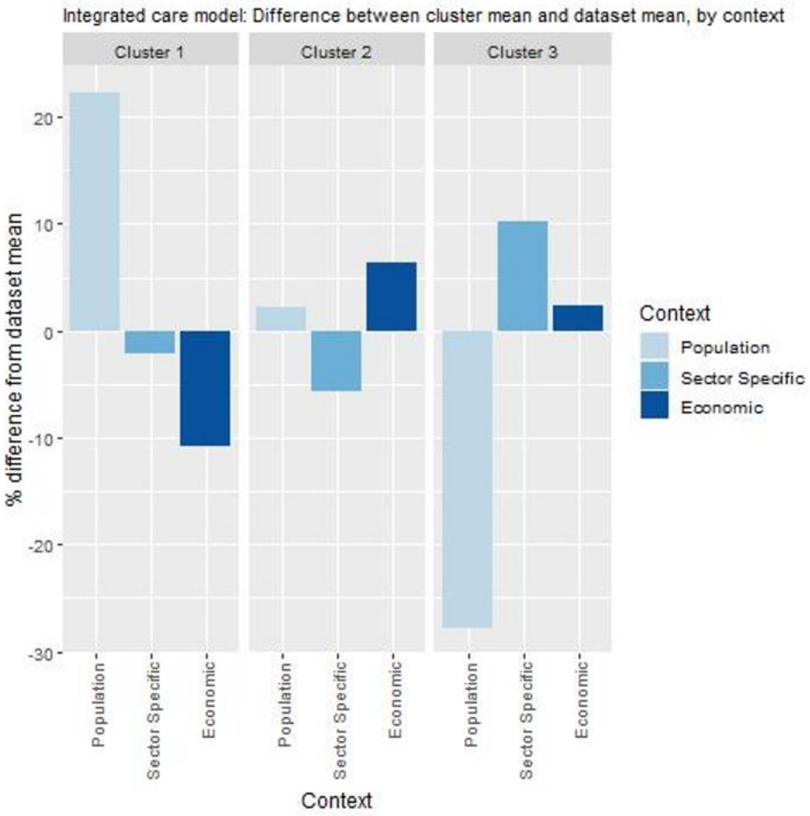
Note: *PC = primary care. **CHE = current health expenditure. n/a = no data available.
Source: See Table 6.3.

To help consolidate findings from the transferability assessment above, countries have been clustered into one of three groups, based on indicators reported in Table 6.3. Countries in clusters with more positive values have the greatest transfer potential. For further details on the methodological approach used, please refer to Annex A.

Key findings from each of the clusters are below with further details in Figure 6.2 and Table 6.5:

- Countries in cluster one typically have populations where internet use for healthcare purposes is high. Given the integrated care model incorporates various digital tools, this may indicate higher levels of engagement from the population. However, expenditure on primary care is relatively low in these countries indicating potential long-term affordability issues. Spain, where this model of care operates, is in this cluster, meaning conditions in which these clusters could improve on, although ideal, are not pre-requisites.
- Similar to cluster one, countries in cluster two have populations who are digitally health literate, however, unlike cluster one, they spend relatively more on primary care indicating long-term affordability. Before transferring this model of care, countries in cluster two should consider whether their healthcare system is prepared, for example, by ensuring electronic sharing of patient data and acceptance of multidisciplinary care teams.
- Countries in cluster three operate healthcare systems that would support this model of care and often spend relatively more on primary care. Nevertheless, the overall success of the intervention may be hampered by the population's low level of digital health literacy.

Figure 6.2. Transferability assessment using clustering – the Basque Country's integrated care model



Note: Bar charts show percentage difference between cluster mean and dataset mean, for each indicator.
Source: See Table 6.3.

Table 6.5. Countries by cluster – the Basque Country's integrated care model

Cluster 1	Cluster 2	Cluster 3
Cyprus	Australia	Austria
Denmark	Bulgaria	Belgium
Germany	Canada	Croatia
Iceland	Czech Republic	Estonia
Malta	Finland	Hungary
New Zealand	France	Italy
Norway	Greece	Latvia
Portugal	Ireland	Lithuania
Spain	Luxembourg	Mexico
Sweden	Netherlands	Slovenia
United Kingdom	Poland	
	Romania	
	Slovak Republic	
	Switzerland	

Note: Due to high levels of missing data, the following countries were omitted from the analysis: Chile, Colombia, Costa Rica, Israel, Japan, Korea, Türkiye and the United States.

New indicators to assess transferability

Data from publicly available datasets is not ideal to assess the transferability of the Basque Country's integrated care model. For example, there is no international data measuring the level of trust between health professionals, which is necessary for multidisciplinary care teams. Therefore, Box 6.6 outlines several new indicators policy makers could consider before transferring this integrated care model.

Policy makers and relevant stakeholders could also assess their readiness to implement integrated care models using the *SCIROCCO (Scaling Integrated Care in Context) Maturity Assessment Model* (an EU funded project). The model includes 12 domains for assessing readiness such as, "structure and governance" and "information and eHealth services" (SCIROCCO, n.d.[22]). The Basque Country has completed this assessment with results available using the following link: https://www.scirocco-project.eu/regions-self-assessment/experience-basque-country/.

Box 6.6. New indicators, or factors to consider, when assessing transferability – the Basque Country's integrated care model

In addition to the indicators within the transferability assessment, policy makers are encouraged to review and/or collect data for the following indicators:

Population context

- What is the population's attitude towards receiving care from health professionals who are not doctors?
- What is the level of health literacy among patients? (i.e. are patients likely to engage in shared decision-making?)

Sector specific context (primary and secondary care)

- What integrated care models currently exist?
- What is the level of acceptability (trust) among health professionals to work together as a co-ordinated team?
- Does the clinical information system support: a) sharing of patient data across health professionals? b) Sharing of patient data across healthcare facilities?
- Do health provider reimbursement schemes support co-ordinated care? (E.g. bundled payments, add-on payments that incentivise co-ordinated care)
- Do regulations support integrated care models? (i.e. professional competencies and practice scope)
- Is there an acceptance of evidence-based care guidelines among health professionals?
- Access to population data including patient level information on demographics, diseases, and healthcare use? (Necessary for developing the risk stratification tool)
- What is the level of patient data operability?

Political context

- Has the intervention received political support from key decision-makers? (E.g. a national strategy to address ageing and chronicity)
- Has the intervention received commitment from key decision-makers?

Economic context

- What is the cost of implementing and operating the intervention in the target setting and to whom?

Conclusion and next steps

In response to rising rates of multimorbidity, the government in the Basque Country, Spain, implemented a new integrated care model. The new integrated care model is defined by six key characteristics: comprehensive baseline assessments; individualised care plans; multidisciplinary teams; co-ordinated hospital discharge; patient empower programs; and a strong health information system. Patients eligible for this model of care are identified through a sophisticated risk stratification system.

The Basque Country's integrated care model reduces demand for hospital services resulting in lower costs. Studies using data from an intervention and control group found patients who participate in the integrated care model are more likely to see primary care thereby reducing hospital admissions and emergency visits. By reducing demand for secondary care services, it is estimated that the integrated care model reduces costs by 5%.

The uptake and impact of the integrated care model across different population groups is not known. The Johns Hopkins Adjusted Clinical Groups Predictive Model (ACG-PM) risk stratification tool is used to identify patients eligible for the integrated care model, which covers 100% of the population. Nevertheless, data on uptake among different population groups – e.g. low SES – is not available. Similarly, it is not clear what impact the integrated care model has on patients with different characteristics and therefore its impact on health equity.

The Basque Country's integrated care model aligns with the Chronic Care Model, which is considered "gold standard", nevertheless, policies to enhance performance are available. For example, by building digital health literacy among the older population who are less familiar with digital tools and who stand to benefit most; ensuring sufficient resources to compensate for an increase in responsibilities among healthcare professionals, in particular nurses; and enhancing the quality of future evaluations by stratifying data by different populations groups, increasing the follow-up time and randomising patients into intervention and control groups.

The integrated care model in the Basque Country, Spain, has been transferred to several regions indicating transferability potential. As part a European Commission funded project, CareWell, the Basque Country's integrated care model was further developed together with the models in regions in Croatia, Poland, Italy and the United Kingdom. A further nine regions across Europe will implement elements of the model as part of the Joint Action on implementation of digitally enabled integrated person-centred care (JADECARE) (2020-23).

Next steps for policy makers and funding agencies in regards to the Basque Country's integrated care model are summarised in Box 6.7.

Box 6.7. Next steps for policy makers and funding agencies – the Basque Country's integrated care model

Next steps for policy makers and funding agencies to enhance the Basque Country's integrated care model are listed below:

- Support researchers undertake more rigorous evaluations to increase the internal validity of studies
- Support policies to build digital health literacy, particularly a mong older populations to maximise the intervention's potential
- Promote findings from this case study to better understand what countries/regions are interested in transferring this intervention
- Promote "lessons learnt" from countries that have transferred the Basque Country's integrated care model to their local setting.

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Notes

[1] Eligible patients are aged 65+, have two of the following three chronic conditions (diabetes, heart failure and chronic obstructive pulmonary disease), have been hospitalised in the past year, and have a Predictive Index score in the 95th percentile (based on Johns Hopkins Adjusted Clinical Groups Predictive Model). Recent updates have extended the target group and include all patients above 13 years of age.

[2] Other regions included in the study include Zagreb (Croatia), Lower Silesia (Poland), Veneto (Italy), Puglia (Italy) and Powys (United Kingdom).

[3] Ibid.

[4] Propensity scores reflect the probability of patient being in the intervention group based on observable characteristic (i.e. allows researchers to construct an artificial control group that is, to the extent possible, the same as the intervention group).

[5] A "new model of primary care" meeting the following four characteristics: 1) multidisciplinary practices or inter-professional practices; 2) comprehensive health services in the community; 3) population health

management (generally based on risk stratification using sophisticated IT systems); and 4) engagement of patients in shared decision-making (OECD, 2020[14]).

[6] Regions in Bosnia and Herzegovina, Croatia, the Czech Republic, Denmark, Greece, Italy (two regions) Portugal and Serbia.

7

Badalona Healthcare Services (Badalona Serveis Assistencials, BSA), Spain

This chapter covers the Badalona Healthcare Service (BSA), an integrated care organisation. The case study includes an assessment of BSA against the five best practice criteria, policy options to enhance performance and an assessment of its transferability to other OECD and EU27 countries.

BSA, an integrated care organisation: Case study overview

Description: In 2000, the Badalona City Council developed an integrated care organisation bringing together health and social care sectors – Badalona Serveis Assistencials, BSA. In addition to organisational integration (i.e. combining and health and social care), BSA creates other form of integration such as professional integration with the use of multidisciplinary teams and normative integration by developing a shared organisational and professional culture.

Best practice assessment:

OECD best practice assessment of BSA, an integrated care organisation

Criteria	Assessment
Effectiveness 🏅	• An evaluation of BSA as a whole is not available, instead evaluations have focused on individual programs • Evaluations from individual programs show they reduce healthcare use and improve patient satisfaction
Efficiency 🏅	• Similar to "Effectiveness", an evaluation of BSA's efficiency as a whole is not available • Cost-utility analyses of individual programs that make up BSA indicate they are cost-effective, and in certain cases, cost-saving
Equity	• The needs of disadvantaged groups are addressed by programs developed on an ad hoc basis
Evidence-base	• The quality of evidence supporting the effectiveness and efficiency of BSA shows mixed results when using the Effective Public Health Practice Project's quality assessment tool for quantitative studies • In general, the studies evaluating BSA performed well in terms of reducing selection bias, the choice of study design and limiting withdrawals and dropouts
Extent of coverage 🏅	• BSA is a population based integrated care organisation, therefore it services cover the whole population

Enhancement options: To *enhance effectiveness* it is important that all health and social care providers have the skills and confidence to deliver multidisciplinary care, and are supportive of this new model of care. To *enhance equity*, BSA administrators could consider developing permanent programs dedicated to needs of disadvantaged groups with worse health profiles. To *enhance the evidence-base*, future research should focus on evaluating the effectiveness and efficiency of BSA as a whole as opposed to individual programs within the integrated care organisation.

Transferability: The BSA integrated care organisation has not explicitly been transferred to other countries. In general, this model of care is more transferable to countries with a national health system (as opposed to insurance-based models), a sophisticated health information system and a workforce supportive of multidisciplinary work.

Conclusion: BSA is an integrated care organisation bringing together health and social care services, and is supported by a sophisticated health information system. Programs within BSA have demonstrated an overall positive impact, however, the impact of BSA as a whole is unknown. Despite aligning with best practice, there are several options available to policy makers to enhance the performance of BSA.

Intervention description

Spain, like many OECD countries, has experienced a rise in the rate of people living with complex health needs. As of 2020, over a third of adults in Spain (37%) report living with a long-standing illness or health problem. Not only is this one of the highest rates in the EU, it is also markedly higher than the rate reported in 2011 (i.e. 21%) (Eurostat, 2022[1]). Rising numbers of people living with complex health needs stems from ageing population partnered with poor lifestyle habits, for example, unhealthy diets and limited physical activity.

New models of care have emerged to improve treatment for patients with complex health needs. Patients with complex health needs often require care from several health professionals working at different levels of care. For this reason, policy makers, including those in Spain, have implemented new models of care which offer integrated, co-ordinated care centred around patient needs (Monterde et al., 2020[2]; Dueñas-Espín et al., 2016[3]; Cano et al., 2017[4]). These models aim to achieve the following four objectives: 1) improve patient experiences; 2) improve population health; 3) reduce the per capita cost of healthcare; and 4) improve the work-life balance of healthcare providers (i.e. the "Quadruple Aim" approach).

In 2000, the Spanish municipality of Badalona introduced an integrated care organisation responsible for providing health and social care. The remainder of this section outlines Badalona's integrated care organisation – namely, the governance structure, service provision and delivery, as well as the supporting health information system.

Governance

Prior to 2000, health and social care services operated in silos within Badalona – the Badalona Healthcare Services (Badalona Serveis Assistencials, BSA) was responsible for healthcare, while the City Council operated social services. This arrangement led to service duplication and uncoordinated care delivery. In response, in 2000, the Badalona City Council agreed to merge health and social care services into one integrated health and social care organisation. This organisation goes by the name of BSA and is owned by the Badalona City Council (Piera, 2015[5]).

BSA's governance structure supports several types of care integration within the health and social care system (Rossi Mori, Albano and Piera Jimenez, 2017[6]):

- **Functional integration**: back office and support function co-ordination across all units involved
- **Organisational integration**: a single organisation in charge of health and social care provision
- **Professional integration**: multidisciplinary teams of health and social care professionals across different tiers of care
- **Service/clinical integration**: development of the care pathway as a single/seamless process across time, place and discipline
- **Normative integration**: shared mission work values and organisational/professional culture
- **Systemic integration**: alignment of incentives at organisational level.

> *"The governance model, involving all stakeholders and especially including policy leaders has provided organisational support, strong commitment and has enhanced a cohesive culture which set the basis for the continuum of the integrated care." (Valls, Piera and Tolra, n.d.[7])*

Service provision and delivery

BSA is responsible for providing a full spectrum of health and social care services to populations living in the northern metropolitan area of Barcelona including the cities of Badalona, Montgat and Tiana. That is, primary care, specialised care, intermediate care and home care (including social home care). These services are delivered within the Hospital Municipal de Badalona, the Homecare Integrated Service, the intermediate care centre "El Carme", seven primary care centres and a Centre for Sexual and Reproductive Health (Valls, Piera and Tolra, n.d.[7]).

One of the key innovations to emerge from BSA is the "Care Model for Patients with Complex Chronic Conditions" (MAMCC). MAMCC follows a case management approach, which is led by both nurses and social workers who are at the centre of MAMCC. Case managers are responsible for co-ordinating health professionals and service provision, as well as providing support to the patient and their family/carer. The case managers are situated mainly within the primary care sector, however, they have the ability to move across different care levels, including the patient's home.

MAMCC encompasses a range of individual programs, which are outlined in Box 7.1. People are allocated to one or several programs based on a predictive modelling tool that stratifies patients into risk groups or via their healthcare provider.

At a high-level, MAMCC (Valls, Piera and Tolra, n.d.[7]):

- Reshapes the care model so that is patient-focused
- Identifies and prevents acute episodes to avoid unnecessary hospitalisations
- Enables patients to benefit from individual integrated care plans
- Promotes independent living
- Provides better co-ordination across healthcare professionals
- Guarantees care continuity.

Box 7.1. Programs within the "Care Model for Patients with Complex Chronic Conditions" (MAMCC)

This box outlines programs within MAMCC – programs have been divided into EU-funded programs and home care programs, which are further split into health and social care.

EU-funded projects

- ReAAL – telemonitoring programme for chronic diseases
- Beyond Silos – short-term rehabilitation at home after injury or illness
- Mastermind – Computerised Cognitive Behavioural Therapy for depression
- Do Change – management of cardiac patients with new devices and behaviour change
- UseCare

Home care programs – healthcare

- Early discharge programme (HaD) – offers patients who have just undergone surgery home care for six weeks
- Home hospitalisation – short follow-up at home after discharge from intermediate care centre
- Palliative care at home (PADES) delivered by a geriatrician and nurse
- AtDom programme – ongoing assistance at home
- Regional case management for all types of chronic conditions
- Telemonitoring to support management of chronic diseases

Home care programs – social care

- Help at home
- Meals at home
- Cleaning at home
- Home repairs
- GPS tracking system
- Social isolation and exclusion avoidance

Source: RossMori and Piera-Jiménez (2021[8]), "Collection of the Service Deployment Outlines about 20 Integrated Care initiatives in Badalona (2003-15)"; RossiMori et al. (2019[9])), "A systematic analysis of the multi-annual journey of Badalona towards integrated care", http://doi.org/10.5334/ijic.s3344.

Health information system support

Large-scale, population-based integrated care models require support from sophisticated health information systems. A list of IT tools used to support BSA is below (Valls, Piera and Tolra, n.d.[7]):

- A longitudinal Integrated Care Record specific to BSA that is designed to manage and integrate health and social services was developed to improve communication across providers. The Integrated Care Record brings together data collected across all levels of health and social care. Nevertheless, systems to upload patient data differ across providers making it difficult to readily identify patient data.
- The BSA Integrated Care Record is compatible with the Catalan Shared Medical Record (HC3). HC3 collects and stores information about the patient's status and progress whilst receiving care. HC3 ensures there is interoperability of Integrated Care Records across public health providers for the whole region of Catalonia.
- The Integrated Care Record System provides health and social care providers (including third sector care providers) with access to patient information.

OECD Best Practices Framework assessment

This section analyses BSA against the five criteria within OECD's Best Practice Identification Framework – Effectiveness, Efficiency, Equity, Evidence-base and Extent of coverage (see Box 1.1 for a high-level assessment). Further details on the OECD Framework can be found in Annex A.

Box 7.2. Assessment of BSA

Effectiveness

- An evaluation of BSA as a whole is not available, instead evaluations have focused on individual programs
- Evaluations from individual programs show they reduce healthcare use and improve patient satisfaction

Efficiency

- Similar to "Effectiveness", an evaluation of BSA's efficiency as a whole is not available
- Cost-utility analyses of individual programme that make up BSA indicate they are cost-effective, and in certain cases, cost-saving

Equity

- Programs that address the needs of disadvantaged groups are developed and implemented on an ad hoc basis. For example, BSA administrators implemented a programme to encourage people within the Pakistani community to have a check-up due to high rates of untreated diabetes.

Evidence-base

- The quality of evidence supporting the effectiveness and efficiency of BSA shows mixed results when using the Effective Public Health Practice Project's quality assessment tool for quantitative studies
- In general, studies evaluating BSA performed well in terms of reducing selection bias, the choice of study design and limiting withdrawals and dropouts

Extent of coverage

- BSA is a population based integrated care organisation, therefore it services cover the whole population

Effectiveness

There has been no evaluation of BSA as a whole to date. Therefore, this section measures BSA's effectiveness according to individual programs that make up the integrated care organisation (see Box 7.1). Specifically, it focuses on two programs – regional case management programs and the early discharge programme. These were chosen given they are both major programs within BSA and have good available data.

- **Regional case management programs** for patients with chronic health conditions led to a (Vela et al., 2018[10]; Lasmarías et al., 2018[11]):
    - 8% reduction in formal care
    - 40% reduction in emergencies
    - 56% reduction in non-programmed hospital admissions
    - 89% increase in patient satisfaction with service provision
    - 59% increase in home-assisted deaths.
- **Early discharge programme** for patients who have just undergone surgery (Santaeugènia et al., 2013[12]; Mas and Inzitari, 2012[13]; Closa et al., 2017[14]; Mas and Santaeugènia, 2015[15]):
    - 67% increase in patients completing rehabilitation (specifically, among those aged 70-83 years of age)
    - 28% reduction in relapse
    - 50% reduction in rehabilitation
    - 27% decline in mortality rates.

Efficiency

Similar to "Effectiveness", an evaluation measuring the efficiency of BSA is not available. For this reason, this section summarises key findings from efficiency studies, which are available for three individual programs (see Box 7.1).

- **Super@** (Spanish version of the EU project, Mastermind, a Computerised Cognitive Behavioural Therapy for depression) (Vis et al., 2015[16]):
    - Super@ recorded an incremental cost-effectiveness ratio (ICER) of EUR 29 367 per quality-adjusted life year (QALY) when using a discount rate of 3%. The ICER declined to EUR 26 484 when not discounted. Both figures fall under the commonly applied cost-effectiveness threshold of EUR 30 000 used in Spain (Piera-Jiménez et al., 2021[17]).
- **BeyondSilos**, a telehealth-enhanced integrated care model in the domiciliary setting for older patients (Piera-Jiménez et al., 2020[18]):
    - The intervention recorded an ICER per QALY of EUR 6 506, which is below the commonly applied EUR 30 000 cost-effectiveness threshold
- **Do CHANGE**, management of cardiac patients with new devices and behaviour change:
    - Do Change recorded a negative ICER per QALY in Spain (EUR -2 515) indicating the intervention is not only cost-effective, but also cost saving. The intervention is also cost-

effective, although not cost-saving, in other countries including the Netherlands (EUR 1 374) (Piera-Jiménez et al., 2020[19]).

Equity

BSA addresses the needs of disadvantaged groups on an ad-hoc basis. For example, BSA administrators identified that members of the region's Pakistan community had higher rates of untreated diabetes leading to worse health outcomes (e.g. diabetic comas). This was due to genetic factors and a cultural tradition of proactively seeking healthcare. In response, BSA administrators took the following action: 1) placing mediators within primary care centres to facilitate discussions between GPs and patients within the community, 2) seeking the assistance of the Mosque's imam to raise the issue during sermons, and 3) developing flyers in the local language encouraging people to have a health check-up.

People with a lower socio-economic status are more likely to live with complex health needs, indicating the integrated care model may reduce inequalities. Socio-economic status is a key predictor of health status, for example, analysis of Eurostat data by OECD found men in the most deprived group are 1.5 times more likely to be obese than those in the least deprived group, with this figure increasing to 1.9 for women (OECD, 2019[20]). Poor lifestyle behaviours contribute to higher rates of multimorbidity, which is reflected by data from Spain. For example, 12% of the Spanish population live with obesity in the top income quintile compared to 17% in the lowest income quintile (Eurostat, 2019[21]). By developing a model to improve the level of care delivered to patients with complex health needs, health inequalities can be reduced, however, a specific analysis examining this topic is not available.

Evidence-based

The "Evidence-based" criterion assesses the quality of evidence used to measure effectiveness, efficiency and equity. That is, three recent studies by Piera-Jiménez – (Piera-Jiménez et al., 2021[17]), (Piera-Jiménez et al., 2020[18]) and (Piera-Jiménez et al., 2020[19]). Each of the three studies were assessed using the Effective Public Health Practice Project's quality assessment tool for quantitative studies (1998[22]). This tool examines several factors that can bias results such as the study design and level of withdrawals and dropouts. Findings from each assessment are in Table 7.1, which show mixed results across the three studies.

Table 7.1. Evidence-based assessment – BSA

Assessment category	Question	Rating for (Piera-Jiménez et al., 2021[17]) measuring the impact of the Super@ intervention	Rating for (Piera-Jiménez et al., 2020[18]) measuring the impact of the BeyondSilos intervention	Rating for (Piera-Jiménez et al., 2020[19]) measuring the impact of the Do CHANGE intervention
Selection bias	Are the individuals selected to participate in the study likely to be representative of the target population?	Somewhat likely	Very likely	Very likely
	What percentage of selected individuals agreed to participate?	80-100%	60-79%	Less than 60%

Assessment category	Question	Rating for (Piera-Jiménez et al., 2021[17]) measuring the impact of the Super@ intervention	Rating for (Piera-Jiménez et al., 2020[18]) measuring the impact of the BeyondSilos intervention	Rating for (Piera-Jiménez et al., 2020[19]) measuring the impact of the Do CHANGE intervention
Selection bias score:		*Strong*	*Moderate*	*Weak*
Study design	Indicate the study design	Pragmatic within group trial	Observational prospective cohort study	RCT
	Was the study described as randomised?	No	No	Yes
	Was the method of randomisation described?	N/A	N/A	Yes
	Was the method of randomisation appropriate?	N/A	N/A	Yes
Study design score:		*Moderate*	*Moderate*	*Strong*
Confounders	Were there important differences between groups prior to the intervention?	Can't tell	Yes	No
	What percentage of potential confounders were controlled for?	80-100%	80-100%	N/A
Confounders score:		*Moderate*	*Strong*	*Strong*
Blinding	Was the outcome assessor aware of the intervention or exposure status of participants?	Yes	Yes	Yes
	Were the study participants aware of the research question?	Yes	Can't tell	Yes
Blinding score:		*Weak*	*Weak*	*Weak*
Data collection methods	Were data collection tools shown to be valid?	Can't tell	Yes	Can't tell
	Were data collection tools shown to be reliable?	Can't tell	Can't tell	Can't tell
Data collection methods score:		*Weak*	*Moderate*	*Weak*
Withdrawals and dropouts	Were withdrawals and dropouts reported in terms of numbers and/or reasons per group?	Yes	Yes	Yes
	Indicate the percentage of participants who completed the study?	60-79%	80-100%	80-100%
Withdrawals and dropouts score:		*Moderate*	*Strong*	*Strong*

Note: N/A = not applicable.
Source: Effective Public Health Practice Project (1998[22]), "Quality assessment tool for quantitative studies", https://www.nccmt.ca/knowledge-repositories/search/14.

Extent of coverage

BSA's predictive modelling tool enables BSA to deliver integrated care across the covered population. BSA currently offers health and social care services to people residing in the municipalities and town of Badalona, Montgat and Tiana. Using electronic patient data, the whole population is stratified into risk groups with those considered to have complex health needs eligible for MAMCC (Care Model for Patients with Complex Chronic Conditions) (see "Intervention description"). As outlined under "Equity", the predictive tool is therefore able to deliver tailored care to the whole population, including disadvantaged groups (e.g. those with a low socio-economic status).

Policy options to enhance performance

In this section, recommendations are given for BSA administrators, as well as policy makers in other countries who are considering implementing a similar model of care, as to how the performance of the programme could be further enhanced.

Enhancing effectiveness

Ensure health professionals have the skills and motivation to deliver multidisciplinary care. MAMCC led to the emergence of new professional roles, as well as changed how work is organised and performed among existing health professionals. Although these changes align with international best practice, they nonetheless "generated resistance and conflict among professionals" (Vallve et al., 2016[23]). For this reason, before implementing any model of care, it is important health professionals receive training on how to work as a team. Ideally training would be harmonised and delivered as part of the formal curricula. Although training is important, many skills are learnt "on the job". Such knowledge can be shared by establishing "learning networks" among health professionals – e.g. via webinars, conferences, materials and guidebooks.

> *"… domiciliary care has also brought resistances among medical staff. Domiciliary attention requires a new vision of care, which not all doctors are prepared to give. Besides, the new teams of homecare attention imply that patients change doctor when they start to be attended at home, and some of the doctors perceive it as an intrusion and don't agree with their patients being attended by another professional."" (Vallve et al., 2016[23])*

Involve health and social care providers when developing and implementing a new model of care. As outlined by Vallve et al. (2016[23]), despite ongoing communication with providers, many still resist this new model of care. Given workforce support is crucial for success and sustainability, it is important they are involved in the transformation process from the outset.

> *"There have been many meetings with social workers from the city council explaining the benefits of the model but, although it's been 12 years since it was implemented, according to some of the interviewees some of these resistances still prevail." (Vallve et al., 2016[23])*

Co-ordinate health information systems across health and social care providers. Large-scale integrated care models must be supported by sophisticated health information systems – e.g. to share patient data electronically. As outlined under the "Intervention description", EHRs specific to the municipality of Badalona exist, however, providers use different information systems to upload patient data. As a consequence it can be difficult for health professionals to readily identify patient information. Policy makers should therefore focus on aligning health information systems across the spectrum of care.

> *"Another problem we have is related to software, which is dreadful. Look, at the hospital they work with a software called GESDOHC. Primary care centres have another programme called ECAP and at "El Carme" (the intermediate care centre) they use another programme. So, you can imagine. Doctors come around and say they don't find the information from the specialist and ask you to look for it. There are many programs, and it is complicated for us, because we are the link among all of them. And still, at the ECAP you may find all the information from Can Ruti (the hospital from ICS operating at the area of Badalona), and we also have to look at it, because many patients go there…"*

Enhancing efficiency

Efficiency is a measure of effectiveness in relation to inputs used. Therefore, interventions that increase effectiveness without significant increases in costs, or reduce costs while keeping effectiveness at least constant, have a positive effect on efficiency.

Enhancing equity

Develop permanent programs dedicated to the needs of disadvantaged groups. Individual programs that make up BSA (Box 7.1) address the population as a whole. As outlined under "Equity", the specific needs of disadvantaged groups – e.g. low socio-economic status, migrants – are taken into account on an ad hoc basis. Developing permanent individual programs targeting disadvantaged groups can help reduce health inequalities. For example, the OptiMedis population integrated care organisation in Germany has a dedicated Health Kiosk that caters to the needs of migrants by offering counselling services in a range of languages including Arabic, Farsi, Russian and Polish.

Improve access to healthcare services for disadvantaged groups by promoting health literacy. Disadvantaged groups, such as those with a lower socio-economic status, are less likely to access necessary healthcare services (OECD, 2019[24]). For example, across the OECD, 74% of people in the highest income quintile have been screened for breast cancer compared to 63% among those in the lowest income quintile (OECD, 2019[24]). Although disadvantaged groups stand to benefit most from integrated care models, which incentivises high-quality, preventative care, they may be less likely to access these services. Programs that promote health literacy among disadvantaged groups may increase access to healthcare services (see Box 7.3 for further details).

Box 7.3. Building population health literacy

Recent analysis estimated that more than half of OECD countries with available data had low levels of HL. To address low rates of adult health literacy, OECD have outlined a four-pronged policy approach, which align:

- **Strengthen the health system role**: establish national strategies and framework designed to address HL
- **Acknowledge the importance of HL through research**: measure and monitor the progress of HL interventions to better understand what policies work
- **Improve data infrastructure***:* improve international comparisons of HL as well as monitoring HL levels over time
- **Strengthen international collaboration**: share best practice interventions to boost HL across countries.

Source: OECD (2018[25]), "Health literacy for people-centred care: Where do OECD countries stand?", https://doi.org/10.1787/d8494d3a-en.

Enhancing the evidence-base

Undertake research to identify the optimal combination of programs to support patients with complex health needs. To date, research has focused on the effectiveness of individual programs within BSA's integrated care organisation (see Box 7.1) (Rossi Mori, Albano and Piera Jimenez, 2017[6]). Given patients likely access more than just one programme, it is important to understand the impact of different programs when combined (e.g. do they have a more than additive effect on patient outcomes?). Results from the analysis will help optimise care for patients with complex health needs.

Studies evaluating the impact of BSA as a whole would strengthen the evidence-base. In addition to examining individual programs (and the combination of them), it is important to evaluate the impact of BSA as a whole. Key indicators to measure include: hospitalisations, emergency department visits, visits to a GP, patient quality of life (e.g. EQ-5D), and clinical outcomes (e.g. risk factors, mortality, disease incidence). OECD are currently piloting a range of integrated care model indicators – these cover all-cause and disease-specific hospital admissions, all-cause mortality after hospital discharge and prescription of appropriate medication for secondary prevention after hospital discharge (Barrenho et al., 2022[26]). In addition to an outcome/effectiveness evaluation, it is important to evaluate the overall efficiency of BSA using a cost-effectiveness, cost-benefit, or cost-utility analysis. Demonstrating an intervention is efficient is crucial for maintaining long-term political support.

Enhancing extent of coverage

No policy options are recommended for enhancing the extent of coverage given BSA covers the whole population. However, improving access to care for disadvantaged populations will ultimately increase the reach of this care model (see “Enhancing equity”).

Transferability

This section explores the transferability of BSA and is broken into three components: 1) an examination of previous transfers; 2) a transferability assessment using publicly available data; and 3) additional considerations for policy makers interested in transferring BSA.

Previous transfers

BSA exists solely within a selection of towns and municipalities in Spain, nevertheless, similar models of care are increasingly popular among OECD countries. For example:

- OECD’s report on primary care (2020[27]) identified 17 member countries which have developed “new models of primary care”,[1] that deliver integrated care to patients.
- The European Commission funded ICARE4U project related to multimorbid patients identified 101 models of integrated care across 24 European countries, of which 40% target those aged 65+ (Melchiorre et al., 2020[28]).

BSA administrators have highlighted several transfer facilitators associated with integrated care models combining health and social care. These are listed in Box 7.4.

Box 7.4. Transfer facilitators

This box outlines facilitators for transferring integrated care models that bring together health and social care. The list is drawn from existing references, which are listed at the bottom of this box. The facilitators are broken into four categories: policy, governance, workforce and culture and digital tools.

Policy

- Strong policy commitment towards providing patient-centric care
- Ensure the views of all key stakeholders are included – e.g. research organisations, policy makers, service providers and end-users

Governance

- One governance and organisational structure for health and social care services – without such a structure, implementation costs are likely to be very high given the change required for institutional, organisation, cultural and legal arrangements
- Implementation is more straightforward in countries with national health systems as opposed to insurance-based models
- Involvement of as many stakeholders as possible in terms of horizontal governance

Workforce and culture

- Allowing health and social care providers to play a leading role in developing and implementing this new model of care
- Willingness and motivation among the workforce to implement such models of care
- Culture of innovation
- Involvement of young people given they have a tendency to be more innovative, experience less cultural constraints and have good ideas

Digital tools

- Sophisticated health information system, including wide-spread use of EHRs that allow for efficient communication across the spectrum of care
- No resistance to health technology among patients and providers

Source: Vallis, Piera and Tolra (n.d.[7]), "Report of in depth analysis of Badalona Healthcare services (BSA)" case study"; Vallive et al. (2016[23]), "SELFIE 2020: Work Package 2: Thick descriptions of the two Catalan case studies, Badalona Serveis Assistencials (BSA) (Spain)"; Lupiañez-Villanueva and Theben (2015[29]), "Strategic Intelligence Monitor on Personal Health Systems Phase 3 (SIMPHS3): BSA (Spain) Case Study Report".

Transferability assessment

This section outlines the methodological framework to assess transferability followed by analysis results.

Methodological framework

A few indicators to assess the transferability of BSA were identified (see Table 7.2). Indicators were drawn from international databases and surveys to maximise coverage across OECD and non-OECD European countries. Please note, the assessment is intentionally high level given the availability of public data covering OECD and non-OECD European countries. For further details on the methodology used, see Annex A.

Table 7.2. Indicators to assess transferability – BSA

Indicator	Reasoning	Interpretation
Population context		
% of older individuals who sought health information online in the past 3 months	The intervention utilises digital tools to engage with participants – e.g. electronic health records	↑ value = more transferable
Sector context (health and social care)		
Proportion of GPs who work in single-handed practices	The intervention is more transferable in countries where GPs feel comfortable working with other health professionals. This indicator is a proxy to measure the willingness of GPs to work in co-ordinated teams.	Low = more transferable High = less transferable
Proportion of physicians in primary care facilities using electronic health records	EHRs improve the ability of health professionals to provide integrated patient-centred care. Therefore, the intervention is more transferable in countries that utilise EHRs in primary care facilities.	↑ value = more transferable
Proportion of hospitals using electronic patient records for inpatients	As above	↑ value = more transferable
The extent of task shifting between physicians and nurses in primary care	This intervention promotes integrated care provided by multidisciplinary teams. Therefore, the intervention is more transferable in countries where physicians feel comfortable shifting tasks to nurses.	The more "extensive" the more transferable
The use of financial incentives to promote co-ordination in primary care	The intervention is more transferable to countries with financial incentives that promote co-ordination of care across health professionals.	Bundled payments or co-ordinated payment = more transferable
Economic context		
Primary healthcare expenditure as a percentage of current health expenditure	The intervention places a stronger emphasis on primary care, therefore, it is likely to be more successful in countries that allocate a higher proportion of health spending to primary care	↑ value = more transferable

Source: WHO (2018[30]), "Primary Health Care (PHC) Expenditure as percentage Current Health Expenditure (CHE)", https://apps.who.int/nha/database; Oderkirk (2017[31]), "Readiness of electronic health record systems to contribute to national health information and research", https://dx.doi.org/10.1787/9e296bf3-en; Schäfer et al. (2019[32]), "Are people's health care needs better met when primary care is strong? A synthesis of the results of the QUALICOPC study in 34 countries", https://doi.org/10.1017/S1463423619000434; Maier and Aiken (2016[33]), "Task shifting from physicians to nurses in primary care in 39 countries: a cross-country comparative study", https://doi.org/10.1093/eurpub/ckw098; OECD (2020[27]), *Realising the Potential of Primary Healthcare*, https://doi.org/10.1787/a92adee4-en; OECD (2016[34]), "Health Systems Characteristics Survey", https://qdd.oecd.org/subject.aspx?Subject=hsc; European Observatory on Health Systems and Policies (2021[35]), "The Health Systems and Policy Monitor", https://eurohealthobservatory.who.int/countries/overview.

Table 7.3. Transferability assessment by country (OECD and non-OECD European countries) – BSA

A darker shade indicates BSA is more suitable for transferral in that particular country

Country	% older people using the internet for health information	% GPs in single practices	% PC* using EHRs	% hospitals using EHRs	Task shifting in PC*	Financial incentives	Primary expenditure percentage CHE**
Spain	**41**	**Low**	**99**	**80**	**Limited**	**No incentive**	**39**
Australia	n/a	Low	96	20	Extensive	Bundled	37
Austria	32	High	80	99	None	Co-ordinated payment	37
Belgium	37	High	n/a	n/a	Limited	Bundled	40
Bulgaria	12	High	n/a	n/a	None	Bundled	47
Canada	n/a	Low	77	69	Extensive	Bundled	48
Chile	n/a	n/a	65	69	n/a	No incentive	n/a
Colombia	n/a	n/a	n/a	n/a	n/a	No incentive	n/a
Costa Rica	n/a	n/a	n/a	n/a	n/a	No incentive	33
Croatia	18	n/a	3	n/a	Limited	No incentive	38
Cyprus	36	Low	n/a	n/a	Limited	No incentive	41
Czech Republic	41	High	n/a	100	None	No incentive	33
Denmark	56	Medium	100	100	Limited	Co-ordinated payment	38
Estonia	32	High	99	100	Limited	No incentive	44
Finland	60	Medium	100	100	Extensive	No incentive	46
France	39	n/a	80	60	None	Bundled	43
Germany	55	High	n/a	n/a	None	Co-ordinated payment	48
Greece	20	High	100	50	None	No incentive	45
Hungary	42	High	n/a	n/a	Limited	No incentive	40
Iceland	56	Low	100	100	Limited	Co-ordinated payment	35
Ireland	40	Low	95	35	Extensive	No incentive	47
Israel	n/a	n/a	100	100	n/a	Co-ordinated	n/a

Country	% older people using the internet for health information	% GPs in single practices	% PC* using EHRs	% hospitals using EHRs	Task shifting in PC*	Financial incentives	Primary expenditure percentage CHE**
						payment	
Italy	27	Medium	n/a	n/a	Limited	Bundled	n/a
Japan	n/a	n/a	36	34	n/a	No incentive	52
Korea	n/a	n/a	n/a	n/a	n/a	No incentive	57
Latvia	28	High	70	90	Limited	Bundled	39
Lithuania	31	Medium	n/a	n/a	Limited	No incentive	48
Luxembourg	46	Medium	n/a	n/a	None	No incentive	38
Malta	34	Medium	n/a	n/a	Limited	No incentive	62
Mexico	n/a	n/a	30	49	n/a	Co-ordinated payment	44
Netherlands	67	Medium	n/a	n/a	Extensive	Bundled	32
New Zealand	n/a	Low	95	100	Extensive	No incentive	n/a
Norway	52	Low	100	100	None	No incentive	39
Poland	25	Medium	30	10	None	No incentive	47
Portugal	19	Low	n/a	n/a	Limited	No incentive	58
Romania	17	Medium	n/a	n/a	None	No incentive	35
Slovak Republic	39	High	89	100	None	No incentive	n/a
Slovenia	30	High	n/a	n/a	Limited	No incentive	43
Sweden	44	Low	100	100	Limited	Co-ordinated payment	n/a
Switzerland	57	Medium	40	100	None	No incentive	40
Türkiye	11	Low	n/a	n/a	None	No incentive	n/a
United Kingdom	45	Low	99	100	Extensive	No incentive	53
United States	n/a	n/a	83	76	Extensive	No incentive	n/a

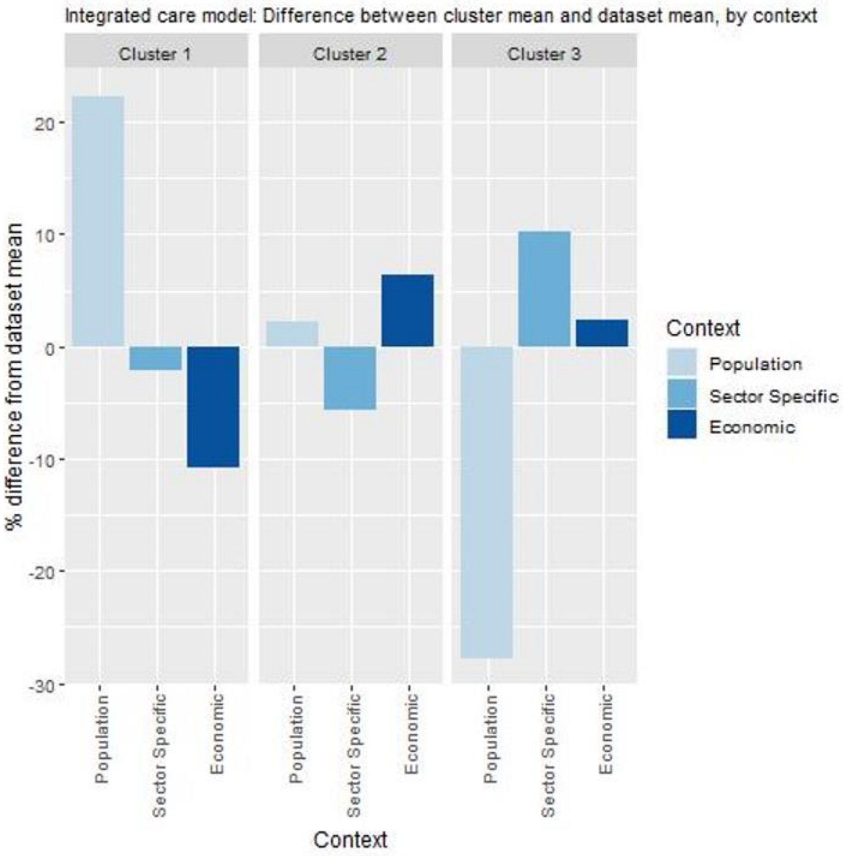
Note: *PC = primary care. **CHE = current health expenditure. n/a = no data available.
Source: See Table 7.2.

To help consolidate findings from the transferability assessment above, countries have been clustered into one of three groups, based on indicators reported in Table 7.2. Countries in clusters with more positive values have the greatest transfer potential. For further details on the methodological approach used, please refer to Best Practice case study guide.

Key findings from each of the clusters are below with further details in Figure 1.1 and Table 7.4:

- Countries in cluster one typically have populations where internet use for healthcare purposes is high. Given the integrated care model incorporates various digital tools, this may indicate higher levels of engagement from the population. However, expenditure on primary care is relatively low in these countries indicating potential long-term affordability issues. Spain, where this model of care operates, is in this cluster, meaning conditions in which these clusters could improve on, although ideal, are not pre-requisites.
- Countries in cluster two should first establish whether its health and social care system is ready to transfer this intervention – e.g. will healthcare professionals be accepting of working as a multidisciplinary care team? This model of care is likely to be popular among the population given relatively high levels of digital health literacy, further, countries in these cluster spend relatively more on primary care indicating support for proactive (preventative) style care.
- Unlike countries in cluster two, countries in cluster three have systems in place to support integrated care models within the health and social system. Nevertheless, digital interventions may be less successful among these countries given lower levels of digital health literacy.

Figure 7.1. Transferability assessment using clustering – BSA



Note: Bar charts show percentage difference between cluster mean and dataset mean, for each indicator.

Table 7.4. Countries by cluster – BSA

Cluster 1	Cluster 2	Cluster 3
Cyprus	Australia	Austria
Denmark	Bulgaria	Belgium
Germany	Canada	Croatia
Iceland	Czech Republic	Estonia
Malta	Finland	Hungary
New Zealand	France	Italy
Norway	Greece	Latvia
Portugal	Ireland	Lithuania
Spain	Luxembourg	Mexico
Sweden	Netherlands	Slovenia
United Kingdom	Poland	
	Romania	
	Slovak Republic	
	Switzerland	

Note: Due to high levels of missing data, the following countries were omitted from the analysis: Chile, Colombia, Costa Rica, Israel, Japan, Korea, Türkiye and the United States.

New indicators to assess transferability

Data from publicly available datasets alone is not ideal to assess the transferability of public health interventions. Box 7.5 outlines several new indicators policy makers could consider before transferring BSA.

Box 7.5. New indicators, or factors, to consider when assessing transferability – BSA

In addition to the indicators within the transferability assessment, policy makers are encouraged to collect information for the following indicators:

Population context

- What is the population's attitude towards receiving care from health professionals who are not doctors?
- What is the level of health literacy among patients? (i.e. are patients likely to engage in shared decision-making?)

Sector specific context (health and social care)

- Does the healthcare workforce support care integration and co-ordination?
- Is there a culture of change and innovation among health and social care professionals?
- Do regulatory arrangements support care integration across and within health and social care services?
- Does the clinical information system support: a) sharing of patient data across health professionals? b) Sharing of patient data across health and social care facilities?
- Do health provider reimbursement schemes support co-ordinated care? (E.g. bundled payments, add-on payments that incentivise co-ordinated care)
- Are health and social care professionals digitally health literate?
- How are health and social care services currently provided?*

Political context

- Has the intervention received political support/commitment from key decision-makers? (E.g. a national strategy to address ageing and chronicity)
- Has the intervention received commitment from key decision-makers?

Economic context

- What is the cost of implementing and operating the intervention in the target setting?

* This model of care more easily transferable to healthcare systems with a national health system model when compared to insurance-based models.

Conclusion and next steps

BSA is an integrated care organisation owned by the Badalona City Council. Unlike many integrated care organisations, BSA brings together both health and social care services to better meet the needs of the population. BSA supports various levels of integration including organisational, functional, clinical and professional.

Individual programs within BSA have demonstrated both effectiveness and efficiency. An evaluation measuring the overall effectiveness and efficiency of BSA is not available. However, certain individual programs that make up BSA show they reduce healthcare utilisation, improve patient outcomes and are cost-effective.

The needs of disadvantaged groups are addressed on an ad hoc basis. Individual programs delivered as part of BSA address the population as a whole. Nevertheless, specific programs are developed on an ad hoc basis in response to unmet needs from disadvantaged groups. For example, BSA administrators introduced several strategies to combat high rates of untreated diabetes in the Pakistani community.

BSA aligns with international best practice, nevertheless, there are opportunities for it to further improve. For example, ongoing training to ensure health and social care professionals have the skills, confidence and motivation to work as a multidisciplinary team will ultimately improve service delivery. Further, future research projects should focus on evaluating BSA as a whole as opposed to focusing on individual programs.

Countries interested in transferring BSA must first consider the context in which their health and social care systems operate. The ability for countries to integrated health and social care services will depend on how both sectors are currently organised. Key transfer facilitates include, but are not limited to, a sophisticated health information system, a motivated workforce and strong political commitment.

Box 7.6. Next steps for policy makers and funding agencies – BSA

Next steps for policy makers and funding agencies to enhance BSA are listed below:

- Consider policy options in this case study to further enhance BSA’s performance
- Share key transfer facilitators with policy makers interested in developing an integrated care organising combining both health and social care
- Focus future research efforts on the impact of BSA as a whole given the growing interested in such models of care across OECD and EU27 countries.

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Note

[1] A “new model of primary care” meeting the following four characteristics: 1) multidisciplinary practices or inter-professional practices; 2) comprehensive health services in the community; 3) population health management (generally based on risk stratification using sophisticated IT systems); and 4) engagement of patients in shared decision-making (OECD, 2020[27]).

8

Medical Diagnostic Centres, Poland

This chapter covers Poland's Medical Diagnostic Centre (MDC), a primary care model for patients with chronic conditions. The case study includes an assessment of MDC against the five best practice criteria, policy options to enhance performance and an assessment of its transferability to other OECD and EU27 countries.

Medical and Diagnostic Centre (MDC): Case study overview

Description: MDC is a primary care model for patients with chronic conditions. Patients who access MDC obtain an Individual Medical Care Plan based on a comprehensive assessment by a GP. Results from the comprehensive assessment are used to stratify patients into risk groups, which helps health professionals proactively manage patient needs. Following the comprehensive assessment, patients receive care by a multidisciplinary care team, which is co-ordinated through a case manager. MDC resembles a new model of primary care growing increasingly popular amongst OECD countries.

Best practice assessment:

OECD Best Practice assessment of MDC

Criteria	Assessment
Effectiveness	The average number of GP and specialist visits did not grow despite an increase in the average age of an MDC patient. Given older patients require more care, these results indicate, but do not confirm, MDC reduces demand for care. An evaluation of similar pilot studies in Poland found patients who access this type of care report better experiences and outcomes. This did not translate into a reduction in secondary care utilisation.
Efficiency	There is no data on the efficiency of MDC. Evidence from the broader literature indicate primary care models such as MDC reduce unnecessary treatment and thereby costs
Equity	More than half (61%) of all MDC patients are located outside urban areas, including a large proportion of people in thinly populated areas. MDC therefore plays a key role in reducing access inequalities.
Evidence-base	Changes in healthcare utilisation of MDC patients was measured using repeated cross-sectional data for MDC patients only. Given there was no control group nor a process to control for confounding factors, the change in utilisation cannot be directly attributed to MDC.
Extent of coverage	Between 2014 and 2020, the number of MDC patients grew by 37% (61 776 to 84 677)

Enhancement options: to *enhance the effectiveness* of MDC, policy makers should continue efforts to promote the use of digital tools across the healthcare sector, including primary care. Digital tools such as electronic health records (EHRs) play an important role in providing co-ordinated care, which is one of MDC's key objectives. Sophisticated digital methods to collect patient data can subsequently be used to stratify patients into risk groups, as seen in countries such as Canada and Spain. To *enhance the evidence-base*, more robust evaluation methods are necessary, for example, by including data for a control group as well as controlling for confounding factors.

Transferability: new models of primary care, such as MDC, operate in 17 OECD countries, including EU Member States such as Austria, Greece, Ireland, Italy, the Slovak Republic and Slovenia. This indicates MDC, and the type of care it provides, is highly transferable.

Conclusion: MDC provides patients with patient-centred care delivered by a multidisciplinary care team. This model of care is considered "best practice" and is therefore increasingly popular amongst OECD countries. At present, the real impact of MDC on patient health outcomes and utilisation is unknown given data availability constraints. However, a study looking at similar primary care models in Poland concluded patients reported better experiences and outcomes. To enhance the impact of MDC, policy makers should continue policy options outlined in this case study.

Intervention description

The number of people living with one or multiple chronic conditions has been rising. Primary care, as the first point of contact with the healthcare system, plays an important role in preventing, managing and controlling the progression of chronic diseases. Despite widespread acceptance that a high functioning primary care system is essential for improving health outcomes and containing costs, international research shows people with chronic diseases frequently do not receive necessary preventative care, further, the care they do receive is not co-ordinated (OECD, 2020▯).

Relative to other OECD and EU Member States, Poland has a weak primary care system. A strong primary care system can reduce or eliminate hospitalisations for diseases such as diabetes and congestive heart failure (CHF). Therefore, hospitalisations for these diseases measure the strength of a country's primary care system. Poland, in 2016, recorded 511 discharges for CHF per 100 000 people, which was the second highest of any EU Member State (OECD, 2019▯).

In response to these challenges, Poland implemented a Primary Healthcare (PHC) Plus programme covering over 40 primary care facilities, each of which offers integrated, patient-centred care. One of these primary care facilities is the Medical and Diagnostic Centre (MDC), established in 2015 in the region of Siedlce. An overview of the MDC model of care is outlined below:

- **Preliminary visit and diagnostic tests**: the patient has an initial visit to the doctor who prescribes a list of tests relevant for the patient. The patient has these tests performed outside the preliminary test.
- **Main complex visit**: once the tests results are available, the patient attends a follow-up appointment with the same doctor and receives a comprehensive assessment. The assessment includes a physical examination by a nurse (e.g. measurement of BMI and blood pressure) followed by a discussion with the doctor who goes over results from the diagnostic tests. Based on test results, the physical examination, medical history, and patient needs, the doctor classifies the patient into one of five risk groups (see Box 8.1) and develops an "Individual Medical Care Plan" (IMCP). The IMCP outlines treatment plans and recommended follow-up appointments. The IMCP is available to the patient's therapeutic team, which includes a GP, psychiatrist, psychologist, dietitian, occupational therapist and physical therapist. The therapeutic team also have access to patient data via the integrated electronic health record (EHR).

Box 8.1. Patient stratification groups

During the main complex visit, patients are allocated into one of five risk groups:

- Group 1: no chronic disease diagnosis
- Group 2: patient with a chronic disease who is stable
- Group 3: patient with a chronic disease who is stable but requires periodical check-ups
- Group 4: patient with a chronic disease who is unstable and requires increased care and frequent follow-up visits
- Group 5: patient with a chronic disease who is cared for at home or in a long-term or nursing care facility.

Before taking the main complex visit, all patients are allocated into Group 0 (i.e. the patient has not been allocated to a risk group).

Risk stratification is important for understanding the health and risk profiles of patients, thus allowing health professionals to proactively manage patient needs.

- **Meeting with the care co-ordinator**: immediately following the main complex visit, the patient visits their care co-ordinator who is responsible for co-ordinating treatment and, in agreement with the patient, sets up the necessary appointments, including an educational session. The main complex visit and the meeting with the care co-ordinator takes approximately 90 minutes.
- **Education sessions**: MDC developed disease-specific education programs to help patients self-manage, which are run by nurses, nutritionists and dieticians.
- **Follow-up visits**: the IMCP indicates the number of follow-up visits the patient requires, which is based on their risk group. For example, a patient in risk Group 3 (stable but requires periodic check-ups) is assigned two follow-up visits a year compared to Group 4 (unstable patient) who requires 3-4 follow-up visits (see Box 8.1).

OECD Best Practices Framework assessment

This section analyses MDC against the five criteria within OECD's Best Practice Identification Framework – Effectiveness, Efficiency, Equity, Evidence-base and Extent of coverage (see Box 8.2 for a high-level assessment of MDC). Further details on the OECD Framework are Annex A.

Box 8.2. Assessment of MDC

The best practice assessment includes results for MDC as well as the Primary Healthcare (PHC Plus) pilot, which included 41 primary care facilities (including MDC). Findings from the evaluation are included given all pilot sites are based off a similar model of care.

Effectiveness

- The number of GP and specialist appointments has remained largely stable (or decreased) despite an increase in the average age of MDC patients. Given, older patients require greater levels of care, these initial results indicate, but do not confirm, MDC has reduced demand for healthcare
- An evaluation of PHC Plus found patients had a better care experience and reported lower disease severity. PHC Plus did not reduce utilisation of healthcare services.

Efficiency

- Studies evaluating the efficiency of MDC are not available. Evidence from the literature show strong primary care systems reduce unnecessary procedures and utilisation of costly hospital and specialist services

Equity

- Over half of all MDC patients are located outside densely populated areas, of which 62% are located in thinly populated areas. These results indicate MDC successfully reaches geographically excluded groups
- MDC improves access to care for all population groups by actively reaching out to patients in rural areas as well as participating in local activities that improve preventative care

Evidence-base

- Utilisation of MDC services was collected from patients over a six-year period (2014-20). Each year the analysis covered between 60-85 000 patients. Given the analysis did not include a control group nor control for confounding factors, the change in utilisation cannot be directly attributed to MDC.

Extent of coverage

- Between 2014 and 2020, the number of MDC patients grew by 37% (61 776 to 84 677)

Effectiveness

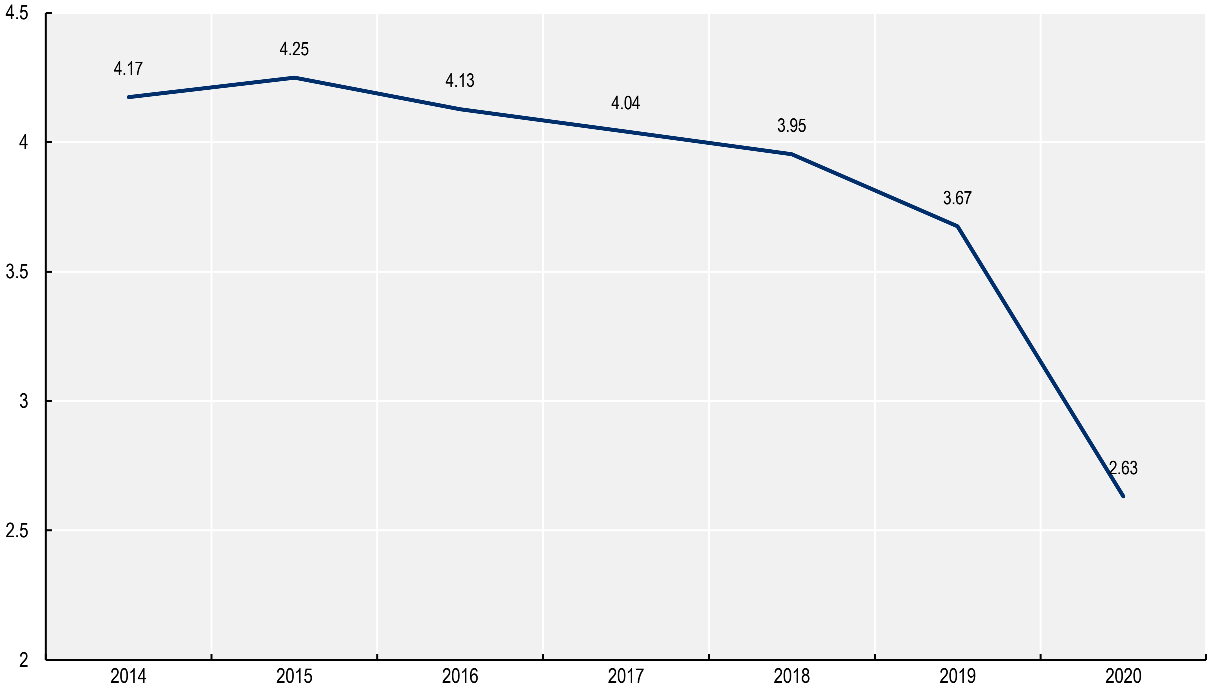
Results for effectiveness are provided for MDC and the PHC Plus pilot. The latter includes findings from an evaluation of 41 pilot sites, which includes MDC. The results are considered relevant for this cases study given all pilot sites are based on the same model of care.[1]

MDC

The objective of MDC is to improve patient experiences, health outcomes, and reduce utilisation of secondary care services and costs. This section presents data measuring the impact of MDC on healthcare utilisation using data over the period 1 April 2014 to 31 December 2020. Results from the analysis provide an indication, but do not confirm, MDC's impact on utilisation given limitations in the study design (explored further under the "Evidence-base" criterion).

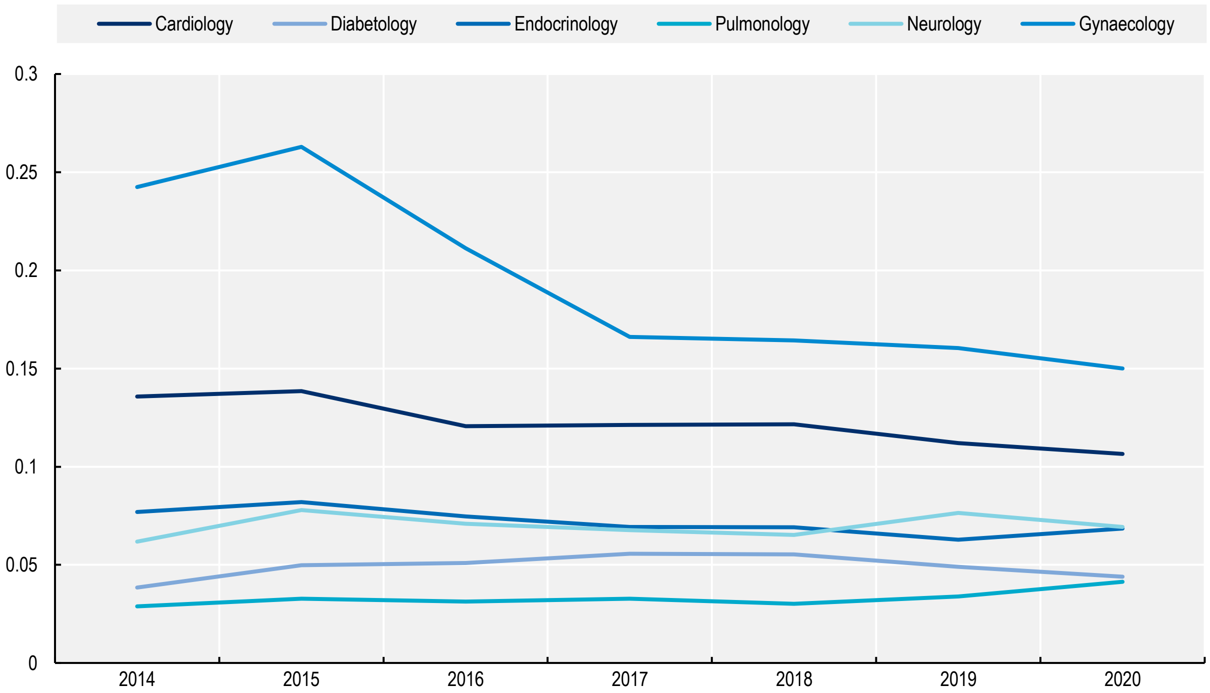
The average number of patient visits did not change markedly despite an increase in the average patient age. Between 2014-20, the average age of patients enrolled in MDC increased from 48.25 to 51.97. Over the same period, the average number of GP (Figure 8.1) and specialists visits fell, in particular for gynaecological appointments[2] (Figure 8.2). Given morbidity and thus healthcare utilisation increase with age, the results indicate, but do not conclude, MDC improved patient outcomes.

Figure 8.1. Change in the average number of GP visits, 2014-20



Note: The marked downward trend in 2020 likely reflects the impact of the COVID-19 pandemic.
Source: Data provided by MDC administrators.

Figure 8.2. Change in the average number of specialist visit, 2014-19



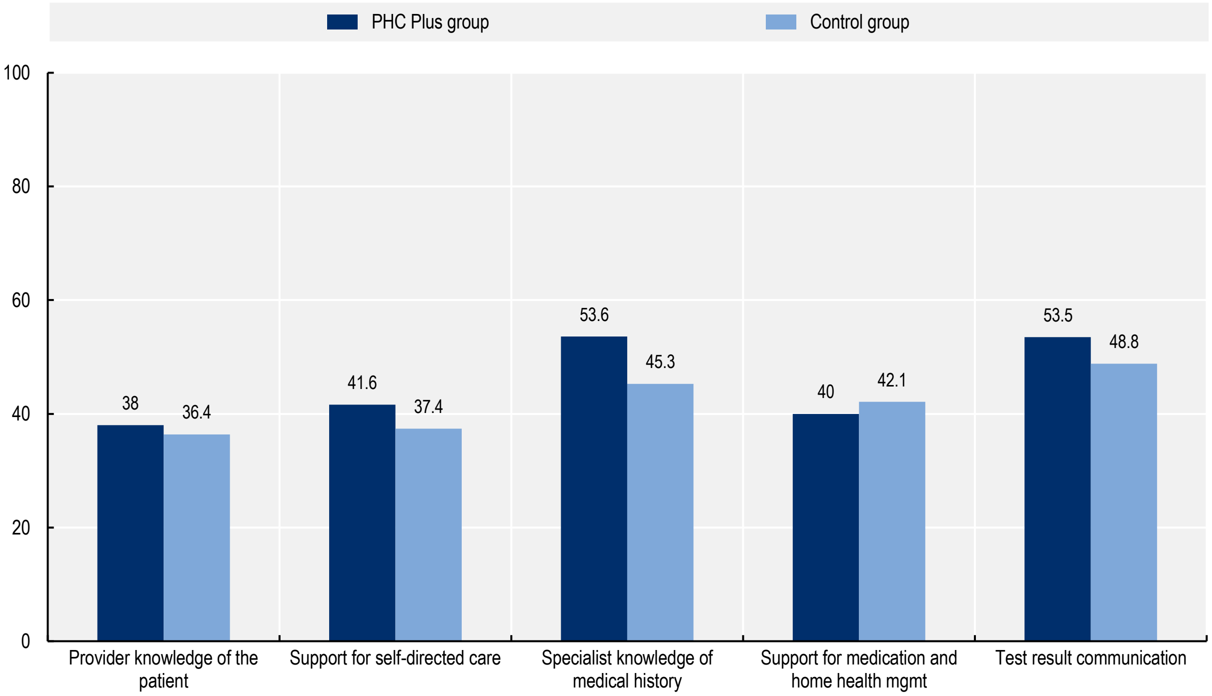
Source: Data provided by MDC administrators.

Primary Healthcare PLUS

In 2020, the World Bank released findings from its evaluation of PHC Plus two years after the implementation of the pilot programme. The evaluation found an improvement in patient reported experiences and outcomes, and health literacy, but no decrease in the utilisation of hospital services.

Patients recorded a better care experience. Patients enrolled in PHC Plus recorded higher levels of patient reported experience measures (PREMs) compared to patients who receive care in a GP single practice (control group). For example, the PREM score reflecting whether the patient felt the specialist had knowledge of their medical history is over eight points higher for those enrolled in PHC Plus (53.6 versus 45.3 out of a possible 100 points) (Figure 8.3). Patients enrolled in PHC Plus also reported better integration of healthcare, albeit marginally (World Bank, 2020[]).

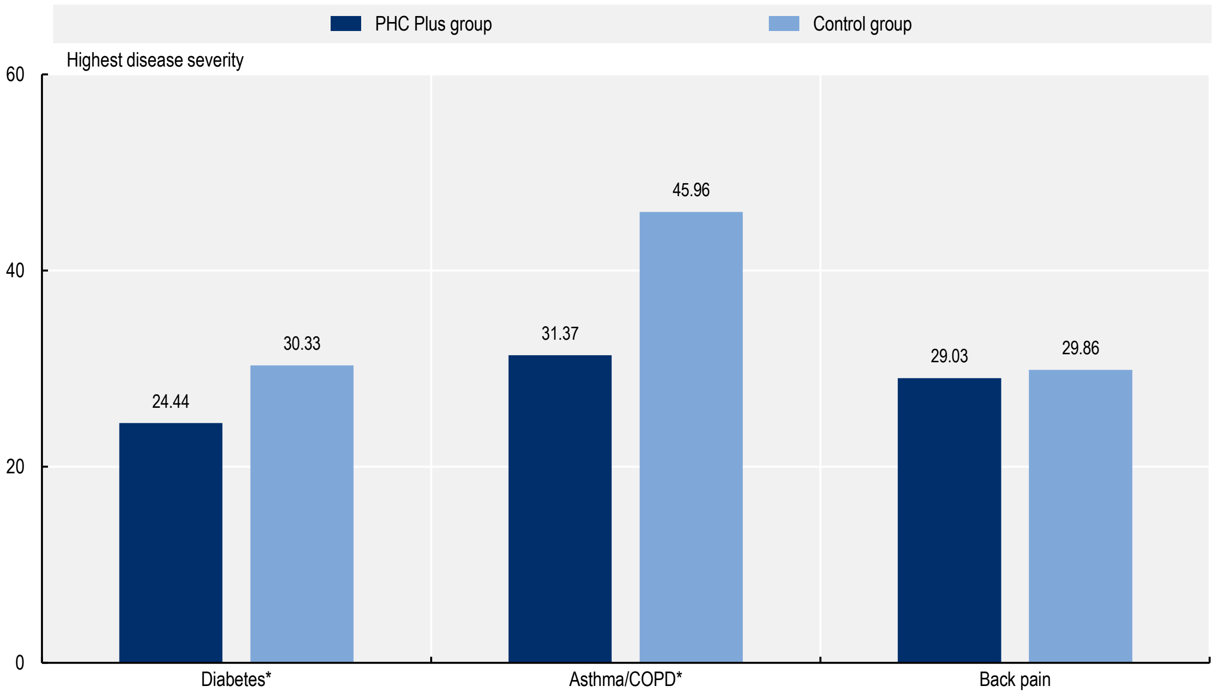
Figure 8.3. Impact of PHC Plus on selected PREM indicators



Note: Differences between the PHC Plus group and the control group are statistically significant. A higher score indicates a better experience.
Source: World Bank (2020▯), "POZ Plus po 2 latach wdrożenia- wstępne wnioski".

Patients reported better outcome measures. PHC Plus patients with diabetes and asthma/COPD reported lower disease severity. Conversely, disease severity for patients with back pain was similar between the two groups (Figure 8.4).

Figure 8.4. Impact of PHC Plus on selected PROMs (patient-reported outcome measures)



Note: *Indicates differences between the two groups are statistically significant. A high score indicates higher disease severity.
Source: World Bank (2020▯), “POZ Plus po 2 latach wdrożenia- wstępne wnioski”.

The number of hospitalisations increased despite faster access to care. The average monthly number of one-day hospital stays increased by 8.86 days while longer hospital stays (i.e. +1 day) increased by 12.59 days after the introduction of PHC Plus. These results may reflect an ongoing disconnect between primary and secondary care in Poland. The same study showed initial results indicating “potentially faster” access to tests and healthcare. For example, on average, a patient with diabetes who is enrolled in PHC Plus receives a comprehensive assessment within 68.52 days, which is markedly lower than the 78 days the same patient would wait to see an outpatient centre specialising in diabetology (World Bank, 2020▯).

Patients report being more health literate and less reliant on others for assistance. PHC Plus patients recorded a health literacy score of 79.19 points (out of 100) compared to 76.35 for the control group. Fourteen percent of PHC Plus patients reported involving their family compared to 28% in the control group (World Bank, 2020▯).

Efficiency

Efficiency data from MDC or the PHC Plus intervention are not available. Instead, this section summarises findings from key sources of literature, which conclude that high performing primary healthcare systems help contain spending – see Box 8.3 (OECD, 2020▯).

Box 8.3. The role of primary care systems in containing health spending

As outlined in OECD's 2020 primary care report, there is sufficient evidence supporting the role of primary care in reducing unnecessary procedures and utilisation of costly hospital and specialist services (WHO, 2018). Given the unit cost of treating the same condition in primary care is markedly lower than in hospitals, primary care plays a key role in containing health spending.

Studies from the literature highlighting the impact of primary care on utilisation of secondary services are summarised below:

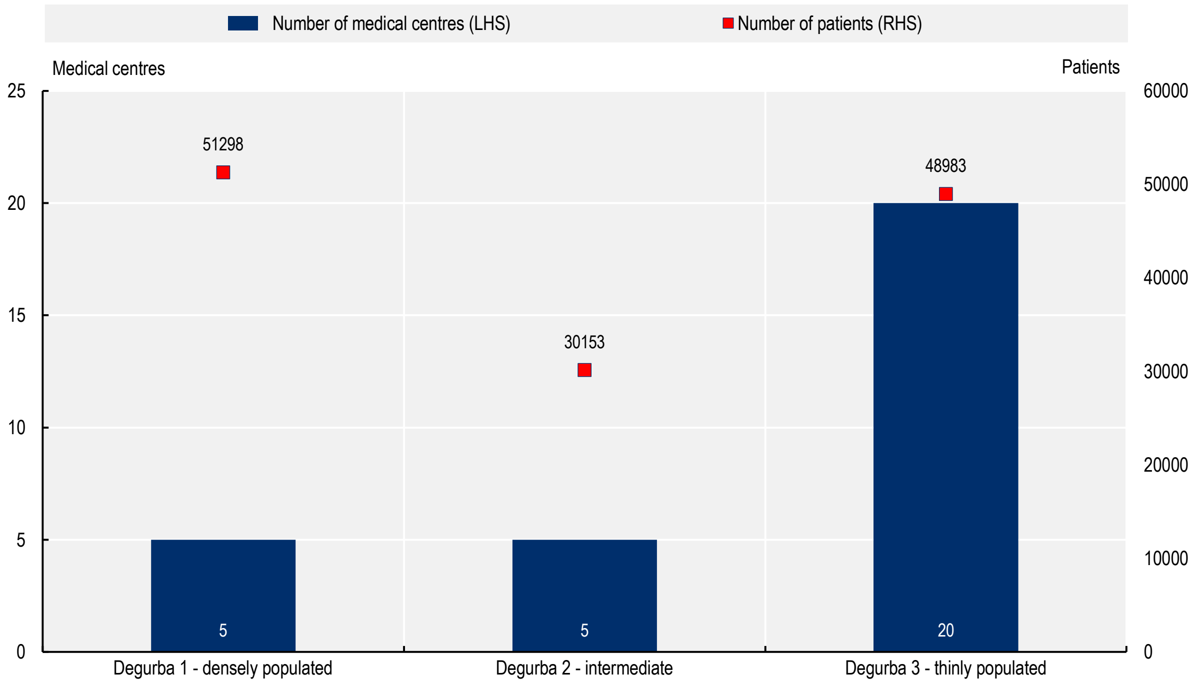
- A systematic review by Wolters et al. (2017) concluded that diabetic patients with regular access to primary were less likely to be hospitalised
- An international survey of 34 countries (including EU27, except France) by Van den Berg et al. (2015) found a significant, negative relationship between better access to primary care and emergency department visits
- A systematic review covering studies in the United States found better access to primary was associated with a reduction in unscheduled secondary visits (Huntley et al., 2014).

Note: This box highlights only a small number of studies supporting the role of primary care in containing costs. For further examples, see OECD (2020).

Equity

More than half of all MDC patients are located outside urban areas. Equity of access has been analysed, at a high-level, using patient data across Degurba (degree of urbanisation) classifications (1 = densely population, 2 = intermediate levels of population, and 3 = thinly populated). Results from the data show more than half of all MDC patients are located outside densely populated areas (61% of all patients or 79 136 patients in total) (see Figure 8.5). These results indicate MDC successfully reaches geographically disadvantaged patients.

Figure 8.5. Number of medical centres and patients by location (total between 2008-20)



Note: Degurba = degree of urbanisation. LHS = left hand side axis and RHS = right hand side axis.
Source: Data provided by MDC administrators.

MDC actively reaches out to patients living in rural areas. People living outside major urban areas have lower access to healthcare services. As part of the MDC intervention, specialist physicians must travel to small health centres located in rural areas on specific days, as a way to address geographic inequalities.

MDC participates in complementary activities designed to reduce social health disparities. In addition to its core services (see “Intervention description”), MDC supports programs that actively reach out to the community, including disadvantaged groups. For example:

- *“Healthy Community” contest*: the Polish Union of Oncology runs a campaign promoting screening tests, which are performed by the MDC. The contest contributed to an increase in the number of people screened, however, due to data constraints, it is unclear if these people are from priority population groups who would otherwise not have been screened.
- *Patient transport services*: in addition to its core services, MDC runs a preventative care campaign, which offers patients screening and diagnostic tests at their local MDC (usually every Saturday). Free transportation is available for people who may have difficulty accessing their local MDC.

Evidence-base

This section analyses the quality of evidence to evaluate the effectiveness of MDC and PHC Plus (Table 8.1). In summary:

- The impact of MDC on healthcare utilisation was evaluated using data from all patients (n = 61 776 to 84 677 depending on the year) over a period of six years (2014-20). Data from patients showed that despite an increase in the average patient age, utilisation of GP and specialists services per person stayed the same or declined (see “Effectiveness”). These results only provide an indication that MDC reduces healthcare utilisation given the study design. For example, the results do not include data for a control group, which is necessary to ascertain if trends in utilisation are a result of MDC, further, the analysis does not control for potential confounders (e.g. socio-economic status). Nevertheless, data from MDC patients was collected using routine utilisation data, which is both valid and reliable.

- The World Bank evaluated PHC Plus using cross-sectional survey data (2019-20) from an intervention and control group. In total, patients from 38 PHC Plus sites were included in the intervention group and 63 primary care facilities in the control group. Differences between the intervention and control group prior to the analyses were not reported, however, the methodology controlled for key confounders including age, gender, facility size, education and self-perceived financial status. Data to measures patient reported experiences and outcomes were collected using valid and reliable tools.

Table 8.1. Evidence-based assessment – MDC

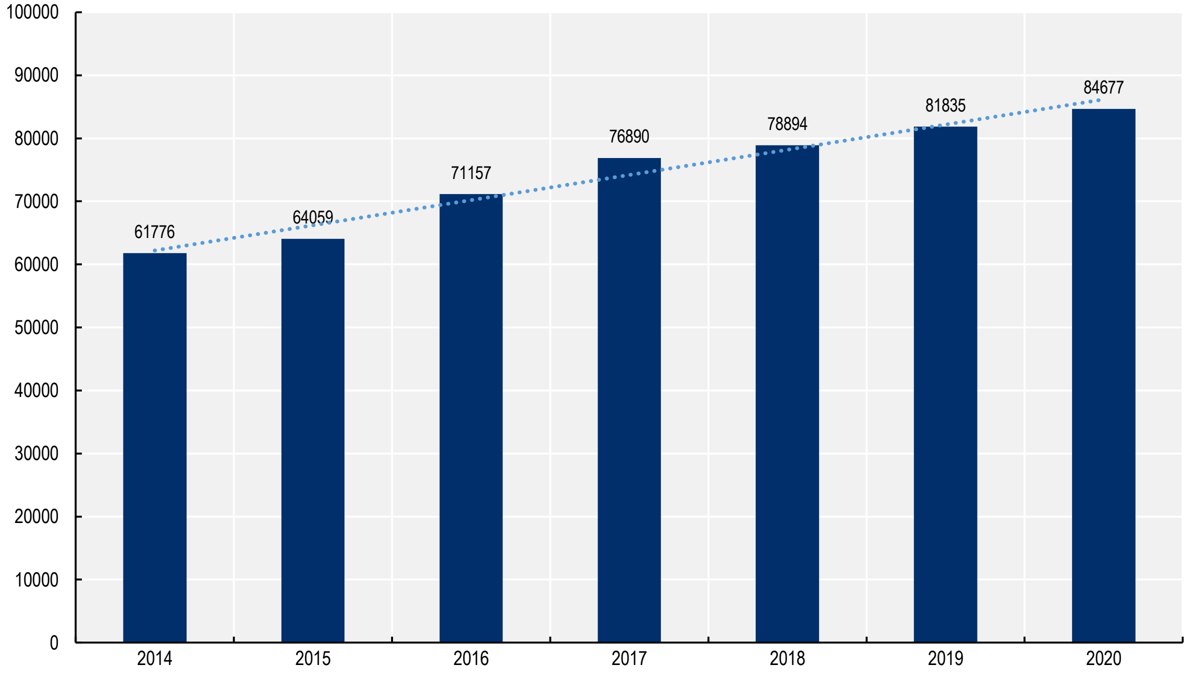
Assessment category	Question	Score – MDC	Score – PHC Plus
Selection bias	Are the individuals selected to participate in the study likely to be representative of the target population?	Very likely	Can't tell
	What percentage of selected individuals agreed to participate?	100%	Can't tell
Selection bias score:		*Strong*	*Weak*
Study design	Indicate the study design	Cohort (one group pre + post)	Other – cross sectional study with control and intervention group
	Was the study described as randomised?	No	Can't tell
	Was the method of randomisation described?	N/A	N/A
	Was the method of randomisation appropriate?	N/A	N/A
Study design bias score:		*Moderate*	*Weak*
Confounders	Were there important differences between groups prior to the intervention?	Can't tell	Can't tell
	What percentage of potential confounders were controlled for?	N/A	80-100%
Confounders score:		*Weak*	*Unknown**
Blinding	Was the outcome assessor aware of the intervention or exposure status of participants?	Yes	Yes
	Were the study participants aware of the research question?	Yes	Yes
Blinding score:		*Weak*	*Weak*
Data collection methods	Were data collection tools shown to be valid?	Yes	Yes
	Were data collection tools shown to be reliable?	Yes	Yes
Data collection methods score:		*Strong*	*Strong*
Withdrawals and dropouts	Were withdrawals and dropouts reported in terms of numbers and/or reasons per group?	Can't tell	Can't tell
	Indicate the percentage of participants who completed the study?	Can't tell	Can't tell
Withdrawals and dropouts score:		*Weak*	*Weak*

Note: *The quality of evidence score is not available when data between differences in the control and intervention group are not provided, yet it is evident that the analysis controlled for confounders. Hence, the "confounders score" has been marked as "unknown".
Source: Effective Public Health Practice Project (1998), "Quality assessment tool for quantitative studies", https://www.nccmt.ca/knowledge-repositories/search/14.

Extent of coverage

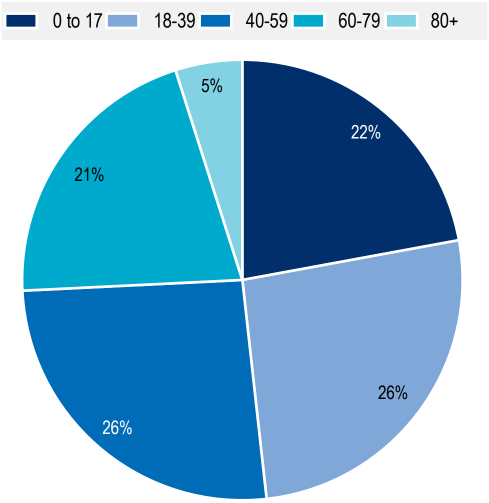
Between 2014 and 2020 the number of MDC patients grew by 37% – i.e. from 61 776 to 84 677 (Figure 8.6). As of 2020, 22% of patients were aged 0-17, 52% between ages 18 to 59 while the remaining 26% are at least 60 years of age (Figure 8.7).

Figure 8.6. Number of MDC patients, 2014-20



Source: Data provided by MDC administrators.

Figure 8.7. Breakdown of MDC patients by age group



Source: Data provided by MDC administrators.

Policy options to enhance performance

Policy options to enhance the overall performance of MDC are summarised below. Many of the options target higher-level policy makers (e.g. at the national level as opposed to MDC administrators), given they involve significant structural change.

Enhancing effectiveness

Continue effort to promote the use of electronic health records (EHRs) in primary care. In 2011, Poland introduced the Act on Information System in Healthcare requiring all patient information to be uploaded electronically by 2014, which was subsequently delayed to 2017 (Czerw et al., 2016▯). As of July 2021, it is compulsory to record medical events using EHRs (specifically to the P1 Platform). Given the importance of EHRs in supporting integrated, patient-centred care, policy makers should continue to promote efforts to safely and securely share patient information electronically.

Improve communication between primary care professionals and patients by continuing to improve Poland's health portal. High-quality primary care models encourage patients to play an active role in improving their health (e.g. shared-decision making, support for self-management). Digital tools, such as health portals (often referred to as patient-provider portals), play a key role in this context. In 2018, Poland introduced the Patient's Internet Account (IKP). Through the IKP patients can obtain information on their e-prescriptions, e-referrals, as well as for their children, sick leave, and a history of visits and medication together with dosage amounts. Patients can also schedule a COVID-19 vaccination appointment as well as download an electronic Digital COVID-19 Certificate (EU DCC) confirming that the vaccination has been administered. Policy makers should continue efforts to expand the services and capabilities of the IKP.

Build towards using data-driven means to stratify patients into risk groups. As part of the MDC intervention, doctors allocate patients into risk groups (see Box 8.1) based on information collected during the main complex visit (e.g. a physical examination, diagnostic tests). Risk stratification is commonly employed amongst OECD countries, however, increasingly countries rely on big data to stratify patients.

For example, the Catalan Open Innovation Healthcare Hub have developed an adjusted morbidity grouper (GMA) algorithm, which uses data from EHRs[3] to stratify patients into risk groups. Sophisticated digital methods improve the accuracy and efficiency of population risk stratification.

Enhancing efficiency

No specific policy options to enhance the efficiency of MDC are proposed. Rather, it is recognised that the government has signalled its intention to offer GPs financial incentives for providing co-ordinated care, a move that aims to enhance the efficiency of primary care models such as MDC (Sowada, Sagan and Kowalska-Bobko, 2019▯).

Enhancing equity

MDC performs well against the equity best practice criterion given its ability to reach patients living outside urban areas. In order to improve equity, information on access to and impact of MDC on different priority population groups is needed (as explored under “Enhancing the evidence base”).

Enhancing the evidence-base

More robust evaluations are necessary to understand the real impact of MDC. Data to evaluate the impact of MDC relied on cross-sectional utilisation data for MDC patients only. Therefore, results from the analysis only provide an indication of MDC’s impact (see “Effectiveness”). Future evaluation study designs should consider:

- Collecting data for a control group, for example using patient data from another region in Poland
- Controlling for potential confounding variables, that is, variables that impact the outcome of interest (e.g. patients with a lower socio-economic status typically experience worse health outcomes)
- Assessing the impact using data on avoidable hospital admissions – e.g. for diabetes, congestive heart failure and chronic obstructive pulmonary disease – given it is common indicator for assessing primary care quality.

Stratify patient data to measure the impact of MDC on priority population groups. When studying the impact of healthcare interventions, it is important to look at their effect on inequalities. As a first step, it is necessary to identify potential inequalities, which can be captured during the data collection process (e.g. collect patient data on race, socio-economic groups if allowed and feasible). This information allows researchers to analyse whether the intervention increases or decreases inequalities. If the latter, follow-up research, for example, through patient interviews, will help MDC administrators adapt and improve the intervention to suit the needs of priority populations.

Enhancing extent of coverage

Given limited information on the extent of coverage for MDC, specific polices to boost uptake have not been included. However, in general, efforts to boost health literacy (HL) likely increase patient motivation to take control of their health and thus participate in programs such as MDC (see Box 8.4 for example policies to boost HL).

Box 8.4. Policies to boost health literacy

To address low rates of adult health literacy, OECD have outlined a four-pronged policy approach (OECD, 2018):

- *Strengthen the health system role*: establish national strategies and framework designed to address HL
- *Acknowledge the importance of HL through research*: measure and monitor the progress of HL interventions to better understand what policies work
- *Improve data infrastructure:* improve international comparisons of HL as well as monitoring HL levels over time
- *Strengthen international collaboration*: share best practice interventions to boost HL across countries.

Transferability

This section explores the transferability of MDC and is broken into three components: 1) an examination of previous transfers; 2) a transferability assessment using publicly available data; and 3) additional considerations for policy makers interested in transferring MDC.

Previous transfers

New models of primary care have been transferred across many OECD countries and EU Member States. The MDC model reflects best practice principles in the area of primary care, specifically by delivering patient centred care through a co-ordinated team of health professionals. These “new models of [primary] care” exist in several OECD/EU countries with Australia (Primary Health Networks), Canada (My Health Team) and the United States (Comprehensive Primary Care Plus) leading the way (OECD, 2020).

Transferability assessment

The following section outlines the methodological framework to assess transferability and results from the assessment.

Methodological framework

Details on the methodological framework to assess transferability can be found in Annex A.

Several indicators to assess the transferability of MDC were identified (Table 8.2). Indicators were drawn from international databases and surveys to maximise coverage across OECD and non-OECD European countries. Please note, the assessment is intentionally high level given the availability of public data covering OECD and non-OECD European countries.

Table 8.2. Indicators to assess transferability – MDC

Indicator	Reasoning	Interpretation
Population context		
% of people who visited a GP in the last 12 months at least once	MDC will have a greater extent of coverage in countries where more people access their GP frequently	↑ = more transferable
Sector context (primary care)		
Proportion of GPs who work in single-handed practices	MDC is more transferable in countries where GPs feel comfortable working with other health professionals. This indicator is a proxy to measure the willingness of GPs to work in co-ordinated teams.	Low = more transferable High = less transferable
Proportion of physicians in primary care facilities using electronic health records	EHRs improve the ability of health professionals to provide integrated patient-centred care. Therefore, MDC is more transferable in countries that utilise EHRs in primary care facilities.	↑ = more transferable
The extent of task shifting between physicians and nurses in primary care	MDC promotes integrated care provided by multidisciplinary teams. Therefore, MDC is more transferable in countries where physicians feel comfortable shifting tasks to nurses.	The more "extensive" the more transferable
The use of financial incentives to promote co-ordination in primary care	MDC is more transferable to countries with financial incentives that promote co-ordination of care across health professionals.	Bundled payments or co-ordinated payment = more transferable
Economic context		
Primary healthcare expenditure as a percentage of current health expenditure	MDC is a primary care intervention, therefore, it is likely to be more successful in countries that allocate a higher proportion of health spending to primary care	↑ = "more transferable"

Source: WHO (2018[]), "Primary Health Care (PHC) Expenditure as percentage Current Health Expenditure (CHE)", https://apps.who.int/nha/database; Oderkirk (2017[]), "Readiness of electronic health record systems to contribute to national health information and research", https://dx.doi.org/10.1787/9e296bf3-en; Schäfer et al. (2019[]), "Are people's healthcare needs better met when primary care is strong? A synthesis of the results of the QUALICOPC study in 34 countries", https://doi.org/10.1017/S1463423619000434; Maier and Aiken (2016[]), "Task shifting from physicians to nurses in primary care in 39 countries: a cross-country comparative study", https://doi.org/10.1093/eurpub/ckw098; OECD (2020[]), *Realising the Potential of Primary Health Care*, https://doi.org/10.1787/a92adee4-en; OECD (2016[]), "Health Systems Characteristics Survey", https://qdd.oecd.org/subject.aspx?Subject=hsc; European Observatory on Health Systems and Policies (2021[]), "The Health Systems and Policy Monitor", https://eurohealthobservatory.who.int/countries/overview.

Results

The transferability of MDC was assessed using six indicators covering three contextual factors – the population context, the sector context (primary care) and the economic context (Table 8.3). Results from the assessment indicate primary care systems in target countries would be supportive of MDC – for example, in countries with available data, 79% of primary care physicians utilise EHRs, a key tool to support co-ordinated care, compared to just 30% in Poland. Further, most countries have the same or a lower proportion of GPs working in single practices, which is a proxy measure of GP willingness to work in a team. MDC's extent of coverage is expected to be high given people living in other OECD/non-OECD European countries are more likely to access primary care (i.e. GP) (79% of people of in OECD/non-OECD European countries visited a GP in the last year compared to 64% in Poland). Nevertheless, results from the assessment indicate many countries may face barriers to implement co-ordinated care given only 22% report extensive task shifting between primary care physicians and nurses. An indicator to measure political support is not included in the assessment. However, the recent (2018) agreement on the Declaration of Astana clearly shows countries support efforts to improve primary care.

It is important to note that 17 OECD countries have implemented new models of primary care similar to MDC (OECD, 2020[]). For these countries, results from the transferability assessment can instead be used to identify areas to enhance the impact of the new care model. For example, despite establishing Primary Care Units, a high proportion of GPs in Austria continue to work in single practices.

Table 8.3. Transferability assessment by country (OECD and non-OECD European countries) – MDC

A darker shade indicates MDC is more suitable for transferral in that particular country

Country	% visited GP in last 12 months	% GPs in single practices	% PC* using EHRs	Task shifting in PC	Financial incentives	Primary expenditure percentage CHE**
Poland	**64**	**Medium**	**30**	**None**	**None**	**47**
Australia †	n/a	Low	96	Extensive	Bundled	37
Austria †	84	High	80	None	Co-ordinated payment	37
Belgium	87	High	n/a	Limited	Bundled	40
Bulgaria	48	High	n/a	None	Bundled	47
Canada †	n/a	Low	77	Extensive	Bundled	48
Chile	n/a	n/a	65	n/a	None	n/a
Colombia	n/a	n/a	n/a	n/a	None	n/a
Costa Rica	n/a	n/a	n/a	n/a	None	33
Croatia	68	n/a	3	Limited	None	38
Cyprus	68	Low	n/a	Limited	None	41
Czech Republic	86	High	n/a	None	None	33
Denmark	86	Medium	100	Limited	Co-ordinated payment	38
Estonia †	73	High	99	Limited	None	44
Finland	68	Medium	100	Extensive	None	46
France †	85	n/a	80	None	Bundled	43
Germany	89	High	n/a	None	Co-ordinated payment	48
Greece †	40	High	100	None	None	45
Hungary	71	High	n/a	Limited	None	40
Iceland	n/a	Low	100	Limited	Co-ordinated payment	35
Ireland †	76	Low	95	Extensive	None	47
Israel	n/a	n/a	100	n/a	Co-ordinated payment	n/a
Italy †	71	Medium	n/a	Limited	Bundled	n/a
Japan	n/a	n/a	36	n/a	None	52
Korea	n/a	n/a	n/a	n/a	None	57
Latvia	80	High	70	Limited	Bundled	39
Lithuania	76	Medium	n/a	Limited	None	48
Luxembourg	89	Medium	n/a	None	None	38
Malta	83	Medium	n/a	Limited	None	62
Mexico †	n/a	n/a	30	n/a	Co-ordinated payment	44
Netherlands	71	Medium	n/a	Extensive	Bundled	32
New Zealand	n/a	Low	95	Extensive	None	n/a
Norway †	79	Low	100	None	None	39
Portugal	81	Low	n/a	Limited	None	58
Romania	57	Medium	n/a	None	None	35

Country	% visited GP in last 12 months	% GPs in single practices	% PC* using EHRs	Task shifting in PC	Financial incentives	Primary expenditure percentage CHE**
Poland	**64**	**Medium**	**30**	**None**	**None**	**47**
Slovak Republic †	82	High	89	None	None	n/a
Slovenia †	76	High	n/a	Limited	None	43
Spain	80	Low	99	Limited	None	39
Sweden †	62	Low	100	Limited	Co-ordinated payment	n/a
Switzerland	n/a	Medium	40	None	None	40
Türkiye †	n/a	Low	n/a	None	None	n/a
United Kingdom	74	Low	99	Extensive	None	53
United States †	n/a	n/a	83	Extensive	None	n/a

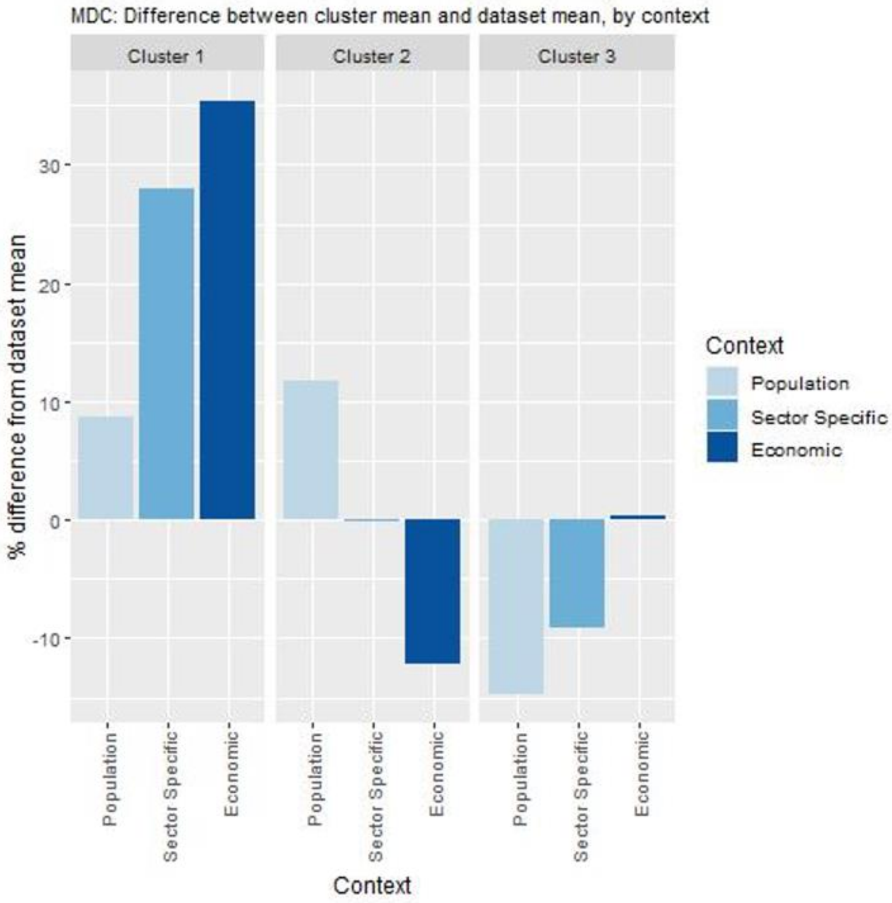
Note: † = implemented new models of primary care. *PC = primary care. **CHE = current health expenditure. n/a = no data available.
Source: See Table 8.2.

To help consolidate findings from the transferability assessment above, countries have been clustered into one of three groups, based on indicators reported in Table 8.2. Countries in clusters with more positive values have the greatest transfer potential. For further details on the methodological approach used, please refer to Annex A.

Key findings from each of the clusters are below with further details in Figure 8.8 and Table 8.4:

- Countries in cluster one have populations who frequently see their GP and a primary care system equipped to implement this model of care. Further, they spend relatively more on primary care. For these reasons, these countries are les likely to experience any implementation barriers should this intervention be transferred.
- Countries in cluster two also have populations who frequently attend their GP, however, they spend relatively less on primary care indicating potential long-term affordability issues.
- Countries in cluster three have populations who are less likely visit their GP and operate primary care systems that may not encourage integration among different care sectors. It is important to note that Poland falls under this cluster, meaning conditions in which these clusters could improve on, although ideal, are not pre-requisites. For example, Poland introduced this model of care as it recognised its primary care sector was weak.

Figure 8.8. Transferability assessment using clustering – MDC



Note: Bar charts show percentage difference between cluster mean and dataset mean, for each indicator.
Source: See Table 8.2.

Table 8.4. Countries by cluster – MDC

Cluster 1	Cluster 2	Cluster 3
Australia Canada Ireland New Zealand United Kingdom	Belgium Croatia Czech Republic Denmark France Iceland Italy Latvia Malta Netherlands Norway Portugal Slovak Republic Spain Sweden	Austria Bulgaria Cyprus Estonia Finland Germany Greece Hungary Lithuania Luxembourg Mexico Poland Romania Slovenia Switzerland

Note: Due to high levels of missing data the following countries were omitted from the analysis Chile, Colombia, Costa Rica, Israel, Japan, Korea, Türkiye, and the United States.

New indicators to assess transferability

Data from publicly available datasets is not ideal to assess the transferability of MDC. For example, there is no international comparable data measuring the level of trust between primary care professionals. Therefore, Box 8.5 outlines several new indicators policy makers could consider before transferring MDC.

Box 8.5. New indicators, or factors, to consider when assessing transferability – MDC

In addition to the indicators within the transferability assessment, policy makers are encouraged to collect information for the following indicators:

Population context

- What is the population's attitude towards receiving care from health professionals who are not doctors?
- What is the level of health literacy amongst patients? (i.e. are patients likely to engage in shared decision-making?)

Sector specific context (primary care)

- To what extent do health professionals already work as a co-ordinated team?*
- What is the level of acceptability (trust) amongst health professionals to work together as a co-ordinated team?
- Does the clinical information system support: a) sharing of patient data across health professionals? b) Sharing of patient data across healthcare facilities?
- Do health provider reimbursement schemes support co-ordinated care? (e.g. bundled payments, add-on payments that incentivise co-ordinated care)

Political context

- Has the intervention received political support from key decision-makers?
- Has the intervention received commitment from key decision-makers?

Economic context

- What is the cost of implementing and operating the intervention in the target setting and to whom?

*17 OECD countries have implemented new models of primary care (see Table 3.2 in OECD (2020▯)).

Conclusion and next steps

MDC offers patient-centred, co-ordinated care. MDC stratifies patients into risk groups based on information collected from their main complex visit. Data from the main complex visit is subsequently uploaded into an Individual Medical Care Plan, which is available to the patient's therapeutic care team. In addition, each patient is assigned a care co-ordinator who sets up necessary appointments and educational sessions to enhance self-management. According to the definition in OECD's recent primary care report, MDC is a "new model of care"" as it delivers care through a multidisciplinary team and promotes shared-decision making (OECD, 2020▯).

New models of primary care, such as MDC, reduce healthcare use and improve patient reported experience and outcomes. Healthcare utilisation data over the period 2014-20 show that despite an increase in the average age of MDC patients, the number of GP and specialists visits per person did not change markedly (and in some cases declined). Given the data do not control for confounding factors nor include a control group, results from this analysis only provide an indication of MDC's impact on utilisation. An evaluation of the PHC Plus pilot (which covered 41 primary care facilities, including MDC) found patients enrolled in the programme reported better experience and outcome measures. Results regarding utilisation did not see a reduction in hospital utilisation.

MDC successfully reaches patients living outside urban areas who typically have lower levels of access to care. More than half (61%) of all MDC patients are located outside densely populated areas, most of whom live in thinly populated areas. Further, MDC requires specialist physicians to visit small rural health centres as a way to address geographic health inequalities. For these reasons, MDC performs particularly well against the equity best practice criterion.

Better use of digital tools such as EHRs and health portals will enhance the performance of MDC. MDC aims to provide patients with co-ordinated patient-centred care. Digital tools such as EHRs and health portals play a key role in this context, and as such have been continually promoted in Poland in recent years. Policy makers should therefore continue their efforts to build the country's digital health system.

Primary care models similar to MDC exist in many OECD countries, with this number likely to grow. MDC represents a new model of primary care that promotes patient-centred, co-ordinated, multidisciplinary care. OECD's recent primary care report found 17 OECD countries employ this type of model indicating it is highly transferable.

Next steps for policy makers and funding agencies regarding the MDC model are in Box 8.6.

Box 8.6. Next steps for policy makers and funding agencies – MDC

Next steps for policy makers and funding agencies to enhance MDC are listed below:

- Continue efforts to enhance the use of digital tools, such as EHRs, in a primary care setting
- Support robust evaluations of MDC to better understand the intervention's impact on patient experiences, outcomes and utilisation of healthcare services
- Support policy efforts to boost population health literacy as a way to encourage people to take a more active role in their care
- Promote findings from the MDC case study to better understand what countries/regions are interested in transferring the intervention.

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Notes

[1] MDC differs from other pilot sites in two key aspects: MDC offers care for all patients where as PHC Plus pilots cover patients with one of 11 selected diseases, further, MDC incorporated an oncology prevention element.

[2] The relatively sharp decline in gynaecological appointments reflects three factors: 1) an increase in prevention activities between years 2011-15; 2) better co-ordination and management of gynaecological appointments; and 3) since 2017, midwives in Poland have the right to provide care for pregnant women independently.

[3] The algorithm uses information such as diagnostic classification, date of diagnosis, age and gender.

9

TeleHomeCare, Ceglie Messapica, Italy

This chapter covers the TeleHomeCare as implemented in the Italian town of Ceglie Messapica. The case study includes an assessment of TeleHomeCare against the five best practice criteria, policy options to enhance performance and an assessment of its transferability to other OECD and EU27 countries.

TeleHomeCare: Case study overview

Description: TeleHomeCare is a digital intervention designed to support home care through telemonitoring and teleconsultation for patients who suffer from one or more of the following chronic diseases: heart failure, chronic obstructive pulmonary diseases (COPD) and diabetes. TeleHomeCare was initially developed in Ceglie Messapica (a small town near Brindisi, Italy). The intervention involves the patient, caregivers of patients, general practitioners (GP), specialists, and nurses working in the area. The device installed at the patient's home – called Hospital-at-Home (H@H) – allows the patient to monitor physiological parameters, share measurements with control room operators and care providers. All clinical parameters of the patients based at home are centralised in the hospital, which respect all privacy laws. The device allows doctors to have remote consultations with patients via video.

Best practice assessment:

OECD Best Practice assessment of TeleHomeCare

Criteria	Assessment
Effectiveness 🌱	The effectiveness of TeleHomeCare has not been assessed. The literature shows that telemonitoring can reduce hospitalisations and mortality when monitoring heart failure and COPD; improve mental health quality of life when monitoring COPD; and improve physiological outcomes when monitoring diabetes and COPD.
Efficiency 🌱	TeleHomeCare costs EUR 1 450 per patient per year, while it saves EUR 640 in healthcare services use.
Equity	Patients who register for TeleHomeCare have to attend a training to acquire sufficient autonomy and use the device safely. The training seeks to overcome cultural limitations and poor aptitude in the use of medical devices and information and communication technologies (ICT).
Evidence-base	A set of systematic reviews and meta-analyses comprised of randomised trials were used to build the knowledge base on the effectiveness of telemedicine. For the cost of TeleHomeCare in Ceglie Messapica, an evaluation carried out by the regional public health agency was used.
Extent of coverage	TeleHomeCare has been tested in the town of Ceglie Messapica, near Brindisi, Italy. It has not been extended yet to other regions.

Enhancement options: Monitoring and evaluating clinical outcomes of TeleHomeCare are needed to enhance the effectiveness. While the intervention was evaluated to cost more than it saves, future evaluation of TeleHomeCare should envisage taking a broader perspective, valuing improved quality of life of patients, reduced waiting and travelling times, reduced workload of healthcare workers, and higher work productivity of patients. Efforts should focus on enhancing the internet network to enable access to TeleHomeCare technology and improve access to population groups who are at risk of digital exclusion, in particular older people, disabled people, people in remote locations and those on low incomes.

Transferability: TeleHomeCare is likely to be transferable, since telemonitoring is experimented in many countries, either at the national, regional or local level. In addition, there is political support given most countries have a national eHealth and telehealth policy or strategy. However, population readiness to use telehealth may be a barrier in countries where technology is less advanced.

Conclusion: By favouring continuity of care from hospital to the home setting, TeleHomeCare has the potential to reduce excessive costs due to long hospital stays and emergency services use. Further evaluations on what aspects of the intervention work well and do not work well are needed to improve effectiveness.

Intervention description

With population ageing, more people are affected by multi-morbidity (i.e. having concomitant chronic diseases, either physical or mental). Overall estimates of the prevalence of multi-morbidity across OECD countries are not available. However, country-specific studies suggest that prevalence is high and increasing (OECD, 2019[1]). A recent systematic review and meta-analysis gathering evidence from 70 community-based studies found that overall pooled prevalence of multi-morbidity was 38% in high-income countries with prevalence increasing with age (Nguyen et al., 2019[2]).

Tertiary prevention helps patient monitor and control their diseases, to reduce symptoms and complications of the disease and hospital stays, improve quality of life, and avoid re-hospitalisation. New information and communication technologies (ICT) installed at home can support patients and doctors to set up tertiary prevention projects.

TeleHomeCare (sometimes referred to as TeleMedicine) is a digital intervention designed to support home care through telemonitoring and teleconsultation for patients who suffer from chronic diseases, namely heart failure, chronic obstructive pulmonary diseases (COPD) and diabetes. TeleHomeCare was initially a pilot project developed in the hospital in Ceglie Messapica, a small town near Brindisi, the Puglia region of Italy in 2015. The intervention involves the patient, caregivers of patients, general practitioners (GPs), specialists, and nurses working in the area. The objective of TeleHomeCare is to implement an intermediate level of care that improves continuity of care from hospital to a home setting, reducing cost due to prolonged hospital stays and avoiding frequent access to emergency rooms.

The devices of the Hospital-at-Home (H@H) technology are installed at the patient's home, allowing the patient to self-monitor diseases. These devices are composed of the H@H medical device that allow monitoring physiological parameters (detection of blood pressure, oxygen saturation, heart rate, respiratory rate) and providing oxygen therapy. It comes with the H@H e-care touchscreen device which provides video consultation, clinical parameter measurements consultation, and remote auscultation (further described in (Bonifazi et al., 2021[3])). Specifically, the devices at home record a patient's physiological parameters and transmit, in real-time, the information to the control room located in the Community Care Centre in Ceglie Messapica as well as doctors and nurses located at the hospital. Control room operators are responsible for assisting users (i.e. patients, care givers, doctors and nurses) to resolve problems with the H@H system, and alerting GPs in case of anomalies in vital signs. The devices can, if needed, deliver oxygen therapy and endocavitary aspiration. All patient clinical parameters are centralised at the hospital, respecting privacy rules. The technology allows patients and doctors to have remote consultations via video. GPs who voluntary enrol in the programme[1] agree to access the H@H system twice a day, 10 times per week, to check patients' status. The role of specialists is to define the healthcare plan with the GP, and visit patients upon request from the GP. Nurses are in charge for visiting patients at home daily. Patients and care providers are appropriately trained to use the devices.

OECD Best Practices Framework assessment

This section analyses TeleHomeCare against the five criteria within OECD's Best Practice Identification Framework – Effectiveness, Efficiency, Equity, Evidence-base and Extent of coverage (see Box 9.1 for a high level assessment of TeleHomeCare). Further details on the OECD Framework can be found in Annex A.

Box 9.1. Assessment of TeleHomeCare

Effectiveness

- The evidence of the effect of TeleHomeCare in Ceglie Messapica has not been evaluated yet.
- Evidence from the literature show that telemedicine for patients with heart failure (HF) can reduce HF-related mortality, reduce the risk of hospitalisation, and improve quality of life. Regarding telemedicine for patients with diabetes, evidence supports effectiveness on health outcomes, but it does not support an effect on mortality or hospitalisation. Regarding telemedicine for patients with COPD, evidence supports a decrease in hospitalisation and emergency room visits among severe patients, an improvement of mental health quality of life, and a reduction in the number of exacerbations.

Efficiency

- The cost of TeleHomeCare in Ceglie Messapica has been evaluated at EUR 1 450 per targeted patient per year, which is greater than estimated savings (EUR 640 per patient per year). However, estimated savings do not take into important factors such as reduced workload for health professionals and travel time for patients.

Equity

- There is no evaluation of equity of TeleHomeCare yet,
- The evidence on digital health interventions indicates they have the potential to both widen and reduce health inequalities.
- The pilot experience in Ceglie Messapica identified technical difficulties in the implementation of TeleHomeCare in areas where there was poor or absence of the internet network coverage.

Evidence-base

- A set of systematic reviews and meta-analyses were used to build the knowledge base on the effectiveness of telemedicine. For the cost of TeleHomeCare in Ceglie Messapica, an evaluation carried out by the regional public health agency (ARESS) was used.

Extent of coverage

- TeleHomeCare has been tested in the town of Ceglie Messapica, near Brindisi, Italy. It has not been extended to other regions.

Effectiveness

The evidence of the effect of TeleHomeCare in Ceglie Messapica has not been evaluated yet. However, systematic reviews and meta-analyses collected by (Bonifazi et al., 2021[3]) provide evidence of effectiveness for telemedicine (Yun et al., 2018[4]; Faruque et al., 2017[5]; Hong and Lee, 2019[6]). This evidence is presented by type of disease in Table 9.1. Four main outcomes are summarised: mortality, healthcare resources use, quality of life, and other health outcomes. The evidence was complemented with a systematic review on telemonitoring for COPD patients (Cruz, Brooks and Marques, 2014[7]) and for patients with heart failure (Drews, Laukkanen and Nieminen, 2021[8]). Telemedicine for patients with heart failure can reduce all-cause mortality, reduce the risk of hospitalisation, and improve the quality of life of patients. In patients with COPD, telemedicine can reduce the risk of hospitalisation and emergency room (ER) admission, and reduce the number of exacerbations. In patients with diabetes, telemedicine can improve clinical measures.

Table 9.1. Effectiveness of telemedicine for managing heart failure, diabetes and COPD

Effect of Telemedicine compared to usual care	Heart Failure (Yun et al., 2018[4])	Diabetes (Faruque et al., 2017[5])	COPD (Hong and Lee, 2019[6])
Mortality	Decreasing all-cause mortality (Relative risk (RR) 0.81, 95% CI 0.70-0.94; I2 = 16%) HF-related mortality (RR 0.68, 95% CI 0.50-0.91; I2 = 8%) The all-cause mortality rate significantly lower in studies: published in Europe, involving patients > 65 years, transmitting =3 biologic indicators	No good evidence found to support a reduction of mortality	No good evidence to support reduction in mortality rate (RR = 1.43; 95% CI = 0.40-5.03) (Cruz, Brooks and Marques, 2014[7])
Use of healthcare resources	Reduced risk of HF-related hospitalisation (RR 0.86, 95% CI 0.74-1.00; I2 = 36%)	Not available	Decreased hospitalisation rate of severe patients [RR 0.92, CI 0.31-1.02]; no difference in moderate patients [RR 1.24, CI 0.57-2.70] Decreased emergency room visits in severe patients [RR 0.48, CI 0.31-0.74]; no difference in moderate patients [RR 1.28, CI 0.61-2.69]
Quality of life	Improve quality of life (Drews, Laukkanen and Nieminen, 2021[8])	No good evidence found to support an improvement in QoL (quality of life)	Improved mental health QoL [RR 3.06, CI 2.15-3.98], failed at improving QoL
Other improvements	Not available	Reductions in HbA1C in all 3 follow-up periods (at = 3 mo: -0.57%, 95% confidence interval [CI] -0.74% to -0.40%; at 4-12 mo: -0.28%, 95% CI -0.37% to -0.20%;at > 12 mo: -0.26%, 95% CI -0.46% to -0.06%. No good evidence found to support a reduced risk of hypoglycaemia	Reduced number of exacerbations (Cruz, Brooks and Marques, 2014[7])

Source: Adapted from Bonifazi et al. (2021[3]) and complemented with Drews, Laukkanen and Nieminen (2021[8]) and (Cruz, Brooks and Marques (2014[7]).

Efficiency

Looking at telemedicine at large, evidence on cost-effectiveness of care delivered through telemedicine is context-specific and cannot be easily generalised (Oliveira Hashiguchi, 2020[9]).

In the context of TeleHomeCare in Ceglie Messapica, the intervention costs more than it saves money (Bonifazi et al., 2021[3]). The cost of the intervention was estimated at EUR 1 450 per targeted patient per year. This estimate, calculated from a regional healthcare perspective, includes costs related to GPs, nurses, control room operator, and medical device unit. On the other hand, TeleHomeCare significantly reduces the cost of outpatient clinic visits and emergency room visits, while the costs for hospitalisations and pharmaceuticals remain unchanged. The total saving is estimated at EUR 640 per patient per year. However this evaluation does not account for improved quality of life of patients, reduced waiting and travelling times, reduced workload of healthcare workers, and potential indirect cost (e.g. effect on patient's participation in the labour force and productivity at work).

Equity

TeleHomeCare, such as self-monitoring based at home and video consultation for people with chronic diseases, can help address inequalities by reducing barriers to access, including time, distance and limited availability of services. Telemedicine services help provide care to difficult-to-reach patient groups. For instance, in Canada, where Indigenous people tend to have poorer health than non-Indigenous people, Ontario Telemedicine Network included 120 indigenous telemedicine sites and counted 9 628 indigenous patient events (OTN, 2018[10]).

However, there is a risk of digital exclusion, in particular with regards to older people, disabled people, people in remote locations as well as those on low incomes. For instance, older people who do not have knowledge or capacity to learn how to use the new technologies may not be able to use the system, and thus be excluded. To overcome this issues, patients who register for TeleHomeCare must attend training to acquire sufficient autonomy to use the device safely. The training seeks to overcome cultural limitations and poor aptitude in the use of medical devices and ICT.

While there is no study evaluating what impact TeleHomeCare has on health inequalities, the pilot experience in Ceglie Messapica identified technical difficulties implementing TeleHomeCare in areas where there was poor or no internet network coverage.

Evidence-base

Evidence of effectiveness for the use of tele-monitoring for heart failure, Diabetes and COPD was gathered from systematic reviews and meta-analyses as described in the section on “Effectiveness”. An evaluation of the cost associated with TeleHomeCare in Ceglie Messapica was made by the Italian regional public health agency (Bonifazi et al., 2021[3]). Hence, it is not appropriate to assess the evidence-base of TeleHomeCare using the *Quality Assessment Tool for Quantitative Studies* from the Effective Public Health Practice Project. Instead, this section summarises the methodology for a selection of articles cited under the section assessing the “Effectiveness” and “Efficiency” of TeleHomeCare Box 9.2.

Box 9.2. Evidence base supporting the effectiveness and efficiency of TeleHomeCare

This box summarises the methodology for the studies outlined in the sections on “Effectiveness” and “Efficiency”.

Effectiveness

- Faruque et al. (2017[5]) undertook a systematic review and meta-analysis to analyse the effectiveness of telemedicine for the management of diabetes compared with usual care, including over 100 randomised control trials (RCTs). The Cochrane Collaboration’s risk of bias (RoB) tool was used. Blinding of participants is generally not feasible for telemedicine interventions. Blinding of outcome assessors was present in 20% of trials. Seventy-eight trials (70%) reported and described an appropriate method of randomisation, but only 30 (27%) reported an adequate allocation concealment process. The intention-to-treat principle was applied in 51 (46%) of the trials. Public funding was exclusively used in 57 trials (51%).
- Hong and Lee (2019[6]) conducted a systematic review and meta-analysis to analyse the effect of telemonitoring on COPD patients using information from 27 RCTs. They used Cochrane risk of bias (RoB) for RCTs and assessed selection bias, allocation bias, performance and detection bias, attrition bias and reporting bias by scoring low, high and unclear risk. Four studies had a high risk of selection bias, and almost all studies reported an unclear allocation concealment. Only two studies reported blindness. Indeed, the blinding of participants was lacking, but treatment for participants cannot be blinded because of intervention characteristics.
- Yun et al. (2018[4]) performed a systematic review and meta-analysis to evaluate the effectiveness of telemonitoring in the management of patients with heart failure. The quality of the 37 selected RCTs was assessed by the Cochrane RoB tool. More than 25% of the studies had a high risk of bias for reporting bias. The risk of device support was designated “uncertain” in the majority of the studies. Because most of the included studies reported objective outcomes, such as death or hospitalisation, the overall risk of detection bias was low.
- Cruz et al. (2014[7]) undertook a systematic review to assess the effectiveness of home telemonitoring in patients with COPD. In total, 10 articles (9 studies) met the inclusion criteria, of which: 8 were RCTs (2 high quality, 5 good quality and 1 fair to good quality); 1 was an experimental study with a control group (good quality), and 1 was quasi-experimental with a control group (good quality).
- Drews et al. (2021[8]) undertook a systematic review and meta-analysis to assess the effect of home telemonitoring in the treatment of patients with decompensated heart failure. In total, 11 articles were included. The Cochrane RoB tool was employed. The intervention was not blinded in any of the primary studies. The overall risk of bias was judged to be high in four primary studies. In three, there was missing patient data. In one study, the study allocation was not adequately randomised or blinded.

Efficiency

- Bonifazi et al. (2021[3]) compared costs and savings of patients who received the TeleHomeCare intervention with those of patients with usual care, in Ceglie Messapica, in the period 2015-19. The control groups were identified ex-post and not through an ad-hoc clinical protocol. Matching each patient in the treatment group with a patient with the same characteristics in the two control group was possible for 179 patients (86.4% of the total patients enrolled). Besides, it was not possible to carry out a cost effectiveness analysis because no clinical data was available on the therapeutic efficacy of telemedicine compared to usual care.

Extent of coverage

The intervention has been initially deployed locally in the hospital of Ceglie Messapica (a small town near Brindisi, Italy), including 207 patients. The intervention has not been extended to other areas of Italy. However, similar telemonitoring programmes are in place in many countries either at the local, regional or national level (Oliveira Hashiguchi, 2020[9]), for instance, Ontario Telemedicine Network in Canada.

Policy options to enhance performance

Policy options available to high-level policy makers (e.g. region / state / national governments) and TeleHomeCare administrators are outlined in this section and refer to each of the five best practice criteria.

Enhancing effectiveness

Monitoring and evaluating clinical outcomes are needed to enhance the effectiveness of TeleHomeCare. Clinical outcomes associated with the use of TeleHomeCare in Ceglie Messapica have not yet been evaluated. An initial evaluation is crucial to define criteria of improvement.

Digital health products, such as TeleHomeCare devices, require patients and health professionals to be digitally health literate. Healthcare systems are growing increasingly digital as evidenced by the growing number of countries with national eHealth strategies (WHO, 2015[11]). Therefore, policy makers should promote digital health literacy so that people can apply their health knowledge/skills to digital products. TeleHomeCare has a training component for the users, however it is important to further develop this component to ensure that people are confident using telemonitoring and teleconsultation. In particular there is a need to focus on the population aged over 50 who are at greater risk of having one or multiple chronic diseases, such as heart failure, diabetes and COPD, and who are less confident using digital tools. Policy efforts should also concentrate on population groups who face barriers to accessing and utilising eHealth products, such as teleconsultation and telemonitoring, given these groups often stand to benefit most (e.g. those with a lower socio-economic status) (Oliveira Hashiguchi, 2020[9]).

Health professionals must also be digitally health literate in order to feel confident using digital products when treating patients. Among OECD countries, one-third of health workers do not feel accustomed to using digital solutions “due to gaps in knowledge and skills in data analytics” (OECD, 2019[1]). To ensure health professionals can “safely and effectively” adopt digital work tools (e.g. teleconsultation and telemonitoring), it is important they receive adequate support via training and education. For instance, GPs and specialists who are involved in the TeleHomeCare service are trained during the first two weeks by control room operators and telemedicine experts from the H@H system provider.

Enhancing efficiency

Future evaluations of TeleHomeCare should envisage taking a broader perspective, valuing all potentially improved outcomes. In the case of TeleHomeCare in Ceglie Messapica, it is shown that intervention costs exceed money saved (see section on “Efficiency”). However, some outcomes of the intervention could not be valued (e.g. improved quality of life of patients, reduced waiting and travelling times, reduced workload of healthcare workers, and higher work productivity of patients). Including such outcomes to future studies would provide a more holistic and therefore accurate picture of TeleHomeCare’s cost-effectiveness potential. Future studies would also benefit from taking a longitudinal perspective given interventions such as TeleHomeCare often require significant upfront fixed costs.

Enhancing equity

Efforts to enhance internet network quality and coverage can help to increase access to TeleHomeCare and improve access for population groups in remote areas. The pilot experience in Ceglie Messapica identified technical difficulties in the implementation of TeleHomeCare in areas where there was poor or absence of the Internet network coverage. Enhancing Internet network can therefore help people in underserved areas use TeleHomeCare devices.

Policies to increase access and utilisation of TeleHomeCare among disadvantaged population groups can reduce health inequalities. There is a risk of digital exclusion, in particular with regards to older people, disabled people, people in remote locations and those on low incomes. As outlined under "Enhancing effectiveness", policy efforts should focus on building health literacy and digital health literacy among disadvantaged groups. More direct action that can be implemented by TeleHomeCare administrators include:

- Providing training to patients on how to use the TeleHomeCare devices and providing technical support to users, especially older people, disabled people, those in remote locations and on those low incomes.
- Collecting data that can be disaggregated by priority population groups (e.g. information on age, disabilities, education, rural location). This information can subsequently be used to amend the implementation of the intervention to suit the needs of priority populations.

Failing to address the needs of disadvantaged population groups risks widening existing health inequalities.

Enhancing the evidence-base

The impact of TeleHomeCare in Ceglie Messapica on clinical outcomes and final outcomes will be of key interest to policy makers and is therefore encouraged. To date, one study evaluated the impact of TeleHomeCare in Ceglie Messapica on health system costs, however there are no evaluations examining the impact on health outcomes, including final health outcomes (e.g. patient quality of life, work productivity of patients).

Key steps involved in undertaking an evaluation are outlined in OECD's *Guidebook on Best Practices in Public Health* (OECD, 2022[12]). These steps are summarised below to assist TeleHomeCare administrators in future evaluation efforts:

Design the evaluation study

- *Develop a logic model*: a logic model summarises the main elements of an intervention and provides a visual overview of the relationship between inputs, activities, outputs and outcomes.
- *Select evaluation indicators*: indicators for each element within the programme logic need to be specified. Example outcome indicators for TeleHomeCare may include EQ-5D (patient quality of life) and work productivity. Indicators should be SMART (specific, measurable, achievable, relevant and time-bound) and where possible be stratified to understand the intervention's impact on inequalities (as discussed under "Enhancing efficiency").
- *Choose a study design*: process evaluations assess whether an intervention was implemented as intended whereas an outcome evaluation assesses the impact the intervention had on outcomes. Regarding the latter, it is necessary to choose a study design that is appropriate for the intervention.
- *Choose a data collection method*: any evaluation of TeleHomeCare will largely rely on real-world data collected from the control room servers and devices. Additional primary sources of data may also be collected, for example, from user surveys.

Execute the evaluation study

- *Collect the data*: data collection methods should consider logistics, consent, privacy, data security and other ethical considerations, in particular given data from TeleHomeCare contains personal and clinical information.
- *Analyse the data*: it is not possible to detail all the various methods available to analyse data here, however, a first step for any intervention is to analyse descriptive statistics including a look at the pattern of missing data.

Act on evaluation results

- *Follow-up action*: results from the evaluation will provide useful information on how the intervention can be adapted to improve performance.
- *Disseminate results*: evaluation results should be conveyed to the target audience via appropriate channels. In particular, it is important to convey "lessons learnt" and how these will be incorporated into the future design of TeleHomeCare.

Enhancing extent of coverage

To boost the uptake of TeleHomeCare throughout the national territory, it is key to ensure the devices are trusted and non-burdensome. It is also important considering the viewpoints of both patients and healthcare professionals. Patient's data (both personal and clinical) needs to be secured. Training and technical support provided to both patients and healthcare professionals have to be promoted. The role of advanced practice nurses in remote monitoring has to be considered.

Transferability

This section explores the transferability of TeleHomeCare and is broken into three components: 1) an examination of previous transfers; 2) a transferability assessment using publicly available data; and 3) additional considerations for policy makers interested in transferring TeleHomeCare.

Previous transfers

TeleHomeCare in Ceglie Messapica has not yet been transferred to other areas or regions in Italy. However, similar telemonitoring programmes are in place in many countries either at the local, regional or national level (Oliveira Hashiguchi, 2020[9]), for instance, Ontario Telemedicine Network in Canada.

The ability to readily transfer TeleHomeCare, as it is implemented in Ceglie Messapica, heavily depends on whether the service uses proprietary technology.

Transferability assessment

The following section outlines the methodological framework to assess transferability and results from the assessment.

Methodological framework

Details on the methodological framework to assess transferability can be found in Annex A.

Several indicators to assess the transferability of TeleHomeCare were identified (Table 9.2). Indicators were drawn from international databases and surveys to maximise coverage across OECD and non-OECD

European countries. Please note, the assessment is intentionally high level given the availability of public data covering OECD and non-OECD European countries.

Table 9.2. Indicators to assess transferability – TeleHomeCare

Indicator	Reasoning	Interpretation
Population context		
ICT Development Index*	TeleHomeCare is more likely to be successful in digitally advanced countries	↑ value = more transferable
Individuals using the Internet – last 3 m (%) who are aged 55-74	TeleHomeCare is more transferable to a population where elderly people – who are more likely to have chronic diseases- are comfortable using the connected smart devices	↑ value = more transferable
Self-reported use of home care services	TeleHomeCare is more transferrable to a population that already uses home care services	↑ value = more transferable
Sector context (digital health sector)		
Legislation exists to protect the privacy of personally identifiable data of individuals, irrespective of whether it is in paper or digital format	TeleHomeCare requires to transfer patient data. Therefore, TeleHomeCare is more likely to be successful in countries with legislation to protect patient data.	'Yes' = more transferable
eHealth composite index of adoption amongst GPs**	TeleHomeCare requires GPs, specialists and nurses to use eHealth technologies. Therefore, TeleHomeCare is more likely to be successful in countries where GPs are comfortable using eHealth technologies	↑ value = more transferable
% of tertiary institutions (public and private) that offer ICT for health (eHealth) courses	TeleHomeCare is more transferable if health professional students receive eHealth training	↑ value = more transferable
% of institutions or associations offering in-service training in the use of ICT for health as part of the continuing education of health professionals	TeleHomeCare is more transferable if health professionals have appropriate eHealth training	↑ value = more transferable
Political context		
A national eHealth policy or strategy exists	TeleHomeCare is more likely to be successful if national policies support eHealth	'Yes' = more transferable
A dedicated national telehealth policy or strategy exists	TeleHomeCare is more likely to be successful if the government is supportive of telehealth	'Yes' = more transferable
Economic context		
% of funding contribution for eHealth programmes provided by public funding sources over the previous two years	TeleHomeCare is more likely to be successful in a country whose government spends more on eHealth	↑ value = more transferable
Special funding is allocated for the implementation of the national eHealth policy or strategy	TeleHomeCare is more likely to be successful if there already is allocated funding for eHealth	'Yes' = more transferable

Note: *The ICT development index represents a country's information and communication technology capability. It is a composite indicator reflecting ICT readiness, intensity and impact (ITU, 2020[13]). **The eHealth composite index of adoption amongst GPs is made up of adoption in regards to electronic health records, telehealth, personal health records and health information exchange (European Commission, 2018[14]).
Source: WHO (2019[15]), "Existence of operational policy/strategy/action plan to reduce unhealthy diet related to NCDs (Noncommunicable diseases)", https://apps.who.int/gho/data/node.imr.NCD_CCS_DietPlan?lang=en; ITU (2020[13]), "The ICT Development Index (IDI): conceptual framework and methodology", https://www.itu.int/en/ITU-D/Statistics/Pages/publications/mis/methodology.aspx; European Commission (2018[14]), "Benchmarking Deployment of eHealth among General Practitioners (2018)", https://op.europa.eu/en/publication-detail/-/publication/d1286ce7-5c05-11e9-9c52-01aa75ed71a1; OECD (2019[16]), "Individuals using the Internet for seeking health information – last 3 m (%) (all individuals aged 16-74)"; World Bank (2017[17]), "GNI per capita, PPP (constant 2017 international $)", https://data.worldbank.org/indicator/NY.GNP.PCAP.PP.KD; WHO (2015[11]), "Atlas of eHealth country profiles: The use of eHealth in support of universal health coverage", https://www.afro.who.int/publications/atlas-ehealth-country-profiles-use-ehealth-support-universal-health-coverage; Maier and Aiken (2016[18]), "Task shifting from physicians to nurses in primary care in 39 countries: a cross-country comparative study", https://doi.org/10.1093/EURPUB/CKW098.

Results

The transfer analysis shows the transferability potential of TeleHomeCare in Ceglie Messapica throughout Italy and to other countries. In Italy, there is political drive to deliver eHealth and telehealth with funding allocations, there is also legislation to protect patient data, and health professionals are comfortable using eHealth technologies according to the eHealth composite index (see the table below).

Data from other countries show high transfer potential based on population and digital health sector indicators, for example, other countries exhibit high rates of ICT development and use of home care services, further, health professional have ready access to eHealth training.

Regarding political support, 27 (out of 39 with available data) countries have a national eHealth policy, and 20 have a dedicated national telehealth policy or strategy indicating there is a mix of political will to introduce programs such as TeleHomeCare among countries.

Finally, using data to represent the economic context, most countries (i.e. 29) have special funding allocated for the eHealth policy implementation.

It is important to note though that data from publicly available datasets, alone, is not appropriate to assess the transferability of the TeleHomeCare programme in Ceglie Messapica. Countries interested in setting up a similar programme should do an analysis to identify what the needs and issues are around telemonitoring and teleconsultation, and how a national programme can address these. In addition, since similar telemonitoring programmes are already in place in many countries either at the local, regional or national level (Oliveira Hashiguchi, 2020[9]), countries should consider evaluating how to their programme compares with TeleHomeCare in Ceglie Messapica.

Table 9.3. Transferability assessment by country (OECD and non-OECD European countries) – TeleHomeCare

A darker shared indicates TeleHomeCare may be more transferable to that particular country

Country	ICT Development Index (2015)	Individuals using the Internet who are aged 55-74	Self-reported use of home care services (%)	Legislation exists to protect the privacy of personally identifiable data of individuals	eHealth composite index (GPs)	% of tertiary institutions that offer ICT for health (eHealth) courses	% institutions or associations offering in-service training in the use of ICT for health as part of the continuing education	A national eHealth policy or strategy exists	A dedicated national telehealth policy or strategy exists	Special funding is allocated for the implementation of the national eHealth policy or strategy	% funding contribution for eHealth programmes
Italy	**6.90**	**56.00**	**35.40**	**Yes**	**2.19**	**Low**	**High**	**Yes**	**Yes**	**Yes**	**Very high**
Australia	8.20	76.62	n/a	n/a	n/a	Medium	High	Yes	No	n/a	Very high
Austria	7.50	69.66	18.00	Yes	1.91	Low	Low	No	No	Yes	Very high
Belgium	7.70	77.96	45.10	Yes	2.07	Low	Low	Yes	Combined*	Yes	Very high
Bulgaria	6.40	n/a	22.30	Yes	1.81	Medium	Medium	Yes	Combined	Yes	Low
Canada	7.60	88.03	n/a	Yes	n/a	High	Low	Yes	No	n/a	Very high
Chile	6.10	52.11	n/a	Yes	n/a	Low	Low	Yes	No	n/a	Very high
Colombia	5.00	n/a	n/a	Yes	n/a	n/a	n/a	n/a	Yes	n/a	n/a
Costa Rica	6.00	64.82	n/a	Yes	n/a	Medium	Medium	Yes	Yes	n/a	Very high
Croatia	6.80	n/a	16.40	Yes	2.18	Low	Medium	Yes	Yes	Yes	Very high
Cyprus	6.30	n/a	23.50		1.93	Medium	Low	Yes	Combined	No	Very high
Czech Republic	7.20	66.85	23.00	Yes	2.06	Medium	n/a	No	Combined	No	Low
Denmark	8.80	93.42	51.40	Yes	2.86	Medium	Very high	Yes	Yes	Yes	Very high
Estonia	8.00	73.25	12.70	Yes	2.79	Medium	Low	Yes	No	Yes	Very high
Finland	8.10	87.83	43.60	Yes	2.64	Medium	Medium	Yes	Combined	Yes	Very high
France	8.00	76.29	56.50	n/a	2.05	n/a	n/a	n/a	n/a	n/a	n/a
Germany	8.10	81.96	27.60	n/a	1.94	n/a	n/a	n/a	n/a	n/a	n/a

Country	ICT Development Index (2015)	Individuals using the Internet who are aged 55-74	Self-reported use of home care services (%)	Legislation exists to protect the privacy of personally identifiable data of individuals	eHealth composite index (GPs)	% of tertiary institutions that offer ICT for health (eHealth) courses	% institutions or associations offering in-service training in the use of ICT for health as part of the continuing education	A national eHealth policy or strategy exists	A dedicated national telehealth policy or strategy exists	Special funding is allocated for the implementation of the national eHealth policy or strategy	% funding contribution for eHealth programmes
Italy	**6.90**	**56.00**	**35.40**	**Yes**	**2.19**	**Low**	**High**	**Yes**	**Yes**	**Yes**	**Very high**
Greece	6.90	46.14	20.60	Yes	1.79	Medium	Medium	Yes	Combined	Yes	Very high
Hungary	6.60	54.77	24.80	Yes	2.03	Low	n/a	No	No	No	Very high
Iceland	8.70	97.47	34.20	Yes	n/a	Very high	Very high	Yes	No	Yes	Very high
Ireland	7.70	73.99	51.90	Yes	2.10	n/a	Low	Yes	No	Yes	Low
Israel	7.30	73.60	n/a	Yes	n/a	High	Low	No	Yes	Yes	Very high
Japan	8.30	n/a	n/a	Yes	n/a	n/a	n/a	Yes	No	n/a	n/a
Korea	8.80	87.45	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Latvia	6.90	65.91	15.70	Yes	1.83	Low	Low	Yes	Combined	Yes	Low
Lithuania	7.00	57.68	18.30	Yes	1.65	Medium	Low	Yes	Yes	No	High
Luxembourg	8.30	88.08	24.40	Yes	1.78	Low	Low	Yes	Combined	Yes	Very high
Malta	7.50	n/a	42.50	Yes	n/a	Very high	Very high	No	No	n/a	Very high
Mexico	4.50	40.49	n/a	Yes	n/a	Medium	Low	No	No	n/a	High
Netherlands	8.40	92.89	59.20	Yes	n/a	High	High	Yes	Combined	Yes	Very high
New Zealand	8.10	n/a	n/a	Yes	n/a	Medium	Very high	Yes	No	n/a	Low
Norway	8.40	95.23	27.20	Yes	n/a	Low	Medium	Yes	Yes	Yes	Very high
Poland	6.60	52.08	20.80	Yes	1.84	High	Medium	Yes	Combined	Yes	Very high
Portugal	6.60	45.83	17.40	Yes	2.12	Low	Low	No	Yes	Yes	High
Romania	5.90	n/a	16.90	Yes	1.79	n/a	n/a	Yes	n/a	n/a	n/a
Slovak Republic	6.70	54.85	18.30	n/a	1.76	n/a	n/a	n/a	n/a	n/a	n/a
Slovenia	7.10	59.89	24.70	Yes	2.00	High	High	No	No	Yes	Very high
Spain	7.50	76.70	39.80	Yes	2.37	Low	Medium	No	No	Yes	Very high

Country	ICT Development Index (2015)	Individuals using the Internet who are aged 55-74	Self-reported use of home care services (%)	Legislation exists to protect the privacy of personally identifiable data of individuals	eHealth composite index (GPs)	% of tertiary institutions that offer ICT for health (eHealth) courses	% institutions or associations offering in-service training in the use of ICT for health as part of the continuing education	A national eHealth policy or strategy exists	A dedicated national telehealth policy or strategy exists	Special funding is allocated for the implementation of the national eHealth policy or strategy	% funding contribution for eHealth programmes
Italy	**6.90**	**56.00**	**35.40**	**Yes**	**2.19**	**Low**	**High**	**Yes**	**Yes**	**Yes**	**Very high**
Sweden	8.50	92.54	22.30	Yes	2.52	Very high	Very high	Yes	No	Yes	Very high
Switzerland	8.50	90.66	n/a	Yes	n/a	Low	Very high	Yes	No	Yes	Low
Türkiye	5.50	34.13	2.90	Yes	n/a	n/a	n/a	No	Combined	Yes	Low
United Kingdom	8.50	87.32	27.50	Yes	2.52	Medium	High	Yes	Yes	Yes	Very high
United States	8.10	78.38	n/a	Yes	n/a	Low	Low	Yes	No	n/a	n/a

Note: *Combined with eHealth policy or strategy. n/a = data not available.
Source: See Table 9.2.

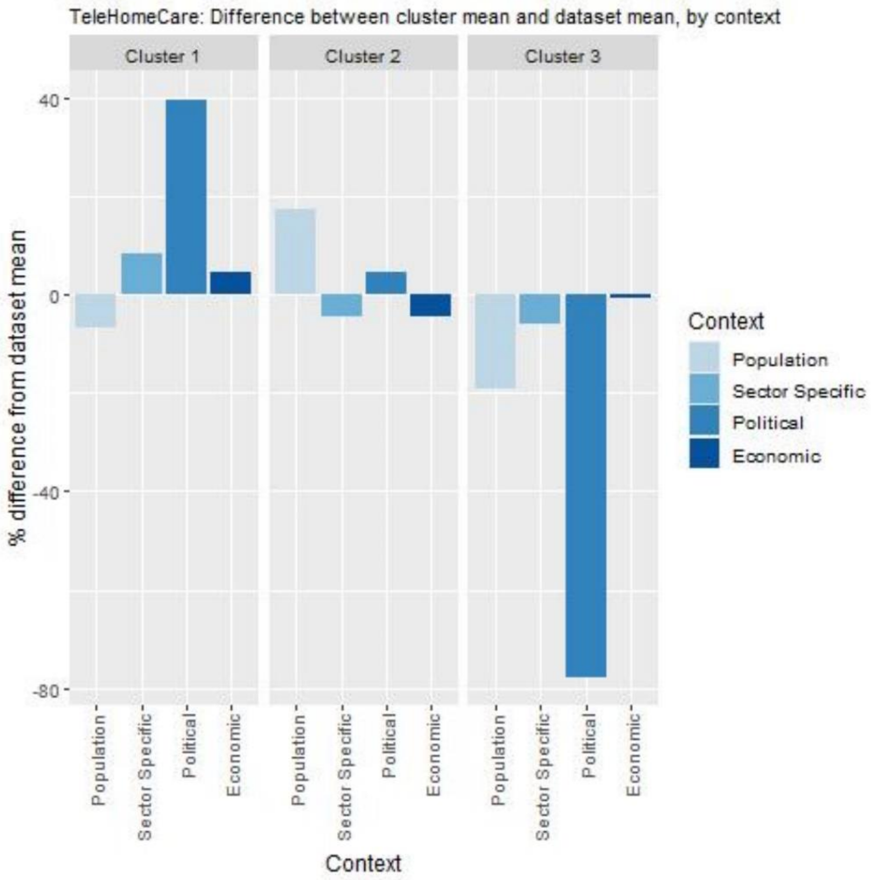
To help consolidate findings from the transferability assessment above, countries have been clustered into one of three groups, based on indicators reported in the table above.

Countries in clusters with more positive values have the greatest transfer potential. For further details on the methodological approach used, please refer to Annex A.

Key findings from each of the clusters are below with further details in Figure 9.1 and Table 9.4:

- Countries in cluster one have political, economic and sector specific arrangements in place to transfer TeleHomeCare. However, population uptake may be low given digital health literacy is typically below average for these countries. Italy, where TeleHomeCare currently operates, falls under this cluster indicating digital health literacy, although ideal, is not a prerequisite for this intervention.
- Countries in cluster two have a population considered digitally health literate, in addition, these countries have political arrangements in place to support TeleHomeCare. However, prior to transferring this intervention, countries in cluster two may wish to consider introducing policies to ensure the digital health sector is ready to deliver this intervention (e.g. staff have the appropriate skills). Further, it will be important to ensure the intervention is affordable in the long run.
- Countries in cluster three should undertake further analysis to ensure TeleHomeCare aligns with political priorities, and that the population and a digital health sector are ready to maximise TeleHomeCare's potential.

Figure 9.1. Transferability assessment using clustering – TeleHomeCare



Note: Bar charts show percentage difference between cluster mean and dataset mean, for each indicator.
Source: See Table 9.2.

Table 9.4. Countries by cluster – TeleHomeCare

Cluster 1	Cluster 2	Cluster 3
Bulgaria	Australia	Austria
Costa Rica	Belgium	Hungary
Croatia	Canada	Israel
Cyprus	Chile	Malta
Czech Republic	Estonia	Mexico
Denmark	Iceland	Portugal
Finland	Ireland	Slovenia
Greece	Latvia	Spain
Italy	Lithuania	
Netherlands	Luxembourg	
Norway	New Zealand	
Poland	Sweden	
Türkiye	Switzerland	
United Kingdom	United States	

Note: Due to high levels of missing data, the following countries were omitted from the analysis: Colombia, France, Germany, Japan, Korea, Romania, the Slovak Republic.

New indicators to assess transferability

Data from publicly available datasets is not ideal to assess the transferability of TeleHomeCare. For example, there is no publicly available information the level of public acceptability of telemonitoring and teleconsultation interventions. Therefore, Box 9.3 outlines several new indicators policy makers should consider before transferring TeleHomeCare.

Box 9.3. New indicators, or factors, to consider when assessing transferability – TeleHomeCare

In addition to the indicators within the transferability assessment, policy makers are encouraged to collect data for the following indicators:

Population context

- How acceptable are telemonitoring and teleconsultation interventions amongst the public?
- Does the population trust their personal health information will be used, stored and managed appropriately?
- What proportion of the population is able to use a telemonitoring device?

Sector specific context (digital health)

- What, if any, compatible interventions exist?
- What, if any, competing interventions exist? (e.g. other telemonitoring and teleconsultation tools)?
- How acceptable are digital products to treat patients with diabetes, COPD and heart failure amongst the health profession?
- Do regulations support integration of telemonitoring and teleconsultation into the healthcare guidelines? (relevant for countries who do not fall under GDPR rules (Genders Data Protection Regulation))
- Do healthcare clinics and hospitals have the appropriate technical equipment to provide TeleHomeCare?
- What healthcare facilities operate in the target setting? (e.g. number of hospital, outpatient centres)

Political context

- Has the intervention received political support from key decision-makers?
- Has the intervention received commitment from key decision-makers?

Economic context

- Are there additional cost of implemented the intervention in the target setting beyond those estimated by TeleHomeCare administrators?

Conclusion and next steps

The TeleHomeCare intervention assessed here, is a telemonitoring and teleconsultation programme for patients with heart failure, diabetes and COPD, implemented in Ceglie Messapica, a town near Brindisi in Italy. With TeleHomeCare, physiological parameters of the patient are recorded at home and transmitted in real-time to the control room located in the Community Care Centre in Ceglie Messapica, and to doctors and nurses located at the hospital. This programme creates an intermediate level of care that improves continuity of care from hospital to the home setting, and has the potential to reduce excessive costs caused by prolonged hospital stays and frequent access to emergency rooms.

Monitoring and evaluating clinical outcomes arising from TeleHomeCare are needed to enhance what aspects of the intervention work well and do not work well – findings from the analysis can subsequently be used to improve overall effectiveness. While the intervention was evaluated to cost more than it saves, future evaluations of TeleHomeCare should envisage taking a broader perspective by incorporating improved patient quality of life, reduced waiting and travelling times, reduced workload of healthcare workers, and higher work productivity of patients. Policy efforts should also focus on enhancing internet network coverage to enable access to the TeleHomeCare technology and improving reach to population groups with a risk of digital exclusion, in particular older people, disabled people, people in remote locations and those on low incomes.

TeleHomeCare is likely to be transferable since telemonitoring operates in many countries, either at national, regional or local level. In addition, there is political support given most countries have a national eHealth and telehealth policy or strategy. However, population readiness to use telehealth may act as a barrier for countries that are less digitally advanced.

Next steps for policy makers and funding agencies regarding TeleHomeCare are summarised in Box 9.4.

Box 9.4. Next steps for policy makers and funding agencies – TeleHomeCare

Next steps for policy makers and funding agencies are listed below:

- Monitor and evaluate clinical outcomes of TeleHomeCare
- Evaluate the improved quality of life of patients, reduced waiting and travelling times, reduced workload of healthcare workers, and higher work productivity of patients, resulting from TeleHomeCare
- Ensure that TeleHomeCare addresses digital inclusion, to reduce rather than exacerbate health inequalities
- Identify needs and issues around telemonitoring, and how a national programme can address these
- For countries which already have in place similar programmes or pilot at the national, regional or local level, compare them with TeleHomeCare in Ceglie Messapica.

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Note

[1] Voluntary enrolment by GPs may have an impact on which patients are selected to receive TeleHomeCare, thereby influencing generalisability of evaluation findings.

10

Digital Roadmaps towards an integrated healthcare system, Southern Denmark

This chapter covers the Digital Roadmap Initiative, which aims to improve co-ordination across health settings using digital means. The case study includes an assessment of Digital Roadmaps against the five best practice criteria, policy options to enhance performance and an assessment of its transferability to other OECD and EU27 countries.

Digital Roadmap initiative: Case study overview

Description: In 2020, the Region of Southern Denmark launched the Digital Roadmap towards an Integrated Healthcare Sector initiative. The Digital Roadmap initiative aims to improve co-ordination across healthcare settings and therefore care for patients, with a specific focus on those living with one or multiple chronic conditions. The initiative comprises several digital care interventions such as TeleCOPD, Telepsychiatry, virtual rehabilitation services and an mHealth app. The Digital Roadmap initiative is classified as a "good practice" intervention as part of European Commission's Joint Action on implementation of digitally enabled integrated person-centred (JADECARE).

Best practice assessment:

OECD best practice assessment of the Digital Roadmap initiative

Criteria	Assessment
Effectiveness	Across the six interventions included in the Digital Roadmap initiative, there is evidence to support their positive impact on patient experiences and, in certain cases, outcomes. For example, TeleCOPD has been shown to reduce hospital readmission rates.
Efficiency	There is limited evidence supporting the efficiency of interventions within the Digital Roadmap initiative. Digital health interventions, in general, have the potential to reduce costs while maintaining care quality for example by reducing patient travel time.
Equity	The impact of the Digital Roadmap initiative on levels of health inequality is not available. More broadly, digital health interventions have the potential to both widen and reduce health inequalities.
Evidence-base	The quality of evidence supporting Digital Roadmap interventions varies from high to low quality depending on the intervention.
Extent of coverage	The Digital Roadmap initiative is accessible to all users of healthcare in the Region of Southern Denmark, which covers 1.2 million people

Enhancement options: to enhance the performance of the Digital Roadmap initiative, policy makers should consider proposals outlined in this case study such as building population digital health literacy, undertaking economic evaluations from a societal perspective, and ensuring both patients and providers (i.e. the end users of products) are included in the design of new interventions or updates to current ones.

Transferability: based on publicly available data, it is clear Denmark is a digitally advanced country. Countries with less advanced digital health systems may therefore experience transfer and implementation barriers. Nevertheless, this should not act as a deterrent as interventions that make up the Digital Roadmap initiative – e.g. TeleCOPD – are common in countries across the OECD and Europe, and not just those that are digitally advanced. The transferability potential of the Digital Roadmap initiative will be tested as part of JADECARE.

Conclusion: The Digital Roadmap initiative in the Region of Southern Denmark comprises several digital health interventions to improve the access to and quality of healthcare. The evidence suggests the initiative improves patient experiences and, in some cases, outcomes, however, its impact on costs (efficiency) and equity is less clear. The Digital Roadmap initiative has greater transfer potential to countries digitally advanced healthcare systems however this should not be considered a pre-requisite.

Intervention description

In recent years, the Danish healthcare system has invested heavily in digital technology, as evidenced by its Digital Health Strategy (2018-22). The Strategy, co-developed by the Ministry of Health, the Ministry of

Finance, the Danish regions local governments, focuses on “digitisation and use of health data in the context of prevention, care and direct treatment” (Danish Ministry of Health et al., 2018[1]).

In line with the Digital Health Strategy, the Region of Southern Denmark, in 2020, launched the Digital Roadmap towards an Integrated Healthcare Sector initiative (hereafter, the Digital Roadmap initiative). The Digital Roadmap initiative aims to improve co-ordination across healthcare settings and therefore care for patients, with a specific focus on those living with one or multiple chronic conditions (European Commission, 2018[2]; Region of Southern Denmark, 2021[3]).

The Digital Roadmap initiative brings together agreements and standards, which make up the foundation for cross-sectoral digital communication in health (European Commission, n.d.[4]; Region of Southern Denmark, 2021[3]).

- **The Health Agreement**: A regional political agreement that details co-operation strategies between the Region of Southern Denmark, the municipalities and general practitioners. The agreement details strategic objectives such as focusing on prevention initiatives and continuity of care for patients and the elderly.
- **National digital communication standards**: Standards for digital communication and handling of healthcare related data across sectors standardised and supported by an IT-infrastructure implemented throughout the Danish healthcare sector.
- **The SAM: BO Agreement**: A regional co-operation agreement for cross-sectoral care and to ensure integrated patient experiences such as patient care pathways.

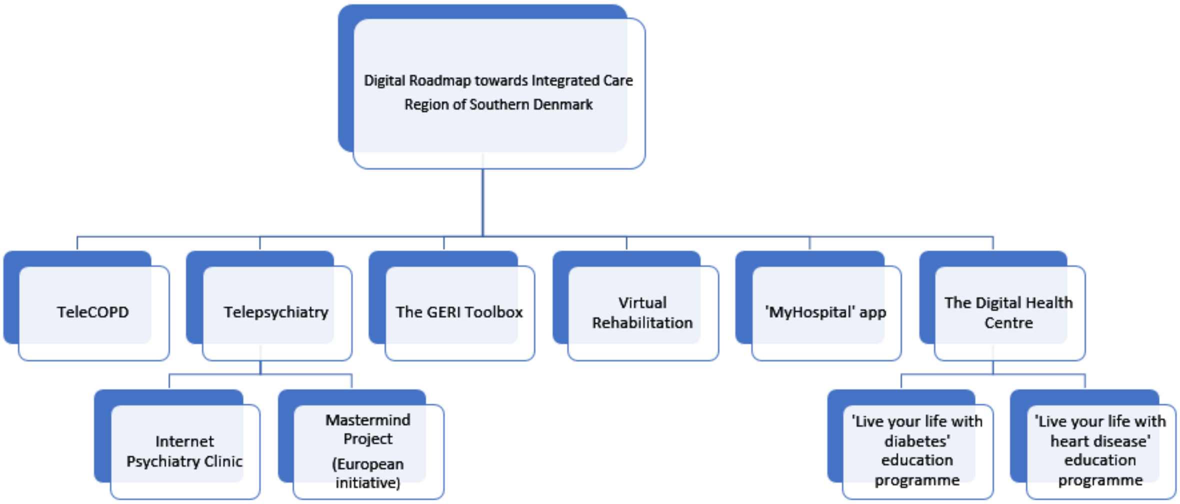
Furthermore, the Digital Roadmap initiative includes six digital interventions or services to improve care for patients with complex diseases (see Figure 10.1 for an infographic of the interventions) (European Commission, n.d.[4]; Region of Southern Denmark, 2021[3]):

- **TeleCOPD (chronic obstructive pulmonary disease):** provides home-based virtual consultations from nurses and doctors for patients who experienced an emergency COPD episode and have been discharged from hospital. (Plans to develop a similar programme for patients with heart failure – TeleHeart – are underway.)
- **TelePsychiatry**: The telepsychiatry intervention is run by the Internet Psychiatry Clinic and aims to treat patients with mild to moderate depression and anxiety by providing ready access to telehealth treatment and guidance without a doctor’s referral (Healthcare Denmark, 2018[5]). The service aims to improve access to treatment, increase flexibility for patients and reduce appointment cancellations. The service is run all day, every day and available to those aged 18 years and over who have access to a computer and the internet.
- **The GERI toolbox** (included in the Generic Telemedicine Platform, GTP): the toolbox is a physical “kit” including point-of-care-testing for basic health exams and digital cross-sectorial communication platform. Using the GERI toolbox, nurses during a home visit undertake tests, with results directly shard via a joint IT-platform to the patient’s home care nurse, general practitioner (GP) and hospital (the results are provided alongside the patient’s medical history). The purpose of sharing information is to identify whether a patient’s health is deteriorating before the point at which it is necessary to admit the patient to hospital. The GERI toolbox also aims to strengthen and simplify communication and collaboration between health sectors (the IT-platform is accessible for community, primary and secondary care physicians and nurses) (Centre for Innovative Medical Technology, n.d.[6]).
- **Virtual Rehabilitation:** an online physical rehabilitation programme, which includes over 600 video exercises tailored to suit patient needs (e.g. patients with COPD, cardiovascular disease (CVD), and musculoskeletal conditions). Lessons provided online are supplementary to in-person physical therapy sessions. Patients can access virtual rehabilitation using a smartphone, tablet or via the web.

- **The Digital Health Centre:** provides online education classes to patients with type 2 diabetes and/or heart conditions on how to lead a healthy lifestyle. For example, by providing tools and support for self-managing changes in diet and levels of physical activity. By switching to an online platform, the Digital Health Centre aims to improve flexibility and therefore participation in education classes.
- **"My Hospital" app:** the My Hospital app, developed at Odense University Hospital in 2014, is a platform for digital communication with patients and clinicians via the use of electronic health records (EHRs). The app helps patients find relevant information about their course of treatment; keep a journal of illness/conditions/symptoms; communicate with the hospital; share data (e.g. on blood pressure, weight, temperature); and view appointments (Centre for Innovative Medical Technology, n.d.[7]). In 2019, the virtual rehabilitation programme was included in My Hospital app. The app is free and available to those with access to a smartphone or the internet. The purpose of the app is encourage patients to become more involved in their own treatment and rehabilitation thereby improving patient empowerment.

Some of the projects included in the Digital Roadmap initiative operate at the region or municipality level, while others operate across the country.

Figure 10.1. Overview of interventions in the Digital Roadmap initiative



OECD Best Practice Framework Assessment

This section analyses the Digital Roadmap initiative against the five criteria within OECD's Best Practice Identification Framework – Effectiveness, Efficiency, Equity, Evidence-base and Extent of coverage (see Box 10.1 for a high-level assessment of the project). Further details on the OECD Framework are in Annex A.

Box 10.1. Assessment of the Digital Roadmap initiative

Effectiveness

- Data on the overall effectiveness of the Digital Roadmap initiative is not available – for this reason, the section on effectiveness examined data from individual interventions which make up the initiative:
    - Academic studies of TeleCOPD found the intervention has the potential to reduce hospital readmissions, for example by up to 10%
    - A study of MasterMind, a type of telepsychiatry intervention, found 29% of participants reported a reduction in depressive symptoms
    - Patients accessing the Digital Health Centre reported positive feedback on their experience of the available education programs (e.g. usability and the content provided)
    - A study of GERI Toolbox, a tool to improve home visits delivered by nurses, found both nurses and patients are satisfied
    - A pilot project involving 300 patients found the virtual rehabilitation intervention found patients are more likely to perform rehabilitation exercises correctly and train more in general, while patients reported a higher quality training experience.

Efficiency

- Digital health interventions have the potential to reduce costs while maintaining access to high-quality care
- Data on efficiency for specific interventions with the Digital Roadmap initiative is limited to just one intervention – TeleCOPD. TeleCOPD is estimated to lead to a net economic impact of DKK 488 million (EUR 66 million) over a period of five years when targeting patients with severe or very severe COPD. A separate study, which examined the cost-effectiveness of TeleCOPD when provided to all COPD patients, however, found the intervention is above willingness-to-pay thresholds typically applied in Europe.

Equity

- An evaluation of interventions within the Digital Roadmap initiative do not break down data by population groups. For this reason, there is no conclusive evidence on what impact the initiative has on reducing health inequalities.
- More broadly, digital health interventions have both advantages and disadvantages in terms of reducing inequalities. For example, digital services improve access to those with mobility issues and/or who live in hard-to-reach areas, conversely, less advantaged populations are less likely to use or have access to technology.

Evidence-base

- The quality of evidence support TeleCOPD and Telepsychiatry is robust using data from the Region of Southern Denmark and the broader literature of similar interventions. However, the impact of remaining interventions was assessed primarily using patient surveys, which is low on the hierarchy of evidence.

Extent of coverage

- The Digital Roadmap initiative is accessible to all users of healthcare in the Region of Southern Denmark, which covers 1.2 million people.
- Data on uptake across the interventions which make up the initiative are not available.

Effectiveness

The section summarises evidence on the effectiveness of individual interventions that make up the Digital Roadmap initiative.

TeleCOPD

Research studies analysing the impact of the TeleCOPD recorded a reduction in hospital admissions and a high levels of patient satisfaction:

- Sorknaes et al. (2013[8]): using a randomised controlled trial, the authors assessed the impact of teleconsultations for patients with respiratory diseases or severe COPD. The number of hospital readmissions within 26 weeks of discharge for the intervention group was 1.4 compared to 1.6 in the control group. The difference between the two groups was not statistically significant.
- Sorknaes et al. (2010[9]): using an intervention and control group study, the authors assessed the impact of TeleCOPD, also using hospital readmissions as the primary outcome measure. Findings from the analysis **show a 10% reduction in the risk of early readmission to hospital among those who received TeleCOPD**. TeleCOPD was also associated with higher levels of patient and nurse satisfaction.
- An evaluation of a similar pilot project implemented in the Region of Northern Denmark – TeleCare North – also found positive results. Specifically, the pilot (Healthcare Denmark, 2021[10]):
  - Reduced the number and length of hospitalisations for COPD patients by 11% and 20%, respectively.
  - Improved patients control over their diseases and increased awareness of their symptoms.
- Nearly three-quarters of COPD patients (71.7%) felt an increase sense of safety from telemonitoring, half of all patients stated that experienced an increased awareness of COPD symptoms and responded proactively, and finally, nearly all patients (96%) found the system easy to use (Oliveira Hashiguchi, 2020[11]).

Due to the promising results of these two pilot projects (in the Regions of Southern Denmark and also Northern Denmark), the Danish Government and the Danish Regions agreed to implement telemedicine home monitoring for COPD patients across the whole country (PA Consulting Group, 2017).

Telepsychiatry

Between 2013 and 2015, the Region of Southern Denmark ran a pilot Telepsychiatry intervention. A report analysing the impact of the pilot could not conclude whether teleconsultation therapy sessions for patients with depression had the same impact as usual therapy (Rasmussen, Wentzer and Fredslund, 2016[12]).

Another telepsychiatry intervention run in the Region of Southern Denmark is Mastermind (Management of mental health through advanced technology and services – telehealth for the MIND). Mastermind is a European project that implemented iCBT (internet-based cognitive therapy) for almost 5 000 adults with depression (MasterMind, 2021[13]). This intervention collected data on clinical symptoms of patients (“no symptoms”, “mild”, “moderate”, “severe”, and “very severe”), before and after treatment. The final evaluation report of the project showed that **29% of patients reported they experienced a reduction in depressive symptoms** (Pedersen et al., 2017[14]).

The Digital Health Centre

The Digital Health Centre developed the Digital Patient Education consists of two patient education programs called “Live your life with diabetes” and “Live your life with heart disease”. Both programs offer patients consultations with healthcare professionals, e-learning modules and online group sessions such as webinars (Det Digitale Sundhedscenter, 2021[15]; Health Innovation Center of Southern Denmark, 2021[16]).

Participants of the Digital Patient Education programme provided positive feedback of their experience in the pilot project. A report analysing the impact of the pilot project, which included 149 citizens (97 with type 2 diabetes and 52 with heart disease), found 80% of patients were satisfied with the programme and experienced positive effects from using digital education. Further, participants gave positive feedback on both the e-learning platform (e.g. "easy and understandable") and on the webinars (e.g. content and pedagogy) (Det Digitale Sundhedscenter, 2018[17]).

The Digital Health Centre fulfils its objective to improve patients' health habits. Patients stated the programme had positive effects on their health habits – after participating in the diabetes course, around one-third of the participants have had their eyesight and feet checked by a health professional (Det Digitale Sundhedscenter, 2018[17]).

GERI toolbox

An 18-month observational study of the GERI Toolbox found (Andersen-Ranberg et al., 2020[18]):

- Nurses felt that were supported during the decision-making process
- Two-third of general practitioners felt that Toolbox reduced acute hospital admissions (specific data, however, is not available)
- Patients felt safe with the acute nurses utilising the Toolbox
- Approximately half of all patients felt the service was equivalent to a GP house call.

Virtual rehabilitation

The main objective of this virtual platform is to strengthen the quality of the integrated rehabilitation process by sharing patient data, increasing support during the patients' rehabilitation journey and improving collaboration across sectors.

A pilot project in 2012 involving over 300 patients assessed the impact of the Virtual Rehabilitation – key findings are summarised below (Nissen, 2012[19]):

- Therapists report that patients are more likely to perform rehabilitation exercises correctly and train more in general when using the virtual platform compared to exercises handed out on paper.
- The virtual rehabilitation is shown to be just as accessible for patients as paper-based exercises
- Virtual rehabilitation helps patients maintain their training (e.g. SMS reminders)
- Patients reported receive a higher quality training experience virtually than when compared to exercises provided on paper.

MyHospital app

Similar to the GERI toolbox, to date there is limited evidence measuring the impact of the MyHospital App. However, research studies have relied on the app to collect patient data, such as patient-reported outcome measures. For example, Møller et al. (2021[20]) in their evaluation of a new cancer treatment, uploaded a survey to the My Hospital app in order to collect data on patient-reported outcome measures.

Efficiency

Digital health interventions have the potential to reduce costs while continuing to provide patients with the same or an even better level of care. For example, digital health interventions, reduce patient travel and waiting time (thereby improving productivity), shorten the length of consultations thereby increasing the volume of consultations, and also have lower unit cost when compared to face-to-face services.

Similar to “Effectiveness”, results for efficiency are summarised according to individual interventions within Digital Roadmaps. Results are not available for the Region of Southern Denmark; therefore, the analysis relies on data from the same intervention implemented in a different region or country.

Results for efficiency are limited to just two interventions operating under Digital Roadmaps – TeleCOPD and Telepsychiatry. Results from analysis show mixed, inconclusive results.

TeleCOPD

Provided below are results for the two most recent efficiency analyses of TeleCOPD. At a high-level, TeleCOPD is only cost-effective when targeting patients with severe or every severe COPD:

- Witt Udsen et al. (2017[21]) conducted a cost-utility analysis of TeleCOPD as it operates in the Northern Region of Denmark. Results from study estimate TeleCOPD has a cost per quality-adjusted life year (QALY) of EUR 55 327, which, on average, is above willingness-to-pay thresholds in countries across Europe and the United Kingdom (around EUR 50 000 according to (Vallejo-Torres et al., 2016[22])). This result indicates TeleCOPD is unlikely to be cost-effective when provided to all COPD patients. TeleCOPD, however, was cost effective under more favourable sensitivity analyses, for example:
    - when procurement prices of technologies drop due to wider coverage (cost per QALY = EUR 46 931)
    - when reducing the average per patient monitoring time, which also reduced costs (cost per QALY = EUR 39 854).
- The PA Consulting Group in (2017[23]) undertook a business case analysis of scaling-up TeleCOPD across the whole of Denmark. Assuming the intervention targets those with either severe or very severe COPD (Global Initiative for Chronic Obstructive Lung Disease (GOLD) grades 3 or 4), it is estimated to have an accumulative net economic impact of DKK 483 million (EUR 66 million) over a period of five years. To take into account uncertainty, the authors also presented figures for a worse and best case scenario – i.e. DKK 388 million and DKK 578 million (EUR 52-78 million), respectively.

Telepsychiatry

Data on efficiency for telepsychiatry is not available; however, there is information on the costs of operating the intervention. See Box 10.2 for further details.

Mastermind, a separate telepsychiatry intervention, did report findings from an economic evaluation – however, results are not specific to the Region of Southern Denmark, instead they represent several regions in Spain and Italy, as well as Scotland, the Netherlands and Germany. Specifically, a European Commission funded study found the cost of reducing depression by one measurement level varies widely from EUR 165 to EUR 1917 across countries. The differences in estimates may be due to different structures and cost models, the volume of treatment, and/or how well established daily operation activities are (European Commission, 2017[24]). The study did not indicate whether these figures fall under a pre-specified willingness-to-pay threshold.

Box 10.2. Costs of implementing and operating telepsychiatry

An evaluation of the pilot telepsychiatry project analysed the two-year operating phase of the intervention and estimated that costs per patient in telemediated psychiatric treatment were probably lower than the average total cost of treatment courses. However, this excludes development costs of the project (such as "shift management" costs and a feasibility study of patients not receiving treatment). If all development costs are included, the estimated cost per patient is around DKK 5 million (EUR 670 000) for around 680 patients included in annual treatment (for nationwide distribution), which would equal DKK 7 353 (EUR 990) per patient, per year (Rasmussen, Wentzer and Fredslund, 2016[12]).

The same report by Rasmussen et al. (2016[12]) also notes that the average costs per treated patient is DKK 9 780 (EUR 1 300). However, a considerable proportion of this cost is spent on recruiting patients. If these costs are excluded, the expected average for telepsychiatry treatment is lower at DKK 6 780 (EUR 900) per patient. Comparatively, expected public health insurance costs for usual course of treatment is DKK 4 820 (EUR 650).

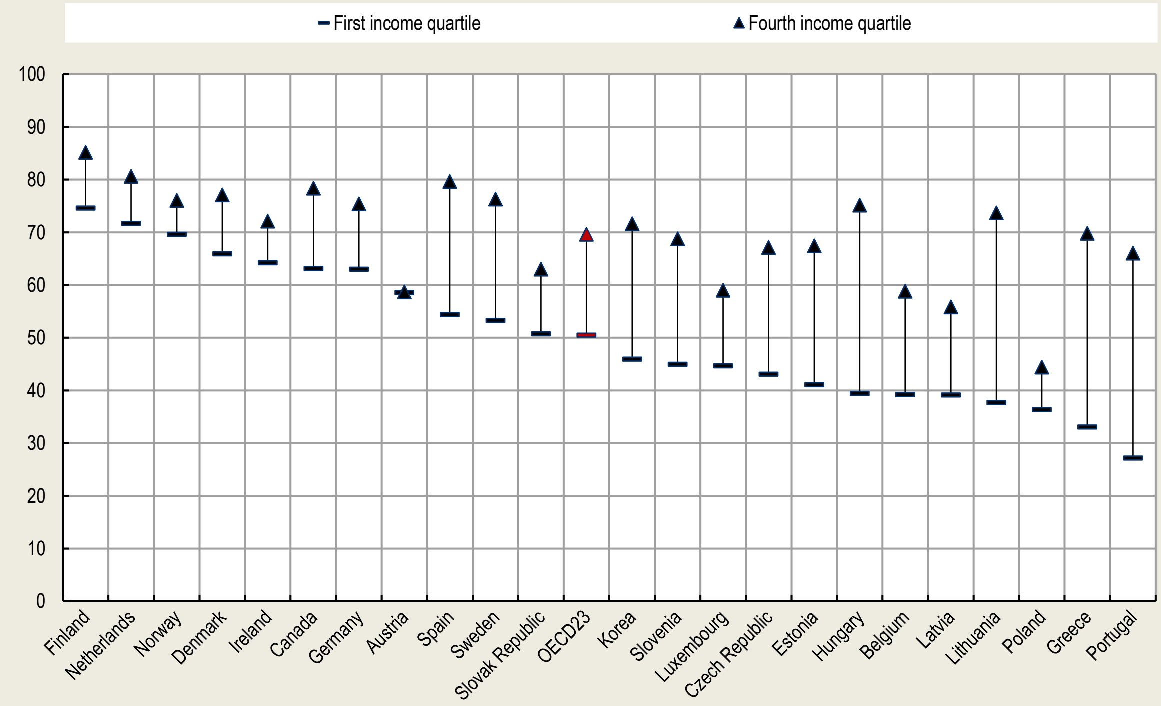
Equity

Studies measuring the effectiveness and efficiency of Digital Roadmap interventions did not report results across population groups. Therefore, it was not possible to assess what impact Digital Roadmaps has on reducing health inequalities. The section on equity therefore summarises, at a high level, the impact of digital health intervention on equality (see Box 10.3).

Box 10.3. Digital health interventions and equality

Telehealth and digital communication can have both advantages and disadvantages in terms of accessing priority groups. While telemedicine can allow patients with mobility issues or those from remote areas to access treatment, others may have difficulties using and/or accessing the technology (digital exclusion). For example, **digital health interventions are more popular among younger, higher- educated populations**: research undertaken by OECD estimated adults in the highest income quartile are markedly more likely to use the internet to research health information, compared to adults in the lowest income quartile (see Figure 10.2). Other groups less likely to use digital health interventions include older populations and those living in rural areas due to factors such as cost, lower digital health literacy skills and limited broadband access (Bol, Helberger and Weert, 2018[25]; Azzopardi-Muscat and Sørensen, 2019[26]; Oliveira Hashiguchi, 2020[11]).

Figure 10.2. Per cent using internet to seek health information by income quartile



Note: Data are shown for 2020 and refer to internet searches in the last three months.
Source: OECD database on ICT Access and Usage by Households and Individuals.

Evidence-base

The evidence-base criteria assesses the quality of evidence used to measure the impact of interventions within the Digital Roadmaps initiative, as outlined under preceding best practice criteria. The *Quality Assessment Tool for Quantitative Studies* from the Effective Public Health Practice Project is a commonly used tool to assess the quality of evidence, with a particular focus on academic articles. Only two articles measuring the impact of Digital Roadmap interventions are eligible for this assessment – both papers by Sorknaes et al. (2013[8]) and (2010[9]), which measured the effectiveness of TeleCOPD (see Table 10.1).

However, only the (2010[9]) paper was assessed given the paper form (2013[8]) is not publicly available. The quality of evidence for remaining studies relied on a qualitative assessment, as outlined in Box 10.4.

Table 10.1. Evidence-based assessment – the Digital Roadmap initiative

Assessment category	Question	Score Sorknaes et al. (2010[9])
Selection bias	Are the individuals selected to participate in the study likely to be representative of the target population?	Somewhat likely
	What percentage of selected individuals agreed to participate?	98%
Selection bias score:		*Moderate*
Study design	Indicate the study design	Observational study (cohort analytic, two group pre and post)
	Was the study described as randomised?	No
	Was the method of randomisation described?	N/A
	Was the method of randomisation appropriate?	N/A
Study design score:		*Moderate*
Confounders	Were there important differences between groups prior to the intervention?	No
	What percentage of potential confounders were controlled for?	Some (60-79%)
Confounders score:		*Moderate*
Blinding	Was the outcome assessor aware of the intervention or exposure status of participants?	Yes
	Were the study participants aware of the research question?	Yes
Blinding score:		*Weak*
Data collection methods	Were data collection tools shown to be valid?	Yes
	Were data collection tools shown to be reliable?	Yes
Data collection methods score:		*Strong*
Withdrawals and dropouts	Were withdrawals and dropouts reported in terms of numbers and/or reasons per group?	Yes
	Indicate the percentage of participants who completed the study?	99%
Withdrawals and dropouts score:		*Strong*

Source: Effective Public Health Practice Project (1998[27]), "Quality assessment tool for quantitative studies", https://www.nccmt.ca/knowledge-repositories/search/14.

Box 10.4. Quality of evidence supporting the Digital Roadmap initiative

This box summarises the quality of evidence use to measure the impact of interventions within the Digital Roadmap initiative.

TeleCOPD

In addition to the quality of evidence assessment outlined in Table 10.1, this section provides an overview of the evidence supporting telemonitoring schemes for COPD patients more broadly.

- Hong and Lee (2019[28]) conducted a systematic review and meta-analysis to analyse the effect of telemonitoring on COPD patients using information from 27 randomised controlled trials (RCTs). They used Cochrane risk of bias (RoB) for RCTs and assessed selection bias, allocation bias, performance and detection bias, attrition bias and reporting bias by scoring low, high and unclear risk. Four studies had a high risk of selection bias, and almost all studies reported an unclear allocation concealment. Only two studies reported blindness. Indeed, the blinding of participants was lacking, but treatment for participants cannot be blinded because of intervention characteristics.
- Cruz et al. (2014[29]) undertook a systematic review to assess the effectiveness of home telemonitoring in patients with COPD. In total, 10 articles (9 studies) met the inclusion criteria, of which: eight were RCTs (two high quality, five good quality and one fair to good quality); one was an experimental study with a control group (good quality), and one was quasi-experimental with a control group (good quality).

Although telemonitoring for patients with heart disease is not currently part of the Digital Roadmap initiative, the quality of evidence supporting such interventions is included given plans to introduce TeleHeart – telemonitoring for patients with heart disease.

- Yun et al. (2018[30]) performed a systematic review and meta-analysis to evaluate the effectiveness of telemonitoring in the management of patients with heart failure. The quality of the 37 selected RCTs was assessed by the Cochrane RoB tool. More than 25% of the studies had a high risk of bias for reporting bias. The risk of device support was designated “uncertain” in the majority of the studies. Because most of the included studies reported objective outcomes, such as death or hospitalisation, the overall risk of detection bias was low.

Telepsychiatry

- The evaluation of MasterMind, a telepsychiatry intervention, relied on survey data from patients both before and after accessing the intervention. Further details on the methodology used – such as the number of patients, selection criteria, questionnaire use – are not available (Pedersen et al., 2017[14]). Therefore, the evidence supporting telepsychiatry is supported in this setting by a review of the broader literature.
- Guiana et al. (2020[31]) undertook a systematic review to evaluate the impact of telepsychiatry on depression. The systematic review included 14 studies all of which were RCTs, which is the most robust method for establishing causality. The review concluded satisfaction with telepsychiatry is equivalent or higher than face-to-face care, relieves depressive symptoms and is cost-effective in the long run.

Remaining interventions

- The evidence supporting remaining interventions – Digital Health Centre, GERI Toolbox and Virtual rehabilitation – relied on survey feedback from participants to assess performance. Surveys measuring patient experiences are considered “low-quality” evidence.

Extent of coverage

The Digital Roadmaps initiative targets all users of healthcare in the Region of Southern Denmark, which has a population of 1.2 million (Region Syddanmark, 2021[32]). Interventions within Digital Roadmaps often however target specific populations – e.g. TeleCOPD focuses on those diagnosed with the disease. Data on the extent of coverage for individual interventions is very limited, with information only available for the My Hospital app and Telepsychiatry:

- **My Hospital app**: since its inception in 2014, the app has been accessed by 30 000 patients
- **Telepsychiatry**: in its first year, nearly 500 patients accessed mental health services online with this figure growing to over 1 800 by 2017 (Healthcare Denmark, 2018[5]).

Policy options to enhance performance

Policy options available to policy makers (e.g. region / state / national governments) and administrators of the Digital Roadmap initiative are outlined in this section and refer to each of the five best practice criteria.

Enhancing effectiveness

Continue to build levels of digital literacy among patients with a focus on disadvantaged population groups. Relative to other OECD and EU27 countries, Denmark has a digitally advanced healthcare system. As a result, a high proportion of people in the country (72%) use the internet to seek health information (OECD, 2019[33]). The proportion of patients seeking care online, however, differs across populations with lower levels recorded for lower socio-economic groups (in terms of income and educational attainment) as well as the older population. Therefore, any policy efforts to promote digital health literacy (HL) should focus on groups who face barriers to accessing and utilising telehealth, given such groups often stand to benefit most.

Digital HL is also high among health professionals in Denmark but can always be improved. Indicators measuring digital HL levels in Denmark suggest relative to other countries, the workforce feel confident using digital tools as part of routine practice. For example, out of all European countries with available data, Denmark recorded the highest eHealth adoption score among general practitioners (GPs) (a composite index score which brings together data on adoption of electronic health records, telehealth, personal health records and health information exchange). Nevertheless, it is important to continue improving digital HL skills among health professionals so that they have the skills and confidence to safely and effectively adopt digital work tools. For example, by developing digital health competency frameworks that inform what changes to the education of health professionals are needed, with a particular focus on physicians, as well as developing concrete guidelines on how to integrate digital health topics into education and training programs.

Enhancing efficiency

Prioritise economic evaluations of interventions within the Digital Roadmap initiative. As outlined under "Efficiency", there is limited evidence supporting the efficiency of specific interventions within the Digital Roadmap initiatives. This findings aligns with the broader literature and is one of the key barriers to the wider use of telehealth/telemedicine (Oliveira Hashiguchi, 2020[11]). Economic evaluations should therefore be prioritised, such as cost-benefit, cost-minimisation and cost-effectiveness analyses. Regardless of the method chosen, it is important that researchers take a broad perspective as opposed to a health system/government perspective. Specifically, by taking into account cost categories from the patient perspective including patient travel and waiting time, both of which result in loss productivity, as well as a reduction in downstream utilisation of healthcare services. For example, research undertaken in

Canada found the Canadian Ontario Telemedicine Network reduced patient travel distance by 270 million km in one year, leading to costs savings from a reduction in travel grants by CAD 71.9 million (EUR 50.2 million) (OTN, 2018[34]). Failing to account for such costs risks excluding key variables that make a more favourable case for telehealth/telemedicine, which limits the possibility of scaling up and transferring such interventions.

Enhancing equity

Policies to increase access and utilisation of Digital Roadmap interventions among priority population groups can reduce health inequalities. There are groups in the population who are less likely to utilise and therefore benefit from digital health products – e.g. the older population are less likely to be digitally health literate, while economically disadvantaged groups may not have regular access to the internet (Bol, Helberger and Weert, 2018[25]; Azzopardi-Muscat and Sørensen, 2019[26]; Oliveira Hashiguchi, 2020[11]). Governments and other relevant policy makers can respond by focusing efforts to build HL and digital HL on priority population groups (e.g. through targeted training programs). More direct action that can be implemented by Digital Roadmap administrators include:

- Targeted promotion campaigns as well as the provision of detailed, tailored, advice on how to use the interventions within the initiative
- Collecting data that can be disaggregated by priority population groups (e.g. information on level of education as a proxy for SES status). This information can subsequently be used to amend interventions to better to suit the needs of priority populations.

Failing to address the needs of priority population groups risks widening existing health inequalities.

Enhancing the evidence base

Collect additional indicators to the measure the impact of interventions on patient health outcomes. As outlined under “Evidence-base”, the quality of evidence supporting interventions within the Digital Roadmap initiative are mixed – i.e. telemonitoring programs, such as TeleCOPD, are supporting by rigorous academic studies, while the remaining interventions rely on qualitative feedback from patients and providers. For interventions supported by low-quality evidence – Digital Health Centre, GERI Toolbox and Virtual rehabilitation – administrators from the Digital Roadmap initiative should also focus on collecting robust forms of data to evaluate impact. See Box 10.5 for a list of example indicators. Although patient/provider experiences are low quality in the hierarchy of evidence, they are an important source of information and should continue to be collected. In particular, validated forms of self-reported feedback such as the EQ-5D, which measures quality of life.

A stronger evidence-base will ultimately increase trust among both patients and providers thereby increasing uptake across the population.

Box 10.5. Example indicators to measure impact of Digital Roadmap interventions

This box outlines indicators useful for measuring the impact of interventions within the Digital Roadmap initiative. The indicators should complement rather than replace indicators measuring patient and provider experiences. Evaluation methodologies that collect indicators for a control and intervention group are the most robust, in particular where allocation into either group is random. The list of indicators is not exhaustive.

Digital Health Centre: Live your life with diabetes / Live your life with heart disease

- Levels of physical activity (e.g. steps per day, minutes per day or moderate to vigorous exercise)
- Fruit and vegetable consumption
- Weight or body mass index (BMI)
- Diabetes specific: Type 2 diabetes incidence, A1C, LDL cholesterol, or microalbuminuria

GERI Toolbox

- Number of hospital admissions

Virtual rehabilitation

- Short Physical Performance Battery
- Quality of life measurement (e.g. EQ-5D)
- Anxiety/depression levels
- For COPD patients: minute ventilation, exercise capacity, max VO2 (measures oxygen uptake), dyspnea (i.e. shortness of breath)

Researchers evaluating individual programs within Digital Roadmaps should be aware of the potential overlap between interventions. This overlap makes it difficult to ascertain the impact of each separate intervention.

Continue to build evidence supporting the efficiency of digital health interventions. For further details, see “Enhancing efficiency”

Enhancing extent of coverage

Encourage health professionals to promote interventions within the Digital Roadmap initiative. There are high-levels of public trust in the health workforce; therefore, health professionals can play an important role in boosting uptake of interventions within the Digital Roadmap initiative. A way of encouraging adoption of digital tools is to make them available in provider settings and have “professionals demonstrate and support their use” (OECD, 2019[35]).

Ensure interventions within the Digital Roadmap are both trusted and non-burdensome for health professionals. Health professionals whose experience with digital health interventions is burdensome are less likely to use as well as promote such interventions. For this reason, administrators of the Digital Roadmap initiative should ensure that any new interventions or updates to existing interventions (OECD, 2019[35]):

- Are evidence-based in order to maintain trust among health professionals and patients
- Include input and feedback from health professionals and patients, who are the end-users
- Do not negatively affect usability and continue to be integrated into current practice (i.e. do not increase the workload of health professionals).

Continue to build the evidence base supporting interventions within the Digital Roadmap initiative. Uptake of interventions within the Digital Roadmap initiative is likely to grow with the level of available evidence supporting its effectiveness and efficiency. See “Enhancing the evidence base” for further details.

Transferability

This section explores the transferability of the Digital Roadmap initiative and is broken into three components: 1) an examination of previous transfers; 2) a transferability assessment using publicly available data; and 3) additional considerations for policy makers interested in transferring this intervention.

Previous transfers

The Digital Roadmap initiative is one of four “good practices” within the European Commission’s Joint Action on implementation of digitally enabled integrated person-centred care (JADECARE). As part of JADECARE, nine Member States in Europe will adopt the Digital Roadmap initiative over the period 2020-23. Next adopters participated in a study visit where the owners of the intervention in Denmark presented the transferability of individual interventions that make up the initiative.

Many of the interventions within the Region of Southern Denmark’s Digital Roadmap initiative operate across the whole country demonstrating their transferability potential. For example, TeleCOPD and Telepsychiatry are available to all COPD patients in Denmark.

Transferability assessment

The following section outlines the methodological framework to assess transferability and results from the assessment.

Methodological framework

Details on the methodological framework to assess transferability can be found in Annex A.

Several indicators to assess the transferability of the Digital Roadmap initiative were identified (see Table 10.1). Indicators were drawn from international databases and surveys to maximise coverage across OECD and non-OECD European countries. Please note, the assessment is intentionally high level given the availability of public data covering OECD and non-OECD European countries.

Table 10.2. Indicators to assess transferability – the Digital Roadmap initiative

Indicator	Reasoning	Interpretation
Population context		
ICT Development Index*	Digital Roadmap (DR) interventions are more transferable to countries that are digitally advanced	↑ value = more transferable
Individuals using the Internet for seeking health information – last 3 m (%)	DR interventions more transferable to a population comfortable seeking health information online	↑ value = more transferable
Sector context (digital health sector)		
eHealth composite index of adoption score amongst GPs in Europe**	DR interventions are more transferable to countries where GPs are comfortable using eHealth technologies	↑ value = more transferable
% of tertiary institutions (public and private) that offer ICT for health (eHealth) courses	DR interventions are more transferable if health professional students receive eHealth training	↑ value = more transferable
% of institutions or associations offering in-service training in the use of ICT for health as part of the continuing education of health professionals	DR interventions are more transferable if health professionals have appropriate eHealth training	↑ value = more transferable

Indicator	Reasoning	Interpretation
Political context		
A national eHealth policy or strategy exists	DR interventions are more transferable if the government is supportive of eHealth	'Yes' = more transferable
A dedicated national telehealth policy or strategy exists	DR interventions are more transferable if the government is supportive of telehealth	'Yes' = more transferable
Economic context		
Special funding is allocated for the implementation of the national eHealth policy or strategy	DR interventions are more transferable if there already is allocated funding for eHealth	'Yes' = more transferable
% of funding contribution for eHealth programmes provided by public funding sources over the previous two years	DR interventions are more transferable if eHealth programme funding mostly comes from public sources	High proportion = more transferable

Note: *The ICT development index represents a country's information and communication technology capability. It is a composite indicator reflecting ICT readiness, intensity and impact (ITU, 2020[36]). **The eHealth composite index of adoption amongst GPs is made up of adoption in regards to electronic health records, telehealth, personal health records and health information exchange.
Source: ITU (2020[36]), "The ICT Development Index (IDI): conceptual framework and methodology", https://www.itu.int/en/ITU-D/Statistics/Pages/publications/mis/methodology.aspx; OECD (2019[33]), "Individuals using the Internet for seeking health information – last 3 m (%) (all individuals aged 16-74)"; European Commission (2018[37]), "Benchmarking Deployment of eHealth among General Practitioners (2018)", https://op.europa.eu/en/publication-detail/-/publication/d1286ce7-5c05-11e9-9c52-01aa75ed71a1; WHO (2015[38]), "Atlas of eHealth country profiles: The use of eHealth in support of universal health coverage", https://www.afro.who.int/publications/atlas-ehealth-country-profiles-use-ehealth-support-universal-health-coverage.

Results

Table 10.3 outlines results from the transferability assessment using indicators in Table 10.2. Overall, Denmark has a relatively advanced digital health system and is therefore well placed to offer interventions deliver interventions part of the Digital Roadmap initiative. Countries with less advanced digital health systems may experience transfer and implementation barriers. Specific details from the assessment are below:

- Access to and use of digital healthcare is high in Denmark when compared to other OECD and EU27 countries. For example, nearly 70% of people in Denmark use the internet to access healthcare compared to just over 50% among all OECD/EU countries. Further, alongside Korea, Denmark has the highest ICT development index, a composite indicator measuring IT access, use and skills at the country level.
- Available indicators also suggest the health workforce in Denmark are digitally health literate. For example, a "very high" proportion of institution offer health professionals ICT training as part of their continual education requirements. For the majority of remaining countries (64% of those with available data), ICT training for health professionals is only offered in a "medium" or "low" proportion of institutions.
- There is strong political support accompanied by relatively high levels of funding for eHealth programs in Denmark. Denmark has both an eHealth and telehealth policy to support programs such as the Digital Roadmap initiative. While most examined countries also have an eHealth policy (73% of those with available data), far fewer also have a telehealth policy (25%). Regarding funding, specific funds are available to implement Denmark's eHealth policy. Further, a "very high" proportion of eHealth funding comes from the Danish Government, indicating the government has a keen interest in pursuing digital health initiatives. While the government is in general the main contributor to eHealth funding among examined countries, this is not always the case – e.g. in a fifth of all countries, the proportion of eHealth spending from government is "low".

Table 10.3. Transferability assessment by country (OECD and non-OECD European countries) – the Digital Roadmap initiative

A darker shade indicates the Digital Roadmap initiative may be more transferable to that particular country

Country	ICT Development Index (2015)	Individuals using the Internet for seeking health information – last 3 m (%)	eHealth composite index of adoption score amongst GPs in Europe	% of tertiary institutions (public and private) that offer ICT for health (eHealth) courses	Proportion of institutions or associations offering in-service training in the use of ICT for health as part of the continuing education of health professionals	A national eHealth policy or strategy exists	A dedicated national telehealth policy or strategy exists	Special funding is allocated for the implementation of the national eHealth policy or strategy	% funding contribution for eHealth programmes provided by public funding
Denmark	**8.80**	**67.36**	**2.86**	**Medium**	**Very high**	**Yes**	**Yes**	**Yes**	**Very high**
Australia	8.20	42.46	n/a	Medium	High	Yes	No	n/a	Very high
Austria	7.50	53.24	1.91	Low	Low	No	No	Yes	Very high
Belgium	7.70	48.74	2.07	Low	Low	Yes	Combined*	Yes	Very high
Bulgaria	6.40	34.00	1.81	Medium	Medium	Yes	Combined	Yes	Low
Canada	7.60	58.70	n/a	High	Low	Yes	No	n/a	Very high
Chile	6.10	27.48	n/a	Low	Low	Yes	No	n/a	Very high
Colombia	5.00	41.47	n/a	n/a	n/a	n/a	Yes	n/a	n/a
Costa Rica	6.30	58.00	1.93	Medium	Low	Yes	No	No	Very high
Croatia	6.80	53.00	2.18	Low	Medium	Yes	Yes	Yes	Very high
Cyprus	6.30	58.00	1.93	Medium	Low	Yes	Combined	No	Very high
Czech Republic	7.20	56.46	2.06	Medium		No	Combined	No	Low
Estonia	8.00	59.54	2.79	Medium	Low	Yes	No	Yes	Very high
Finland	8.10	76.32	2.64	Medium	Medium	Yes	Combined	Yes	Very high
France	8.00	49.59	2.05	n/a	n/a	n/a	Yes, but not national	n/a	n/a
Germany	8.10	66.49	1.94	n/a	n/a	n/a	n/a	n/a	n/a
Greece	6.90	49.86	1.79	Medium	Medium	Yes	Combined	Yes	Very high

Country	ICT Development Index (2015)	Individuals using the Internet for seeking health information – last 3 m (%)	eHealth composite index of adoption score amongst GPs in Europe	% of tertiary institutions (public and private) that offer ICT for health (eHealth) courses	Proportion of institutions or associations offering in-service training in the use of ICT for health as part of the continuing education of health professionals	A national eHealth policy or strategy exists	A dedicated national telehealth policy or strategy exists	Special funding is allocated for the implementation of the national eHealth policy or strategy	% funding contribution for eHealth programmes provided by public funding
Denmark	**8.80**	**67.36**	**2.86**	**Medium**	**Very high**	**Yes**	**Yes**	**Yes**	**Very high**
Hungary	6.60	60.46	2.03	Low	n/a	No	No	No	Very high
Iceland	8.70	64.68	n/a	Very high	Very high	Yes	No	Yes	Very high
Ireland	7.70	56.87	2.10	n/a	Low	Yes	No	Yes	Low
Israel	7.30	50.00	n/a	High	Low	No	Yes	Yes	Very high
Italy	6.90	35.00	2.19	Low	High	Yes	Yes	Yes	Very high
Japan	8.30	n/a	n/a	n/a	n/a	Yes	No	n/a	n/a
Korea	8.80	50.38	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Latvia	6.90	47.89	1.83	Low	Low	Yes	Combined	Yes	Low
Lithuania	7.00	60.63	1.65	Medium	Low	Yes	Yes	No	High
Luxembourg	8.30	58.17	1.78	Low	Low	Yes	Combined	Yes	Very high
Malta	7.50	59.00	n/a	Very high	Very high	No	No	No	Very high
Mexico	4.50	49.76	n/a	Medium	Low	No	No	n/a	High
Netherlands	8.40	73.97	n/a	High	High	Yes	Combined	Yes	Very high
New Zealand	8.10	n/a	n/a	Medium	Very high	Yes	No		Low
Norway	8.40	68.98	n/a	Low	Medium	Yes	Yes	Yes	Very high
Poland	6.60	47.40	1.84	High	Medium	Yes	Combined	Yes	Very high
Portugal	6.60	49.41	2.12	Low	Low	No	Yes	Yes	High
Romania	5.90	33.00	1.79	n/a	n/a	Yes	n/a	n/a	n/a
Slovak Republic	6.70	52.64	1.76	n/a	n/a	n/a	n/a	n/a	n/a
Slovenia	7.10	48.07	2.00	High	High	No	No	Yes	Very high
Spain	7.50	60.13	2.37	Low	Medium	No	No	Yes	Very high
Sweden	8.50	62.24	2.52	Very high	Very high	Yes	No	Yes	Very high

Country	ICT Development Index (2015)	Individuals using the Internet for seeking health information – last 3 m (%)	eHealth composite index of adoption score amongst GPs in Europe	% of tertiary institutions (public and private) that offer ICT for health (eHealth) courses	Proportion of institutions or associations offering in-service training in the use of ICT for health as part of the continuing education of health professionals	A national eHealth policy or strategy exists	A dedicated national telehealth policy or strategy exists	Special funding is allocated for the implementation of the national eHealth policy or strategy	% funding contribution for eHealth programmes provided by public funding
Denmark	**8.80**	**67.36**	**2.86**	**Medium**	**Very high**	**Yes**	**Yes**	**Yes**	**Very high**
Switzerland	8.50	66.87	n/a	Low	Very high	Yes	No	Yes	Low
Türkiye	5.50	51.26	n/a	n/a	n/a	No	Combined	Yes	Low
United Kingdom	8.50	66.89	2.52	Medium	High	Yes	Yes	Yes	Very high
United States	8.10	38.33	n/a	Low	Low	Yes	No	n/a	n/a

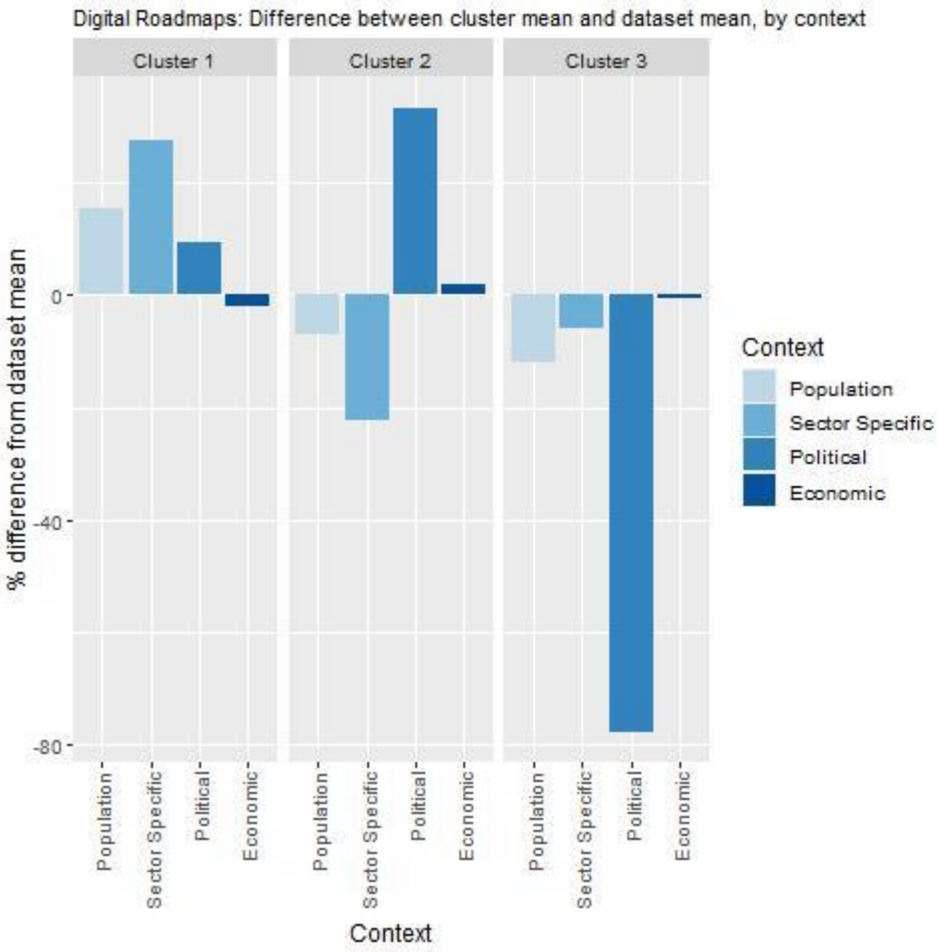
Note: n/a = data is missing. *Combined with eHealth policy or strategy.
Source: See Table 10.2.

To help consolidate findings from the transferability assessment above, countries have been clustered into one of three groups, based on indicators reported in Table 10.2. Countries in clusters with more positive values have the greatest transfer potential. For further details on the methodological approach used, please refer to Annex A.

Key findings from each of the clusters are below with further details in Figure 10.3 and Table 10.4:

- Countries in cluster one have population, political and sector specific arrangements in place to transfer the Digital Roadmaps initiative, and are therefore good transfer candidates. This cluster includes Denmark, the owner country for this intervention.
- Countries in cluster two have political priorities, which align with the Digital Roadmap initiative, such as a dedicated national eHealth policy. However, further analysis is needed to ensure these countries have a population and a digital health sector ready to maximise the potential of interventions within the Digital Roadmap initiative.
- Countries in cluster three require further analysis to ensure the right conditions are in place to transfer the Digital Roadmap initiatives, in particular, to ensure the initiative aligns with overarching political priorities.

Figure 10.3. Transferability assessment using clustering – the Digital Roadmap initiative



Note: Bar charts show percentage difference between cluster mean and dataset mean, for each indicator.
Source: See Table 10.2.

Table 10.4. Countries by cluster – the Digital Roadmap initiative

Cluster 1	Cluster 2	Cluster 3
Australia	Belgium	Austria
Canada	Bulgaria	Hungary
Chile	Costa Rica	Israel
Denmark	Croatia	Malta
Estonia	Cyprus	Mexico
Iceland	Czech Republic	Portugal
Ireland	Finland	Slovenia
Lithuania	Greece	Spain
New Zealand	Italy	
Sweden	Latvia	
Switzerland	Luxembourg	
United Kingdom	Netherlands	
United States	Norway	
	Poland	
	Türkiye	

Note: Due to high levels of missing data, the following countries were omitted from the analysis: Colombia, France, Germany, Japan, Korea, Romania and the Slovak Republic.

New indicators to assess transferability

Data from publicly available datasets is not sufficiently comprehensive to assess the transferability of the Digital Roadmap initiative. Therefore, Box 10.6 outlines several new indicators policy makers should consider before transferring this intervention. In particular, countries should assess whether current technological infrastructure systems support sharing of patient data and therefore digital integrated care interventions.

Box 10.6. New indicators, or factors, to consider when assessing transferability – the Digital Roadmap initiative

In addition to the indicators within the transferability assessment, policy makers are encouraged the possibility of collecting data for the following indicators:

Population context

- How acceptable are digital health interventions among the public?
- Do patients have the skills to access healthcare online?
- What proportion of the population has access to a smartphone/laptop/compute and the internet?
- Does the population trust their personal health information will be used, stored and managed appropriately?

Sector specific context (digital health system)

- Are there organisational agreements in place to support the implementation of interventions within the Digital Roadmap initiative?
- Are there clear reimbursement mechanisms for telemedicine services?
- Is there a common health data infrastructure in place to support Digital Roadmap initiative?
- Do regulations support the delivery of healthcare via digital means (i.e. telemedicine)?
- Are health professionals supportive of delivering care remotely?
- Is there a culture of change and adoption of new technologies among the health workforce?
- What, if any, compatible or competing interventions exist?

Political context

- Has the intervention received political support from key decision-makers?
- Has the intervention received commitment from key decision-makers?

Economic context

- Are there additional cost of implementing interventions part of the Digital Roadmap initiative? (e.g. updating technology, creating a harmonious data health infrastructure system)

Conclusion and next steps

In 2020, the Region of Southern Denmark launched the Digital Roadmap towards an Integrated Healthcare Sector (i.e. the Digital Roadmap initiative). The initiative aims to improve co-ordination across healthcare settings and therefore care for patients, with a specific focus on those living with one or multiple chronic conditions. A number of digital health interventions make up the initiative including TeleCOPD and Telepsychiatry.

The Digital Roadmap initiative has a positive impact on patient experiences, and to a lesser extent, health outcomes. Data on the overall effectiveness of the Digital Roadmap initiative is not available – for this reason, the case study explored the individual performance of each intervention. Evidence from TeleCOPD and Telepsychiatry were the strongest by showing improvements in health outcomes – for example, TeleCOPD can reduce hospital readmissions by up to 10%. The remaining interventions also had a positive impact based on patient experiences, which were measured using patient survey data.

Policy makers should consider recommendations in this case study to improve the overall performance of the Digital Roadmap initiative. Available options to policy makers include continuing to build digital health literacy among providers as well as patients, with a specific focus on disadvantaged population groups – e.g. lower socio-economic status. Disadvantaged groups typically have lower levels of digital health literacy despite having the most to gain from digital interventions. Further, given the paucity of data supporting the efficiency of digital health interventions, future studies should focus on economic evaluations from the perspective of society, as opposed to the government/health system perspective.

Digital health interventions within the Digital Roadmap initiative exist in countries across the OECD/EU, nevertheless, the potential for transfer is greatest among those that are digitally advanced. Telemonitoring interventions for patients with COPD or depressive symptoms are common among OECD and EU countries, indicating interventions within the Digital Roadmap initiative are highly transferable. However, in general, digital health interventions have the greatest transfer potential to countries with digitally advanced healthcare systems.

Next steps for policy makers and funding agencies regarding the Digital Roadmap initiative are summarised in Box 10.7.

Box 10.7. Next steps for policy makers and funding agencies – the Digital Roadmap initiative

Next steps for policy makers and funding agencies to enhance the Digital Roadmap initiative are listed below:

- Consider policy options in this report such as:
    - → Ensuring that interventions addresses digital inclusion, to reduce rather than exacerbate health inequalities
    - → Evaluating the economic potential of digital health interventions based on the perspective of society – i.e. by including changes to waiting and travelling times, workload of healthcare workers, and higher work productivity of patients
    - → Report on findings from the experiences of countries transferring the Digital Roadmap initiative to their own country as part of JADECARE, including barriers, facilitators and the lessons learnt
- Promote findings from the Digital Roadmap initiative case study to better understand what countries/regions are interested in transferring the intervention.

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11

Technology Enabled Care, Scotland

This chapter covers Technology Enabled Care (TEC) programme in Scotland, which aims to mainstream digital health and care initiatives. The case study includes an assessment of TEC against the five best practice criteria, policy options to enhance performance and an assessment of its transferability to other OECD and EU27 countries.

Technology-Enabled Care (TEC), Scotland: Case study overview

Description: the objective of the Technology Enabled Care (TEC) programme in Scotland is to ensure that successful digital health and care initiatives are mainstreamed. To reach this goal, the TEC programme works at two levels. At the national level it provides leadership, evidence and guidance on mainstreaming TEC to the government, healthcare providers and other stakeholders. It also invests in national infrastructure, such as national licenses for digital care tools. At a local level, it helps to grow TEC initiatives by providing dedicated funding, as well as change management support and knowledge exchange, to organisations implementing or trialling such initiatives. If initiatives are successful and fit with health and social care priorities, there is an opportunity for the TEC programme to support the national scale up.

Best practice assessment:

OECD Best Practice assessment of TEC, Scotland

Criteria	Assessment
Effectiveness	• The TEC programme has been effective in scaling-up a number of initiatives across Scotland • Evaluation studies of TEC-funded and supported interventions provide evidence of various positive outcomes
Efficiency	• In general, technology-enabled interventions were found to have a positive return on investment. • At the current level of provision for people aged 75 and over, telecare has a return-on-investment of 153%
Equity	• Addressing inequalities and digital exclusion is one of the key objectives of the TEC programme. • There are specific programmes that focus on increasing digital inclusion among vulnerable or excluded groups.
Evidence-base	• There is no single study to evaluate TEC as a whole – instead, programmes are evaluated at the individual level. • Home and mobile health monitoring and telecare have the strongest evidence base.
Extent of coverage	• It is difficult to determine the coverage of the programme as it entails many different interventions. • At a high-level, it is estimated that approximately 100 000 citizens have benefited from TEC since its inception.

Enhancement options: A programme-wide evaluation study would make the case for continued investment in the programme, allow comparative analysis between the different work streams and inform the selection of new activities or interventions, to ensure they align with the programme and reflect the best use of resources. Any countries implementing a TEC programme need to ensure that it increases rather than reduces digital inclusion.

Transferability: Many countries are well-placed to implement a TEC programme, as they have a national eHealth policy or strategy, and rely mostly on public funding for eHealth. Importantly, each country should shape their TEC programme to respond to local needs, priorities and barriers around technology-enabled care.

Conclusion: The TEC programme in Scotland is a multifaceted, national programme to support the development, implementation, scale-up and evaluation of technology-enabled care. It does this by supporting and funding the design, implementation and scale-up of specific technology-enabled care interventions, but also by addressing factors that affect uptake, such as digital inclusion, training, infrastructure and developing an evidence-base.

Intervention description

Launched in late 2014, the objective of the Technology Enabled Care (TEC) programme in Scotland is to ensure that successful digital health and care initiatives are mainstreamed. Rather than developing or implementing initiatives itself, the TEC programme aims to create the right conditions for digitally enabled service transformation to take place across health and care services.

To reach this goal, the TEC programme works at two levels. At the national level it provides leadership, evidence and guidance on mainstreaming digital health and care to the government, healthcare providers, NHS boards[1] and other stakeholders. It also invests in national infrastructure, such as national licenses for digital care tools. At a local level, it helps to grow technology-enabled care activities and initiatives by providing dedicated funding, as well as change management support and knowledge exchange, to organisations implementing or trialling such initiatives. If initiatives are successful and fit with health and social care priorities, there is an opportunity for the TEC programme to support the national scale up.

The TEC programme works in partnership with other organisations, including the NHS Boards, national care agencies, national Third Sector organisations (such as voluntary and community organisations), national and local care and housing providers, innovation centres, academia and industry.

The programme has four strategic priorities (TEC, 2021▯):

- **Addressing inequalities and promoting inclusion**: the TEC programme works to increase the access to and uptake of digital in key populations, such as
  - Care home residents
  - Social care users
  - People who use drugs with multiple and complex needs
- **Innovating for transformation**
- **Redesigning Services**: the TEC programme works to scale up digital care technologies and roll them out across all of Scotland as sustainable Business As Usual (BAU) models of service delivery, including:
  - Video consultations (Attend Anywhere/Near Me)
  - Remote health pathways
  - Telecare
  - Digital mental healthcare
- **Engaging with citizens and staff/services through co-design and participation:** the TEC programme supports workforce development by providing content, including the evidence base, around technology-enabled care, and engages with partners at international, national and local level and across health, social care, housing, public, independent and third sectors. It also works to increase citizen engagement in the development and implementation of technology-enabled care.

OECD Best Practices Framework assessment

This section analyses TEC against the five criteria within OECD’s Best Practice Identification Framework – Effectiveness, Efficiency, Equity, Evidence-base and Extent of coverage (see Box 11.1 for a high-level assessment of TEC). Further details on the OECD Framework can be found in Annex A.

Box 11.1. Assessment of TEC, Scotland

Effectiveness

- The TEC programme has been effective in scaling-up a number of initiatives across Scotland.
- Evaluation studies of TEC-funded and supported interventions provide evidence of various positive outcomes, including enhanced dignity, independence and quality of life for clients, increased health and well-being of carers, and a reduction in unplanned hospital admissions.

Efficiency

- In general, technology-enabled interventions were found to have a positive return on investment.
- At the current level of provision for people aged 75 and over (20% of them receiving telecare), telecare has a return-on-investment of 153%: telecare costs GBP 39 million (EUR 46 million) per year but yields GBP 99 million (EUR 116 million) in economic benefits, primarily cost-savings due to prevention and delay of care home or hospital admissions.

Evidence-base

- There is no single study to evaluate TEC as a whole – instead, programmes are evaluated at the individual level.
- Home and mobile health monitoring and telecare have the strongest evidence base.

Equity

- Addressing inequalities and digital exclusion is one of the key objectives of the TEC programme.
- There are programmes that focus on increasing digital inclusion among residents in care homes, people at risk of drug-related harm, and other vulnerable people who were not already online during the COVID-19 pandemic.

Extent of coverage

- It is difficult to determine the coverage of the programme as it entails many different interventions.
- At a high-level, it is estimated that between TEC's inception in 2014 and 2019, approximately 100 000 citizens have benefited from TEC.

Effectiveness

The primary objective of the TEC programme is to identify new approaches in technology-enabled care and support them in becoming "business as usual" and being adopted at scale. Example initiatives where this has been achieved include (TEC, 2019):

- **Computerised cognitive behavioural therapy (cCBT)**: the TEC programme supported and funded the scale up of cCBT across Scotland. This is now a business-as-usual service within local mental health services in all NHS Boards.
- **Workforce development**: TEC funded a resource to develop and implement online learning tools for the workforce, including "Introduction to TEC" and "TEC in practice", which is now being transitioned to NHS Education for Scotland.

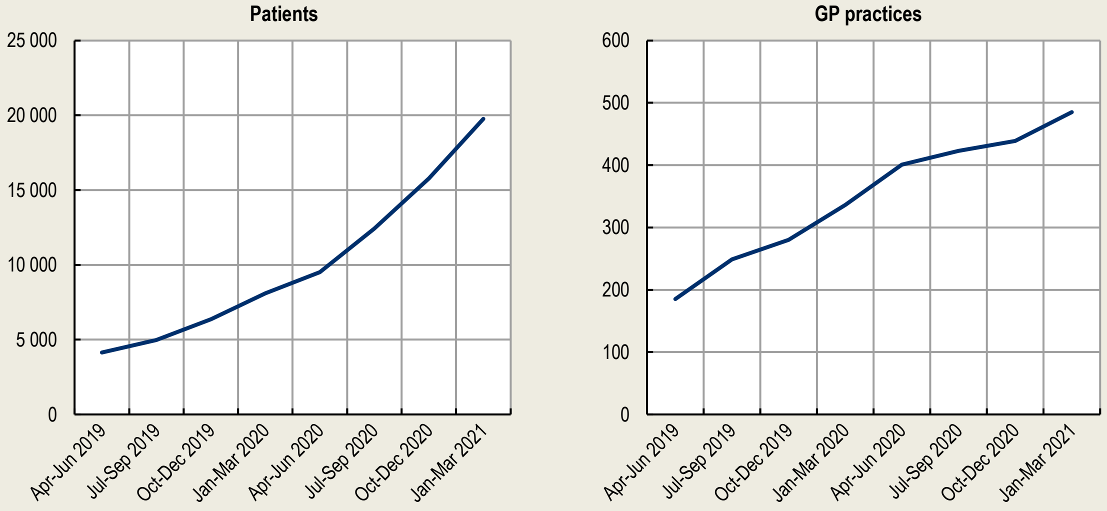
- **CARED**: The CARED service provides parents and carers of young people with eating disorders with information and support. It was funded by TEC and is now being adopted as a mainstream service within NHS Lothian and available as a resource across Scotland through the Mental Health Strategy.
- **Attend Anywhere / Near Me**: The web-based video consultations platform is now in place in all NHS Boards for patient/service user consultations (see Box 11.2).

Box 11.2. The effectiveness of the TEC programme in scaling up the Attend Anywhere platform for video consultations

Attend Anywhere, branded as Near Me by many organisations in Scotland, is a web-based platform providing video call access to healthcare services. Patients can use the service through a computer or mobile device with internet, camera and microphone. An internet link takes patients to a "virtual" online waiting area, where service providers meet them and provide a consultation over video. It can be used by both health and social care organisations, and by both primary care and secondary care. Currently, most activity (>90%) is hospital-based.

Attend Anywhere was developed by Health Direct Australia, a government funded organisation system, and it was procured for Scotland in 2016. Attend Anywhere clinics have now been established in all NHS Board as well as a range of Health and Social Care Partnerships and third sector organisations. To date, the platform is being used by nearly 500 GP practices for more than 20 000 appointments per week across 50 specialities in Scotland (TEC, 2021▯) (see Figure 11.1).

Figure 11.1. Uptake of the Attend Anywhere platform in Scotland



Source: TEC, 2021

Evaluation studies of TEC-funded and supported technology-enabled care interventions provide evidence of a range of different outcomes. Studies looking at telecare interventions reported enhanced dignity, independence and quality of life for clients, increased confidence of vulnerable clients to be more active, increased health and well-being of carers, a reduction in unplanned hospital admissions, and prevention or delay of admission to care homes. Evaluation studies of video conferencing programmes found better pharmaceutical management, improved access to specialist services, reduced hospital admissions and length of stay, cost and time savings for staff and clients, and a greater confidence in care for patients, their family and staff (Scottish Government, 2018).

Efficiency

Funding for technology-enabled care solutions makes up the bulk of the cost of the TEC programme: in 2020/21, GBP 11.0 million (EUR 12.86 million) was invested (TEC, 2021). The benefits that are returned depend on the intervention that was funded. In a progress report on the Attend Anywhere platform, NHS Boards reported savings on both staff and patient travel due to the use of video consultations of GBP 25 000 to GBP 130 000 per year across Scotland (EUR 29 200 – 152 000) (TEC, 2019). However, there is no one review comparing the investments of the TEC programme to the benefits of the various technology-enabled care interventions.

The TEC programme has commissioned several evaluation and economic analyses to understand the potential long-term health and economic benefits of different technology-enabled care interventions. Reviewing ten studies that provided economic data, all were found to have a positive return on investment (Scottish Government, 2018). One specific study looked at the economic benefits of universal telecare services in Scotland (Deloitte, 2017). It is estimated that at the current level of provision for people aged 75 and over (20% of them receiving telecare), telecare has a return-on-investment of 153% – i.e. telecare costs GBP 39 million (EUR 46 million) per year but yields GBP 99 million (EUR 116 million) in economic benefits, primarily cost-savings due to prevention and delay of care home or hospital admissions.

Equity

Technology-enabled care, such as video consultation or remote monitoring, can help address inequalities by reducing barriers to access, including time, distance and limited availability of services. However, there is a risk of digital exclusion. Given that those who experience health inequalities are also more likely to be digitally excluded (e.g. older people, disabled people, people in remote locations and on low incomes), there is a risk that technology-enabled care will exacerbate inequalities (Scottish Government, 2018).

In its 2021/22 strategic plan, the TEC programme pinpointed addressing inequalities and digital exclusion as one of its key objectives (TEC, 2021). In particular, the programme will focus on increasing digital inclusion among residents in care homes and people at risk of drug-related harm.

To bring technology-enabled care to care home residents, TEC will offer support and funding to ensure care homes have reliable internet connections, devices and other infrastructure needed for digital care. It will also support the development and adoption of a suite of tools that can be used in care homes, such as telecare, video-consultations, messaging and assessments tools. Finally, there will be initiatives to increase the digital skills of both staff and residents. This includes the testing, development and roll out of information and education for residents, based on the Connecting Scotland programme. To educate staff, TEC will work with the Scottish Social Services Council (SSSC) to adapt and apply digital learning tools (TEC, 2020).

Two interconnected programmes will be run to prevent drug deaths and addresses digital exclusion among people who use drugs with multiple and complex needs. Overdose detection and responder alert technologies (ODART) will be used to transform preventative care. A package of devices, connectivity and training support will be provided to organisations to build digital inclusion for people who use drugs with multiple and complex needs, as well as and those who support them (TEC, 2021).

To support other vulnerable people who were not already online during the COVID-19 pandemic, the Connecting Scotland programme was created. This GBP 5 million (EUR 5.85 million) programme provided internet connection, training and support, and a laptop or tablet to 9 000 people who were considered at clinically high risk themselves. This allowed them to access services and support, as well as connect with friends during the pandemic.

Evidence-base

There is no single study to evaluate TEC as a whole – instead, programmes are evaluated at the individual level. For this reason, evaluating the quality of evidence used to assess TEC using the *Quality Assessment Tool for Quantitative Studies* from the Effective Public Health Practice Project is not appropriate. Instead, this section summarises the process TEC has in place to evaluate individual interventions funded through the programme.

As already shown in the effectiveness and efficiency sections, a key component of the TEC programme is measurement and evaluation to demonstrate the effectiveness of technologies that sit within individual work streams. This includes one-off evaluations, improvement reports, ongoing monitoring, and forecast reports to assess the impact of scaling up, particularly on cost-effectiveness.

The individual evaluation studies were summarised in a report called “Technology Enabled Care: Data Review and Evaluation Options Study”, published by the Scottish Government (Scottish Government, 2018▯), which synthesised the evidence and identified gaps in the evidence, to inform future evaluations. This report looked at the evidence for different digital solutions, and found that:

- For **telecare**, the evidence supporting short-term outcomes (e.g. increased confidence staying at home, fewer falls, increased independence and choice) was of **high-to-medium quality**, as was the evidence supporting medium-term outcomes (e.g. remaining at home longer, fewer admissions), and long-term outcomes (e.g. improved quality of life and well-being, for both service users and carers).
- For **home and mobile health monitoring (HMHM)**, the evidence of the short-term impacts (e.g. improved adherence to treatment, improved self-management) was judged to be of **medium quality**, while that of the medium-term (e.g. improved condition control, more timely appointments) and long-term impacts (e.g. improved viability of remote and rural communities, improved person-centred effective healthcare) was **medium-to-low quality**.
- For **video conferencing**, the evidence of the short-term impacts (e.g. improved access to specialist services, reduced travel for staff) and the medium-term impact (e.g. shorted waiting times for appointments, improved efficiency) was judged to be of **high-to-medium quality**, while the evidence of long-term impacts (e.g. improved viability of remote and rural communities, improved person-centred effective healthcare) was of **medium quality.**

As discussed in the section on efficiency, some studies also looked at the economic benefits of technology-enabled care. The areas of the TEC programme which have seen the greatest levels of funding and are furthest along with implementation – HMHM and telecare – have the strongest evidence base around economic return. For interventions based on video conferencing and digital platforms the focus has been on developing, testing and deploying technology and infrastructure, and the evaluation studies are smaller in scale (Scottish Government, 2018▯).

The evidence base also evaluates the implementation of new programmes. One such study was conducted by Oxford University to evaluate the implementation and scale-up of the Attend Anywhere platform (Scottish Government, 2020▯). It follows the NASSS theoretical model, looking at Non-adoption, Abandonment and challenges to spread, Scale-up and Sustainability. In addition to identifying organisational and wider contextual factors that have aided the scale-up of the programme, the report provides ten recommendations to support continued scale-up, spread and sustainability of the Attend Anywhere platform.

Extent of coverage

As the TEC programme consists of a wide range of different interventions, it is difficult to determine the coverage. Nevertheless, at a high-level, it is estimated that between TEC's inception in 2014 and 2019, approximately 100 000 citizens have benefited from TEC (TEC, 2019▯), which equates to around 2% of the Scottish population.

During the COVID-19 pandemic, the TEC programme rapidly scaled up and expanded some of its existing programmes (TEC, 2021▯). For example, the Attend Anywhere teleconsultation platform saw its uptake increase from 300 appointments a week in March 2020 to over 22 000 a week in early 2021. Digital mental health services were also scaled up, including the rapid expansion of computerised cognitive behaviour therapy (cCBT) and deployment of Internet Enabled CBT services across all territorial Health Boards. Now, one in four referrals for psychological services are for digital consultations (TEC, 2021▯).

In addition to digital care platforms, TEC also invests in the underlying infrastructure needed for people to make use of digital care solutions. The Digital Approaches for Care Homes programme, run by TEC, helps care homes become "digitally enabled", by providing devices, internet connections, and training for staff and residents. So far, a total of 1 857 iPads have been provided to 996 care homes, reaching about 10% of the resident population.

Policy options to enhance performance

The TEC programme is not a technology-enabled care intervention in and off itself, but rather a national, multifaceted programme to support the development, implementation, scale-up and evaluation of such interventions. In this section, recommendations are given for TEC administrators as well as policy makers in countries who are considering implementing a similar programme, rather than recommendations for individual technology-enabled care interventions.

Enhancing effectiveness, efficiency and evidence base

To ensure the programme has the desired impact and delivers value for money, evidence is needed on the (cost-) effectiveness of the different elements of the programme combined. While evaluation studies of the individual interventions are crucial to support their development and implementation, it is also necessary to look at the national programme as a whole.

A programme-wide evaluation study would have a number of benefits:

- It would help with funding and political support for the programme, and make the case for continued investment in the programme.
- It would allow comparative analysis between the different work streams. Currently, the TEC programme encompasses a wide variety of activities and interventions, and it is unclear whether resources could be reallocated to increase their impact. Especially when it comes to making decisions on scaling-up pilots, comparative analysis is needed.
- A programme-wide evaluation with a gap analysis could inform the selection of new activities or interventions, to ensure they align with the programme and reflect the best use of resources.

Enhancing equity

To ensure technology-enabled care solutions reach as many people as possible, TEC programmes need to invest in the underlying infrastructure and skills that enable people to make use of digital care interventions. Particular attention needs to be paid to population groups who are less experienced with technology or might not have access to it. For example, older adults are less likely to use the internet for health information, as are people with lower education (OECD, 2019), while economically disadvantaged groups may not have regular access to internet (Sieck et al., 2021). This digital divide risks exacerbating instead of reducing inequalities.

For this reason, TEC programmes need to ensure digital inclusion. The US-based National Digital Inclusion Alliance defines digital inclusion as “the activities necessary to ensure that all individuals and communities, including the most disadvantaged, have access to and use of Information and Communication Technologies (ICTs)” (NDIA, n.d.). This includes:

- Affordable and reliable broadband internet service;
- Internet-enabled devices that meet the needs of the user;
- Access to digital literacy training;
- Quality technical support;
- Applications and online content designed to enable and encourage self-sufficiency, participation and collaboration.

The Scottish TEC programme addresses points 1 and 2 by providing devices and investing in internet connections for vulnerable or digitally-disadvantaged groups. It also provides training for health and social care staff and for patients, to address point 3. Points 4 and 5 are specific to the various digital health intervention, and need to be considered during their development and implementation. As the TEC programme supports this process through funding, research and evaluation, it has the ability to also address these elements of digital inclusion. While these initiatives are an important first step, research is needed to confirm that they are having the desired effect.

Enhancing coverage

Increasing the coverage of technology-enabled care is one of the cornerstones of the TEC programme. The various activities under the TEC programme cover a wide range of healthcare services, sectors and users. They aim to scale up effective approaches and increase the uptake of existing solutions by the healthcare workforce and health service users. The number of users or providers reached is a key performance indicator used across various work streams.

However, it is important to keep in mind that high population coverage is not the ultimate aim. Regardless of training and educational efforts, there will always be people who prefer, or who will have better outcomes under, traditional care models (Lam et al., 2020). To safeguard equal and universal healthcare, TEC-like programmes should actively work to ensure that technology-enabled care always complements, rather than replace, face-to-face delivery of health services (WHO, 2019).

Transferability

This section explores the transferability of the TEC programme from Scotland to other OECD and non-OECD EU countries and is broken into three components: 1) an examination of previous transfers; 2) a transferability assessment using publicly available data; and 3) additional considerations for policy makers interested in transferring TEC.

Previous transfers

International engagement is a core part of the TEC programme, to exchange good practices, and identify opportunities for research, innovation and new funding. For example, as part of a Digital Health Europe (DHE) funded Twinning project, the TEC programme shared good practices from Scotland with the University of Agder (Norway), Grimstad Kommune (Norway) and the Agency for Social Services and Dependency of Andalusia (Spain), and vice versa. Scotland also participates in the SCIROCCO Exchange project, which aims to support health and social care authorities in the adoption and scaling-up of integrated care.

Transferability assessment

The following section outlines the methodological framework to assess transferability and results from the assessment.

Methodological framework

Details on the methodological framework to assess transferability can be found in Annex A.

Indicators from publicly available datasets to assess the transferability of the TEC programme are listed in Table 11.1. Please note, the assessment is intentionally high level given the availability of public data covering OECD and non-OECD European countries.

Table 11.1. Indicators to assess transferability – TEC programme

Indicator	Reasoning	Interpretation
Population context		
ICT Development Index*	TEC is more transferable to countries with wide access to the internet	↑ value = more transferable
Individuals using the Internet for seeking health information – last 3 m (%) (OECD data – 2019 or latest year) + Eurostat data (2017)	TEC is more transferable to a population comfortable seeking health information online	↑ value = more transferable
Sector context (digital health sector)		
eHealth composite index of adoption score amongst GPs in Europe**	TEC is more transferable to countries where GPs are comfortable using eHealth technologies	↑ value = more transferable
Proportion of tertiary institutions (public and private) that offer ICT for health (eHealth) courses	TEC is more transferable if health professional students receive eHealth training	↑ value = more transferable
Proportion of institutions or associations offering in-service training in the use of ICT for health as part of the continuing education of health professionals	TEC is more transferable if health professionals have appropriate eHealth training	↑ value = more transferable
Political context		
The national universal health coverage policy or strategy clearly refers to the use of ICT or eHealth to support universal health coverage	TEC is more likely to be successful if the government sees ICT and eHealth as an integral part of healthcare delivery	'Yes' = more transferable
A national eHealth policy or strategy exists	TEC is more likely to be successful if the government is supportive of eHealth	'Yes' = more transferable
A dedicated national telehealth policy or strategy exists	TEC is more likely to be successful if the government is supportive of telehealth	'Yes' = more transferable
Economic context		
Special funding is allocated for the implementation of the national eHealth policy or strategy	TEC is more likely to be successful if there already is allocated funding for eHealth	'Yes' = more transferable
Proportion of funding contribution for eHealth programmes provided by public funding sources over the previous two years	A government-led TEC programme is more likely to be successful if eHealth programme funding mostly comes from public sources	High proportion = more transferable

Note: *The ICT development index represents a country's information and communication technology capability. It is a composite indicator reflecting ICT readiness, intensity and impact (ITU, 2020). **The eHealth composite index of adoption amongst GPs is made up of adoption in regards to electronic health records, telehealth, personal health records and health information exchange (European Commission, 2018).

Source: ITU (2020), "The ICT Development Index (IDI): conceptual framework and methodology", https://www.itu.int/en/ITU-D/Statistics/Pages/publications/mis/methodology.aspx; OECD (2019), "Individuals using the Internet for seeking health information – last 3 m (%) (all individuals aged 16-74)"; WHO (2015), "Atlas of eHealth country profiles: The use of eHealth in support of universal health coverage", https://www.afro.who.int/publications/atlas-ehealth-country-profiles-use-ehealth-support-universal-health-coverage; European Commission (2018), "Benchmarking Deployment of eHealth among General Practitioners (2018)", https://op.europa.eu/en/publication-detail/-/publication/d1286ce7-5c05-11e9-9c52-01aa75ed71a1.

Results

The transfer analysis shows how the United Kingdom is well placed for a programme like the Scottish TEC programme: there is political drive to deliver eHealth, the population has a high level of digital inclusion, and there is public funding for eHealth (Table 11.2). Nevertheless, many other countries also have a national eHealth policy or strategy, and rely mostly on public funding for eHealth.

It is important to note though that data from publicly available datasets is not sufficient to assess the transferability of a multifaceted programme like the Scottish TEC programme. Countries interested in setting up a similar programme should do an analysis to identify what the needs and issues are around technology-enabled care, and how a national programme can address these. Each country will likely shape their TEC programme differently to respond to local needs, priorities and barriers.

Table 11.2. Transferability assessment by country (OECD and non-OECD European countries) – TEC programme

A darker shade indicates TEC may be more suitable for transferral in that particular country

	The Inclusive Internet Index	Individuals using the Internet for seeking health information – last 3 m (%)	eHealth composite index of adoption score amongst GPs in Europe	% tertiary institutions offering ICT for health courses	% tertiary institutions offering in-service training for ICT for health professionals	National universal health coverage policy refers to use of ICT or eHealth to support universal health coverage	A national eHealth policy or strategy exists	A dedicated national telehealth policy of strategy exists	Special funding for implementation of national eHealth policy or strategy	% funding contribution for eHealth provided by public sources
United Kingdom	**850.0**	**66.9**	**2.5**	**Medium**	**High**	**Yes**	**Yes**	**Yes**	**Yes**	**Very high**
Australia	820	42.5	n/a	n/a	n/a	n/a	Yes	n/a	n/a	Very high
Austria	750	53.2	2.1	Low	Low	No	No	No	Yes	Very high
Belgium	770	48.7	2.1	Low	Low	No	Yes	Combined*	Yes	Very high
Bulgaria	640	34.0	1.8	Medium	Medium	Yes	Yes	Combined	Yes	Low
Canada	760	58.7	n/a	n/a	n/a	n/a	Yes	n/a	n/a	Very high
Chile	610	27.5	n/a	n/a	n/a	n/a	Yes	n/a	n/a	Very high
Colombia	500	41.5	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Costa Rica	600	44.0	n/a	Medium	Medium	n/a	Yes	Yes	n/a	Very high
Croatia	680	53.0	2.2	Low	Medium	Yes	Yes	Yes	Yes	Very high
Cyprus	630	58.0	1.9	Medium	Low	n/a	Yes	Combined	No	Very high
Czech Republic	720	56.5	2.1	Medium	n/a	Yes	No	Combined	No	Low
Denmark	880	67.4	2.7	Medium	Very high	n/a	Yes	Yes	Yes	Very high
Estonia	800	59.5	2.4	Medium	Low	Yes	Yes	No	Yes	Very high
Finland	810	76.3	2.6	Medium	Medium	No	Yes	Combined	Yes	Very high
France	800	49.6	2.1	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Germany	810	66.5	1.9	n/a	n/a	n/a	n/a	n/a	n/a	n/a

	The Inclusive Internet Index	Individuals using the Internet for seeking health information – last 3 m (%)	eHealth composite index of adoption score amongst GPs in Europe	% tertiary institutions offering ICT for health courses	% tertiary institutions offering in-service training for ICT for health professionals	National universal health coverage policy refers to use of ICT or eHealth to support universal health coverage	A national eHealth policy or strategy exists	A dedicated national telehealth policy of strategy exists	Special funding for implementation of national eHealth policy or strategy	% funding contribution for eHealth provided by public sources
United Kingdom	**850.0**	**66.9**	**2.5**	**Medium**	**High**	**Yes**	**Yes**	**Yes**	**Yes**	**Very high**
Greece	690	49.9	1.8	Medium	Medium	n/a	Yes	Combined	Yes	Very high
Hungary	660	60.5	2.0	Low	n/a	Yes	No	No	No	Very high
Iceland	870	64.7	n/a	Very high	Very high	Yes	Yes	No	Yes	Very high
Ireland	770	56.9	2.1	n/a	Low	n/a	Yes	No	Yes	Low
Israel	730	50.0	n/a	High	Low	No	No	Yes	Yes	Very high
Italy	690	35.0	2.2	Low	High	Yes	Yes	Yes	Yes	Very high
Japan	830	n/a	n/a	n/a	n/a	n/a	Yes	n/a	n/a	n/a
Korea	880	50.4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Latvia	690	47.9	1.8	Low	Low	Yes	Yes	Combined	Yes	Low
Lithuania	700	60.6	1.6	Medium	Low	Yes	Yes	Yes	No	High
Luxembourg	830	58.2	1.8	Low	Low	n/a	Yes	Combined	Yes	Very high
Malta	750	59.0	n/a	Very high	Very high	Yes	No	No	n/a	n/a
Mexico	450	49.8	n/a	n/a	n/a	n/a	No		n/a	High
Netherlands	840	74.0	n/a	High	High	Yes	Yes	Combined	Yes	Very high
New Zealand	810	n/a	n/a	n/a	n/a	n/a	Yes	n/a	n/a	Low
Norway	840	69.0	n/a	Low	Medium	Yes	Yes	Yes	Yes	Very high
Poland	660	47.4	1.8	High	Medium	Yes	Yes	Combined	Yes	Very high
Portugal	660	49.4	2.1	Low	Low	Yes	No	Yes	Yes	High
Romania	590	33.0	1.8	n/a	n/a	n/a	Yes	n/a	n/a	n/a
Slovak Republic	670	52.6	1.8	n/a	n/a	n/a	n/a	n/a	n/a	n/a

	The Inclusive Internet Index	Individuals using the Internet for seeking health information – last 3 m (%)	eHealth composite index of adoption score amongst GPs in Europe	% tertiary institutions offering ICT for health courses	% tertiary institutions offering in-service training for ICT for health professionals	National universal health coverage policy refers to use of ICT or eHealth to support universal health coverage	A national eHealth policy or strategy exists	A dedicated national telehealth policy of strategy exists	Special funding for implementation of national eHealth policy or strategy	% funding contribution for eHealth provided by public sources
United Kingdom	**850.0**	**66.9**	**2.5**	**Medium**	**High**	**Yes**	**Yes**	**Yes**	**Yes**	**Very high**
Slovenia	710	48.1	2.0	High	High	No	No	No	Yes	Very high
Spain	750	60.1	2.4	Low	Medium	Yes	No	No	Yes	Very high
Sweden	850	62.2	2.5	Very high	Very high	n/a	Yes	No	Yes	Very high
Switzerland	850	66.9	n/a	Low	Very high	No	Yes	No	Yes	Low
Türkiye	550	51.3	n/a	n/a	n/a	Yes	No	Combined	Yes	Low
United States	810	38.3	n/a	n/a	n/a	n/a	Yes	n/a	n/a	n/a

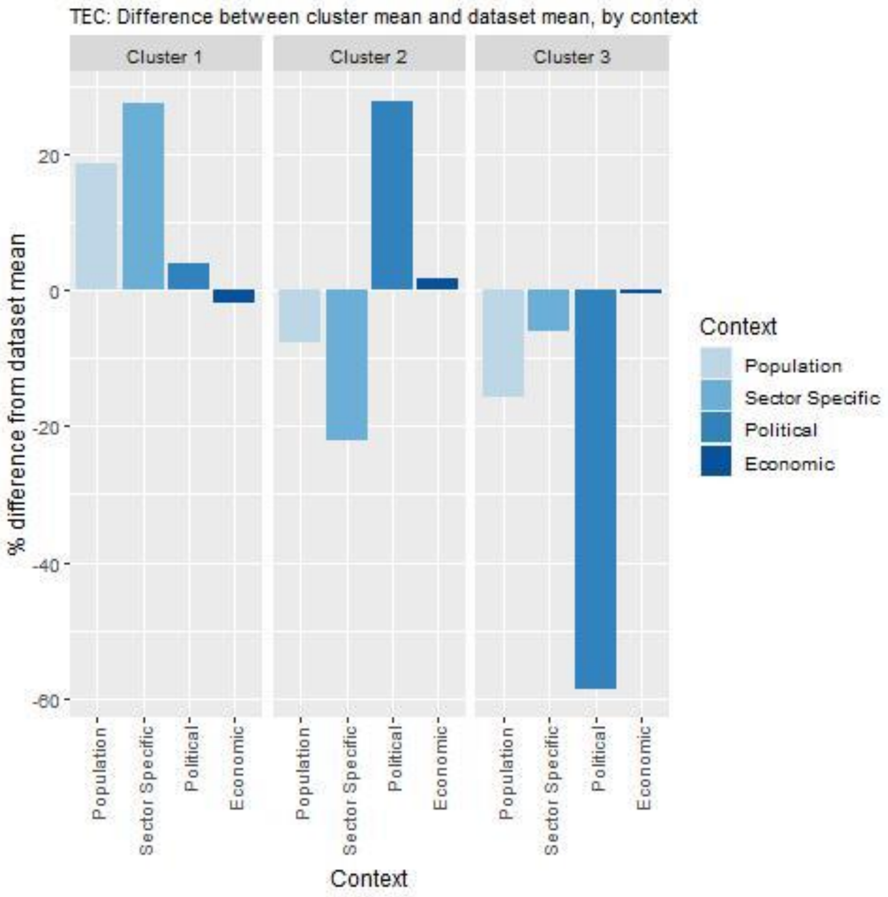
Note: Blank cells indicate data is missing. *Combined with eHealth strategy of policy.
Source: See Table 11.1.

To help consolidate findings from the transferability assessment above, countries have been clustered into one of three groups, based on indicators reported in Table 11.1. Countries in clusters with more positive values have the greatest transfer potential. For further details on the methodological approach used, please refer to Annex A.

Key findings from each of the clusters are below with further details in Figure 11.2 and Table 11.3:

- Countries in cluster one have population, sector specific and political arrangements in place to transfer TEC, and are therefore good transfer candidates. Scotland, which is within the United Kingdom and also the owner of this intervention, falls under this cluster.
- Countries in cluster two have political priorities that align with TEC interventions, for example, the existence of a national eHealth strategy. Nevertheless, before transferring this interventions, countries in this cluster should undertake further analysis to determine whether the population and digital health sector are ready. For example, determining whether the health workforce have the appropriate skills to deliver widespread digital care.
- Countries in cluster three should undertake further analysis to ensure TEC aligns with political priorities, and similar to countries in cluster two, ensure the population and a digital health sector are ready.

Figure 11.2. Transferability assessment using clustering – TEC programme



Note: Bar charts show percentage difference between cluster mean and dataset mean, for each indicator.
Source: See Table 11.1.

Table 11.3. Countries by cluster – TEC programme

Cluster 1	Cluster 2	Cluster 3
Australia	Belgium	Austria
Canada	Bulgaria	Hungary
Chile	Costa Rica	Israel
Denmark	Croatia	Malta
Estonia	Cyprus	Mexico
Iceland	Czech Republic	Portugal
Ireland	Finland	Slovenia
Lithuania	Greece	Spain
New Zealand	Italy	
Sweden	Latvia	
Switzerland	Luxembourg	
United Kingdom	Netherlands	
United States	Norway	
	Poland	
	Türkiye	

Note: Due to high levels of missing data, the following countries were omitted from the analysis: Colombia, France, Germany, Japan, Korea, Romania, and the Slovak Republic.

New indicators to assess transferability

Data from publicly available datasets is not sufficient to assess the transferability of TEC. For example, there is no easily comparable information available on the current TEC landscape in different countries. Box 11.3 outlines information policy makers should consider before transferring TEC.

Box 11.3. New indicators, or factors, to consider when assessing transferability – TEC programme

In addition to the indicators within the transferability assessment, policy makers are encouraged to collect the following information:

Population context

- How acceptable are mHealth interventions amongst the public?
- Do patients have the skills to access healthcare online? What are the gaps in skills that the programme should address?
- Does the population trust their personal health information will be used, stored and managed appropriately?

Sector-specific context (digital health)

- What is the TEC landscape currently?
- What are the gaps in TEC that the programme should address?
- Are healthcare providers supportive of using digital products?
- What regulations are in place and how do they affect TEC interventions?

Political context

- Has TEC received political support from key decision-makers?
- Has TEC received commitment from key decision-makers?

Economic context

- Where should funding for the TEC programme come from?

Conclusion and next steps

The TEC programme in Scotland is a multifaceted, national programme to support the development, implementation, scale-up and evaluation of technology-enabled care. It does this by supporting and funding the design, implementation and scale-up of specific technology-enabled care interventions, but also by addressing factors that affect uptake, such as digital inclusion, training, infrastructure and developing an evidence-base.

To ensure the effectiveness and efficiency of TEC-like programmes, a programme-wide evaluation following a logic model could be useful. This would help make the case for continued investment in the programme and help prioritise investments between the different work streams. It is also strongly recommended that any TEC programmes consider and address digital inclusion, to prevent creating a digital divide that worsens health inequalities.

The United Kingdom is well placed for a programme like the Scottish TEC programme, as there is political drive to deliver eHealth and a high level of digital inclusion. However, countries should design their TEC programme to fit with their needs. It is therefore important for transfer countries to conduct a local analysis of needs, priorities and barriers around technology-enabled care to inform the design of their TEC programme.

Box 11.4 outlines next steps for policy makers and funding agencies in relation to TEC.

Box 11.4. Next steps for policy makers and funding agencies – TEC programme

Next steps for policy makers and funding agencies are listed below:

- Ensure that TEC programmes address digital inclusion, to reduce rather than exacerbate health inequalities
- Evaluate the TEC programme as a whole, to make the case for investment in the programme and help prioritise investments between the different work streams
- Design TEC programmes to address the local needs, priorities and barriers to technology-enabled care

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WHO (2019), *Recommendations on digital interventions for health system strengthening*. [14]

WHO (2015), *Atlas of eHealth country profiles: The use of eHealth in support of universal health coverage*, Global Observatory for eHealth, https://www.afro.who.int/publications/atlas-ehealth-country-profiles-use-ehealth-support-universal-health-coverage. [18]

Note

[1] NHS Scotland consists of 14 regional NHS Boards, who are responsible for the protection and the improvement of their population's health and for the delivery of frontline healthcare service.

12

Telemonitoring for patients with advanced heart failure, Czech Republic

This chapter covers Telemonitoring for advanced heart failure in the Czech Republic's University Hospital of Olomouc. The case study includes an assessment of the Telemonitoring programme against the five best practice criteria, policy options to enhance performance and an assessment of its transferability to other OECD and EU27 countries.

Telemonitoring for patients with advanced heart failure case study overview

Description: in 2013, the University Hospital Olomouc in the Czech Republic implemented a telemonitoring intervention for patients with advanced heart failure (HF). As part of the intervention, a patient's vital signs are automatically shared daily with health professionals at the hospital including blood pressure, blood saturation, and results from electrocardiograms. Patient data is collected automatically through an implanted defibrillator or pacemaker. In addition, patients manually upload information such as their fluid intake for the day.

Best practice assessment:

OECD best practice assessment of telemonitoring for patients with advanced heart failure

Criteria	Assessment
Effectiveness 🌱	An evaluation of telemonitoring for HF patients in Olomouc is not available. However, findings from the literature show telemonitoring for HF patients reduces all-cause and HF-related mortality.
Efficiency 🌱	Telemonitoring for HF patients has the potential to improve efficiency within the healthcare system. However, the evidence to date is limited and shows mixed results.
Equity	Based on the broader literature, there is evidence to suggest telemonitoring can both increase as well as decrease existing health inequalities (e.g. digital exclusion while on the other hand increasing access to difficult-to-reach patients).
Evidence-base	Evidence supporting the impact of telemonitoring for HF on health outcomes is of high quality as it relies on systematic reviews and meta-analyses largely covering RCTs studies. The evidence supporting its efficiency however is less developed and very much lacking in regard to equity.
Extent of coverage	The current pilot operating in the city of Olomouc only reaches a small proportion of patients with HF in the Czech Republic. Therefore, there is significant scope to extend the coverage of this intervention.

Enhancement options: policy makers should prioritise undertaking a robust evaluation of the pilot intervention in Olomouc to better understand what is working and what requires improvement. Following an evaluation, and if results prove positive, this intervention can be extended to cover a larger number of people thereby decreasing per participant costs. Finally, when scaling-up the intervention, attention should be paid to ensuring eligible patients from disadvantaged populations are prioritised (e.g. those at risk of digital exclusion, such as people living in regional/rural areas).

Transferability: telemonitoring programs for HF patients exist across many OECD and EU countries highlighting its transferability. Administrators of this intervention in Olomouc are supportive of scaling-up the intervention across the Czech Republic and do not foresee any major implementation barriers.

Conclusion: telemonitoring for HF patients in Olomouc, Czech Republic, is a well-designed intervention with the potential to improve patient outcomes and experiences while simultaneously reducing costs. A future evaluation is necessary to determine the true impact of this intervention and is necessary for scaling-up the intervention across the country.

Intervention description

Heart failure (HF), also known as congestive heart failure, is when the heart muscle stops pumping blood the way they should. Consequently, fluid can build up in the lungs leading to shortness of breath. There are several common causes of HF including coronary artery disease (caused by a build-up fatty material in the arteries, also known as plaque), high blood pressure and diabetes. For these reasons, HF is more common among people living with overweight and those aged 65 years and over. It is also more common among men than women (Mayo Clinic, 2022).

An ageing population combined with rising rates of overweight (including obesity) have led to an increase in the number of people experiencing HF in OECD and EU countries. For example, between 2000 and 2019, the rate of cardiovascular diseases (CVDs) among OECD countries increased by 18%. However, mortality from major types of HF such as cardiac arrests has been falling over the past two decades (e.g. across the OECD, mortality from cardiac arrests and other ischemic heart diseases fell by 46% between 2000 and 2019) (OECD, 2021). Trends in HF specific to the Czech Republic are in Box 12.1.

Box 12.1. Heart failure trends in the Czech Republic

A recent analysis of data from the Czech National Registry of Reimbursed Health Services provide insight into HF trends. Key findings from the paper are summarised below (Táborský et al., 2021):

- The prevalence of HF increased by 61% – i.e. from 1 679 to 2 689 per 100 000 people between 2012 and 2018 ($p < 0.001$). Better recognition of and treatment for HF over this period likely explains, at least in part, the rise in prevalence.
- The prevalence of HF is greater among men than women: 2 778 and 2 602 per 100 000 for men and women, respectively (as of 2018).
- The annual mortality rate from HF decreased by around 5 percentage points between 2012 and 2018 – i.e. from 20.55% to 15.89%.

Increased rates of people with HF is not only a health problem, but also an economic one given it is associated with a high number of hospital visits, premature mortality and productivity losses. For example, approximately 2% of a country’s healthcare budget is spent on HF in European and North American countries (Soundarraj et al., 2017). In the Czech Republic, this equates to approximately EUR 21.2 million per year (OECD, 2021).

In an effort to improve care for patients with HF while simultaneously reducing costs, countries across the OECD are increasingly looking to digital solutions, including telemonitoring. Telemonitoring refers to the use of “mobile devices and platforms to conduct routine medical tests, communicate the results to healthcare workers in real-time, and potentially launch pre-programmed automated responses” (Oliveira Hashiguchi, 2020).

In the Czech Republic, in 2013, the University Hospital Olomouc introduced telemonitoring for patients with advanced HF – specifically, congestive heart failure, structural damage of the myocardium or left chamber dysfunction.[1] As part of this intervention, a patient’s vital signs are shared daily with health professionals, using both automatic and manual means (see Box 12.2 for a list of vital signs). Patient information is primarily collected using invasive means – i.e. an implanted defibrillator or pacemaker.

Box 12.2. Types of patient vital signs

This box outlines the types of vital signs collected from patients on a daily basis as of part telemonitoring for HF patients in the Czech Republic:

- Blood pressure
- Heart rate
- Weight
- Body fat
- Percentage water in body
- Blood saturation
- Electrocardiogram (EKG)
- Medication adherence
- Step count

In addition to the data outlined above, patients can manually enter information on their fluid intake, leg swelling as well answer questionnaires (e.g. about quality of life and depression).

Each patient receives the necessary equipment and devices to transmit data, which are property of the hospital to ensure they meet regulatory standards. To participate, patients must also have access to a smart phone or tablet with Android iOS in order to upload the application necessary for transferring data (a smart phone or tablet can be supplied by the patient or provided by the University Hospital Olomouc).

The objectives of this intervention are three-fold, namely:

- **Treatment quality**: deliver patients high-quality, standardised care in line with national and European medical society standards
- **Patient outcomes**: improve morbidity, mortality and patient quality of life by detecting signs of deterioration at an early stage, thereby allowing patients to receive treatment promptly
- **Cost savings**: reduce hospitalisations, emergency admissions and other healthcare services thereby cutting expenses.

The intervention currently operates out of one hospital in the Czech Republic – the University Hospital of Olomouc – and therefore only covers patients living within this city.

OECD Best Practices Framework assessment

This section analyses telemonitoring for advanced HF patients in the Czech city of Olomouc against five criteria within OECD's Best Practice Identification Framework – Effectiveness, Efficiency, Equity, Evidence-base and Extent of coverage (see Box 12.3 for a high-level assessment). Further details on the OECD Framework can be found in Annex A.

Box 12.3. Assessment of telemonitoring for advanced HF patients, city of Olomouc, Czech Republic

Effectiveness 🌱

- A robust evaluation of telemonitoring for HF patients in the Czech Republic is not available, therefore its effectiveness cannot be verified. However, initial reports indicate the intervention successfully reduced hospitalisations by 40%.
- Evidence from similar interventions in other countries indicate that telemonitoring for HF patients is highly effective at reducing all-cause and HF related mortality.

Efficiency 🌱

- Telemonitoring has the potential to reduce costs by performing routine checks remotely as well as detecting patient deterioration at an early stage, which limits the potential for health problems to escalate.
- Economic evaluations are not available for this specific intervention in the Czech Republic. Further, findings from the broader literature on the efficiency of telemonitoring are limited (e.g. due to a small number of studies and poor study designs).

Equity

- At this stage, there is no data to assess whether telemonitoring for HF patients in the Czech Republic widens or narrows existing health inequalities.
- Based on the broader literature, there is evidence to suggest telemonitoring can both increase as well as decrease existing health inequalities (e.g. digital exclusion while on the other hand increasing access to difficult-to-reach patients).

Evidence-base

- The evidence supporting the impact of telemonitoring of HF on health outcomes (i.e. effectiveness) is of high quality as it relies on systematic reviews and meta-analyses largely covering randomised controlled trials. The evidence supporting its efficiency however is less developed and is very much lacking in regard to equity.

Extent of coverage

- Telemonitoring for HF patients in the Czech Republic only covers one city and a handful of eligible patients. Given nearly 300 000 people suffer from HF in the country, there is scope to greatly increase the intervention's coverage.

Effectiveness

Evidence to assess whether telemonitoring for patients with advanced HF in the Czech city of Olomouc is meeting its three objectives[2] is limited. According to a 2017 European Commission report, the intervention was found to improve medication adherence and access to healthcare professionals (specific indicators for the latter two measures were not provided) (Gutter, 2017). Details on the methodological study design associated with these results are not available meaning the effectiveness of this specific intervention cannot be verified.

Evidence of similar interventions operating in other countries, however, is well established (see Table 12.1). Specifically, recent systematic reviews and meta-analyses reveal this type of intervention is **effective at reducing all-cause and HF mortality**.

Table 12.1. Evidence summarising the effectiveness of telemonitoring for HF patients

Outcome	Evidence	Source
All-cause mortality	40% decrease in the odds of all-cause mortality at 180 days (odds ratio (OR) = 0.6) (no statistical significant change at 365 days)	Systematic review by (Pekmezaris et al., 2018▯)
	OR = 0.53 in favour of the treatment group	Systematic review and network meta-analysis by (Kotb et al., 2015▯)*
	OR = 0.81 in favour of treatment group	Systematic review and meta-analysis by (Yun et al., 2018▯)
	Risk ratio (RR) = 0.66 meaning the treatment group have 0.66 times the risk of dying compared to the control group	Overview of systematic reviews by (Bashi et al., 2017▯)
HF mortality	OR = 0.39 in favour of treatment group	Systematic review by (Pekmezaris et al., 2018▯)
	OR = 0.68 in favour of treatment group	Systematic review and meta-analysis by (Yun et al., 2018▯)

Note: *The review by (Kotb et al., 2015▯) included "telephone support, telemonitoring, telephone support and telemonitoring together, video monitoring or monitoring by ECG", whereas the other reviews relied on studies measuring the impact of telemonitoring using transmission of biological information.

Efficiency

Reports from a previous European Commission report noted that telemonitoring for HF patients in Olomouc resulted in a 40% reduction in hospitalisations (Gutter, 2017▯). However, similar to the findings reported under "Effectiveness", these results cannot be verified. No further studies evaluating the economic impact of the intervention are available, for this reason, the remainder of this section focuses on investment costs for telemonitoring facilities in the Czech Republic as well as summarising economic studies from similar interventions operating in other countries.

The Czech national health service does not reimburse telemonitoring services for advanced HF patients. For this reason, the intervention is reliant on funds from projects undertaken by the Czech National eHealth Centre, operated by the Ministry of Health, as well as funds from project partners. It is estimated that **an investment between EUR 1 000 – 5 000 per eligible patient is needed** to operate the intervention (however, information on the timeline for investment was not provided) (Gutter, 2017▯). Given the average hospitalisation cost for chronic HF patients in the Czech Republic is approximately EUR 3 500 (or CZK 84 900), such an intervention has the **potential to be not only cost-effective, but even cost-saving** (Pavlušová et al., 2018▯).

Telemonitoring can reduce costs by performing routine status checks remotely, detecting patient deterioration at an early stage thereby limiting the potential for health problems to escalate as well as reducing patient travel time. Several studies from the academic literature support this argument while others report opposing results. For example, regarding telemonitoring's impact on utilisation, some studies show a decrease in hospitalisations but an increase in emergency department visits, while the most recent systematic review found most studies recorded no change in utilisation (see Table 12.2). The impact of telemonitoring on total costs was also assessed, which reported mixed, inconclusive results (see Table 12.3).

Table 12.2. Evidence summarising the impact of telemonitoring for HF on utilisation

Outcome	Evidence	Source
Hospitalisations	No statistically significant change in all-cause hospitalisation	Systematic review by (Pekmezaris et al., 2018▯)
	The number of hospitalisations was significantly reduced in 38% (9/24) of studies	Systematic review by (Auener et al., 2021▯)
	OR = 0.64 in favour of the treatment group	Systematic review and network meta-analysis by (Kotb et al., 2015▯)
Emergency department visits	Emergency department visits were reduced in 13% (1/8) of studies.	Systematic review by (Auener et al., 2021▯)
	OR = 1.51 in favour of the control group (i.e. telemonitoring patients more likely to access emergency care)	Systematic review by (Pekmezaris et al., 2018▯)
	RR = 1.37 in favour of the control group	Meta-analysis of randomised controlled trials by Klersy et al. (2016▯)
Total healthcare utilisation	Most studies showed no effect of telemonitoring on healthcare utilisation	Systematic review by (Auener et al., 2021▯)
	RR ranging from 0.72 to 0.93 in favour of the treatment group	Overview of systematic reviews by (Bashi et al., 2017▯)
	RR = 0.56 in favour of the treatment group	Meta-analysis of randomised controlled trials by Klersy et al. (2016▯)

Table 12.3. Evidence summarising the impact of telemonitoring for HF on costs

Source	Economic benefit (Yes/No)	Details
Systematic review by (Auener et al., 2021▯)	Unclear	Mixed results – 3 studies found an increase in healthcare costs, 3 reported a reduction and 4 found no significant differences
Systematic review by (Jiang, Ming and You, 2019▯)	Yes – but the number of studies is limited	An included study from the United Kingdom recorded an ICER (incremental cost-effectiveness ratio) of GBP 11 873 per QALY (quality-adjusted life year), which is well below the willingness-to-pay threshold* Findings from an economic evaluation of a wireless pulmonary artery pressure sensor was also found to be cost-effective in the United Kingdom and the United States
Literature review by (Grustam et al., 2014▯)	Yes – but the quality of evidence is low	The few studies that included an economic evaluation found telemonitoring was cost saving and led to marginal improvements in effectiveness. Overall, however, the quality of studies was low making findings unreliable.

Note: *The cost threshold for funding healthcare services in England (as set out by NICE (National Institute for Health and Clinical Excellence)) is between GBP 20 000 and GBP 30 000.

Equity

Given there are no studies evaluating the impact this intervention, it is not possible to assess its impact on equity. Drawing upon the broader literature regarding digital health technologies and equity, there is evidence to suggest telemonitoring can both widen as well as narrow existing health inequalities (e.g. between socio-economic groups) (Table 12.4).

Table 12.4. The impact of telemonitoring and equity

Narrow existing health inequalities	Widen existing health inequalities
Telemonitoring has the potential to improve access to healthcare in particular patients who live in difficult-to-reach areas as well as patients with mobility issues	Telemonitoring risks **digitally excluding vulnerable populations** such as older people, disabled people, people in remote locations as well as those on low incomes. Examples of digital exclusion are listed below:
Overweight and diabetes are two key risk factors for developing heart failure. Given these risk factors are more prominent among disadvantaged groups (e.g. those with a lower level of education), telemonitoring for HF patients has the potential to narrow existing inequalities.	– Those in regional/rural areas have lower levels of access to the internet – Older people are less likely to own a smartphone or have access to the internet in their home* – Those with a lower socio-economic status are less likely to be able to afford digital devices

Note: * As part of the trial, patients have the option to use devices provided by the hospital. This option however may not be economic feasible when scaled-up across the country.

Source: Oliveria Hashiguguchi (2020▯) =, "Bringing healthcare to the patient: An overview of the use of telemedicine in OECD countries", https://doi.org/10.1787/8e56ede7-en; OECD (2019▯), *The Heavy Burden of Obesity: The Economics of Prevention*, https://doi.org/10.1787/67450d67-en.

Evidence-based

Evidence supporting the impact of the Czech Republic's telemonitoring for advanced HF patients is limited. Further, findings that are available do not detail the design of the study's methodology. For this reason, an evaluation of the quality of evidence supporting this specific intervention is not possible. Instead, this section (i.e. Box 12.4) details the quality of studies used in systematic reviews and meta-analyses that support the effectiveness and efficiency of telemonitoring for HF patients.

Overall, the evidence supporting the effectiveness of telemonitoring for HF patients is strong given there are a large number of systematic reviews and meta-analysis based on randomised controlled trials (RCTs), which are considered high quality evidence. The evidence supporting efficiency is less developed.

Box 12.4. Quality of evidence supporting telemonitoring for HF patients

This box summarises the methodological quality of studies outlined under the sections "Effectiveness" and "Efficiency". The purpose of this exercise is to verify the validity of findings regarding the impact of telemonitoring for HF patients.

Effectiveness

- Pekmezaris et al. (2018▯) performed a systematic review and meta-analysis of randomised controlled trials (RCTs) published between 2001 and 2016. RCTs are considered the "gold-standard" in establishing causality and therefore strengthen the validity of findings (i.e. that telemonitoring for patients with HF reduces mortality).
- Yun et al. (2018▯) also performed a systematic review and meta-analysis to assess the impact of telemonitoring for HF patients on all-cause mortality. Thirty-seven studies met the inclusion criteria covering nearly 10 000 patients. The authors used Cochrane RoB (risk of bias) tool to assess the quality of studies, which found the overall risk of detection bias was "low".
- Bashi et al. (2017▯) performed an overview of 19 systematic reviews. The authors assessed the quality of each systematic review using AMSTAR (Assessment of Multiple Systematic Reviews) tool. Of the 19 systematic review, 5% were rated as high quality, 68% as moderate quality and 26% as low quality.

- Klersy et al. (2016) performed a systematic review and meta-analysis of 11 RCTs. The quality of studies was assessed as GRADE guidelines with thresholds for inclusion set.
- Kotb et al. (2015) performed a systematic review and network meta-analysis covering RCTs (n = 30 studies). Similar to (Bashi et al., 2017), the authors used the AMSTAR tool to assist the quality of included RCTs. Of the 30 included studies, 17 were assessed as high quality, 10 as moderate and three as low quality.

Efficiency

It is important to note that results for efficiency were inconclusive with reviews findings both increases and decreases in costs – see “Efficiency” for further details.

- Auner et al. (2021) undertook a systematic review of 29 studies which included RTCs, non-randomised trials as well as observational studies. Each study was assessed against the Cochrane RoB tool, which found the following results: 75% of RCT studies showed some risk of bias while 75% of non-randomised trials shows serious or critical risk of bias.
- Jian et al. (2019) performed a systematic review of 14 economic studies, which were quality-checked against the Consolidated Health Economic Evaluation Reporting Standards (CHEERS). Fourteen of the studies were rated as good quality, four as moderate and one as low.
- Grustam et al. (2014) performed a literature review of 32 articles related to telehealth interventions for chronic HF patients, including telemonitoring. The majority of studies analysed reported findings from RCTs.

Extent of coverage

At present, telemonitoring for advanced HF patients is only available to eligible patients living within the city of Olomouc. This equates to between 100 and 249 people. However, there is only enough equipment for 40 patients. Since 285 745 people in the Czech Republic live with HF (as of 2018[3]), it is clear there is significant potential to extend the coverage of this intervention (Táborský et al., 2021).

Policy options to enhance performance

This section outlines policies to enhance the performance of Olomouc’s telemonitoring programme for HF patients against each of the five best practice criteria.

Enhancing effectiveness

Table 12.5 compares best practices related to telemonitoring for HF patients from the literature with characteristics of the model in the Czech Republic. The analysis reveals the current model in the Czech Republic aligns with international recommendations; therefore, no specific policies to enhance effectiveness are included in this section. This does not mean, however, there is not room for improvement; instead, it highlights the importance of undertaking a rigorous evaluation to identify policy enhancement options (see “Enhancing the evidence base”).

Table 12.5. Best practice for telemonitoring for HF patients

Intervention characteristic	Details	Included in the Czech Republic model?
Frequent data transmission	Frequent transmission of data between patients and healthcare professionals is associated with a decreased risk of all-cause mortality (relative risk (RR) = 0.81) (Yun et al., 2018▯)	✓
Monitoring medication adherence	Interventions that actively monitor a patients adherence to prescribed medication is linked to lower rates of all-cause mortality (RR = 0.73) (Yun et al., 2018▯)	✓
Collecting biological parameters	Telemonitoring interventions that collect at least three biological parameters (e.g. weight and blood pressure) from a patient or electrocardiograph data are linked to reduced rates of all-cause mortality and hospitalisations (Auener et al., 2021▯).	✓

Enhancing efficiency

As outlined under "Efficiency", telemonitoring for HF patients has the potential to improve efficiency within the healthcare system. However, at present it is unlikely to be cost-effective in the Czech Republic given the small number of participating patients. For this reason, once an evaluation of the pilot in Olomouc is complete (see "Enhancing the evidence-base"), and assuming positive results, policy makers should prioritise expanding the intervention's reach across the country. By doing so, the average cost per patient will markedly fall (Auener et al., 2021▯).

Enhancing equity

There is paucity of studies of telemonitoring studies that stratify data by different patient characteristics. Such information is necessary for evaluating the impact of an intervention on existing health inequalities. Policies to ensure telemonitoring for HF patients in the Czech Republic lessens existing inequalities should be derived from future programme evaluations (as discussed under "Enhancing the evidence-base"). Nevertheless, given it is known that vulnerable populations such as the elderly and those with a low socio-economic status (SES) are at greater risk of being digitally excluded, it is important that specific efforts are made to ensure participation by these population groups. For example, including representatives of disadvantaged groups in the design of the intervention, and providing targeted training and support.

Enhancing the evidence-base

There has not been a robust outcome or economic evaluation of telemonitoring for HF patients in Olomouc. An evaluation should therefore be of top priority to policy makers. Tips on how to undertake a thorough evaluation are summarised in this section with a focus on what indicators to collect (see Box 12.5).

The indicators listed are useful for undertaking an outcome evaluation (i.e. whether the intervention achieved its desired objectives). For greater insight, outcomes evaluations can be paired with a process evaluation which assesses whether the intervention was implemented as planned. For example, if an outcome evaluation reveals no major change in key outcome indicators, a process evaluation will inform researchers whether this is due to poor implementation or not. For further details on undertaking an evaluation, see OECD's *Guidebook on Best Practices in Public Health* (OECD, 2022▯).

Box 12.5. Indicators for an evaluation of telemonitoring programs for HF patients

This box outlines the types of indicators important when undertaking an evaluation of the telemonitoring programme for HF patients in Olomouc, Czech Republic. Italicised indicators are those considered essential.

Effectiveness

- *All-cause mortality* (e.g. at 180 and 365 days)
- *HF-related mortality*
- Patient feedback: quality of life*, perceived health status, activities of daily living etc.

Efficiency

- *All-cause hospital admissions* (e.g. at 180 days)
- *All-cause emergency department admissions*
- *HF-related hospital admissions*
- *HF-related emergency department admissions*
- Length of stay in hospital (all-cause and HF-related)
- Use of other healthcare services such as home visits, outpatient visits, and specialist visits)

Equity

To the extent possible, stratify effectiveness and efficiency indicators to assess the intervention's impact on health inequalities. Example ways stratify data are outlined below:

- Age and gender
- Income
- Education level
- Ethnicity
- Location (e.g. rural, regional or urban).

Economic evaluation

Economic evaluations assess costs in relation to benefits. Results from these evaluations help policy makers maximise outcomes with a limited set of resources. There are several cost items to collect for this evaluation including labour, capital, consumables, administrative and overhead costs.

Note: *There are a range of available questionnaires such as HeartQoL (by the European Association of Preventative Cardiology), EQ-5D-5L, the Kansas City Cardiomyopathy Questionnaire and the Minnesota Living with Heart Failure Questionnaire.
Source: OECD (2022▯), "Guidebook on Best Practices in Public Health", https://doi.org/10.1787/4f4913dd-en; Pekmezaris et al. (2018▯), "Home Telemonitoring In Heart Failure: A Systematic Review And Meta-Analysis", https://doi.org/10.1377/hlthaff.2018.05087; Yun et al. (2018▯), "Comparative Effectiveness of Telemonitoring Versus Usual Care for Heart Failure: A Systematic Review and Meta-analysis", https://doi.org/10.1016/j.cardfail.2017.09.006; Auener et al. (2021▯), "The Effect of Noninvasive Telemonitoring for Chronic Heart Failure on Healthcare Utilisation: Systematic Review", https://doi.org/10.2196/26744.

Enhancing extent of coverage

As outlined under "Extent of coverage", to date, very few patients with advanced heart failure have access to this intervention in the Czech Republic. Following an evaluation of the pilot in Olomouc, assuming positive results and no major negative side effects, this intervention should be expanded to reach the thousands of people in the country experiencing HF.

Based on feedback from intervention administrators in Olomouc, there are no major barriers to scaling-up this intervention in the region (Gutter, 2017). However, as discussed under the section on “Transferability”, it is important to take into the local context of where an intervention is being transferred and to adapt the intervention accordingly.

> *“This good practice can be replicated in other hospitals providing medical services for patients with heart failure.” (Gutter, 2017)*

Transferability

This section explores the transferability of telemonitoring for HF patients and is broken into three components: 1) an examination of previous transfers; 2) a transferability assessment using publicly available data; and 3) additional considerations for policy makers interested in transferring this intervention.

Previous transfers

Telemonitoring for patients with HF in the city of Olomouc has neither been transferred to another country nor scaled-up across the Czech Republic. However, several countries across the OECD have already implemented similar if not near identical interventions indicating telemonitoring for HF patients is highly transferable (see Box 12.6).

Box 12.6. International telemonitoring for HF patients: Country examples

Telemonitoring is growing increasingly popular among OECD countries, but as stated by a recent OECD report, few of these interventions operate at the national level. Rather the majority of telemonitoring interventions are small-scale pilots involving just a few thousand patients. Example countries are listed below:

- **Countries with national level interventions**: Sweden, Spain and Japan
- **Example countries with pilot interventions**: Austria, Denmark, Portugal, the United Kingdom.

Note: The list of countries listed is not exhaustive.
Source: Oliveria Hashiguguchi (2020), “Bringing healthcare to the patient: An overview of the use of telemedicine in OECD countries”, https://doi.org/10.1787/8e56ede7-en.

The transferability potential of this intervention is supported by administrators from the University Hospital Olomouc, which operate this intervention. Specifically, intervention administrators state that the target population in Olomouc reflects the “standard [EU] population” as it has a medium developed economy and a population with average rates of chronic disease. For this reason, it is suitable for transferral across the EU.

> *“The good practice is, thanks to use EBM [evidence-based medicine] methods, highly transferable to* other hospitals in the region, the whole country and, with possible adjustments to other medical systems, also to further EU countries.” *(Gutter, 2017)*

In order to be prepared to implement telemedicine interventions (such as telemonitoring) successfully, policy makers can draw upon the validated Telemedicine Community Readiness Model (TCRM) tool. The tool is free and available online, http://care4saxony.de/?page_id=3837.

Transferability assessment

The following section outlines the methodological framework to assess transferability and results from the assessment.

Methodological framework

A few indicators to assess the transferability of telemonitoring for HF were identified (see Table 12.6). Indicators were drawn from international databases and surveys to maximise coverage across OECD and non-OECD European countries. Please note, the assessment is intentionally high level given the availability of public data covering OECD and non-OECD European countries.

Table 12.6. Indicators to assess transferability – Telemonitoring for HF patients

Indicator	Reasoning	Interpretation
Population context		
ICT Development Index*	Telemonitoring is more transferable to digitally advanced countries	↑ value = more transferable
Individuals using the Internet for seeking health information – last 3 m (%)	Telemonitoring is more transferable to a population where people are more comfortable accessing digital health services	↑ value = more transferable
Self-reported use of home care services	Telemonitoring is more transferrable to a population that already uses home care services	↑ value = more transferable
Sector context (digital health sector)		
Remote patient monitoring programmes	Telemonitoring for HF patients is more transferable to countries which already have telemonitoring programs in place (e.g. for diabetes)	'Yes' = more transferable
Legislation exists to protect the privacy of personally identifiable data of individuals, irrespective of whether it is in paper or digital format	Telemonitoring requires to transfer patient data. Therefore, TeleHomeCare is more likely to be successful in countries with legislation to protect patient data.	'Yes' = more transferable
% of tertiary institutions (public and private) that offer ICT for health (eHealth) courses	Telemonitoring is more transferable if health professional students receive eHealth training	↑ value = more transferable
% of institutions or associations offering in-service training in the use of ICT for health as part of the continuing education of health professionals	Telemonitoring is more transferable if health professionals have appropriate eHealth training	↑ value = more transferable
Political context		
A national eHealth policy or strategy exists	Telemonitoring is more likely to be successful if national policies support eHealth	'Yes' = more transferable
A dedicated national telehealth policy or strategy exists	Telemonitoring is more likely to be successful if the government is supportive of telehealth	'Yes' = more transferable
Economic context		
% of funding contribution for eHealth programmes provided by public funding sources over the previous two years	Telemonitoring is more likely to be successful in a country whose government spends more on eHealth	↑ value = more transferable
Special funding is allocated for the implementation of the national eHealth policy or strategy	Telemonitoring is more likely to be successful if there already is allocated funding for eHealth	'Yes' = more transferable

Note: *The ICT development index represents a country's information and communication technology capability. It is a composite indicator reflecting ICT readiness, intensity and impact (ITU, 2020[]).

Source: WHO (2019[]), “Existence of operational policy/strategy/action plan to reduce unhealthy diet related to NCDs (Noncommunicable diseases)”, https://apps.who.int/gho/data/node.imr.NCD_CCS_DietPlan?lang=en; ITU (2020[]), “The ICT Development Index (IDI): conceptual framework and methodology”, https://www.itu.int/en/ITU-D/Statistics/Pages/publications/mis/methodology.aspx; OECD (2019[]), “Individuals using the Internet for seeking health information – last 3 m (%) (all individuals aged 16-74)”; European Commission (2018[]), “Benchmarking Deployment of eHealth among General Practitioners (2018)”, https://op.europa.eu/en/publication-detail/-/publication/d1286ce7-5c05-11e9-9c52-01aa75ed71a1; World Bank (2017[]), “GNI per capita, PPP (constant 2017 international $)”, https://data.worldbank.org/indicator/NY.GNP.PCAP.PP.KD; Maier and Aiken (2016[]), “Task shifting from physicians to nurses in primary care in 39 countries: a cross-country comparative study”, https://doi.org/10.1093/eurpub/ckw098; WHO (2015[]), “Atlas of eHealth country profiles: The use of eHealth in support of universal health coverage”, https://www.afro.who.int/publications/atlas-ehealth-country-profiles-use-ehealth-support-universal-health-coverage.

Results

Table 12.7 provides a summary of transferability indicator values among OECD and EU countries compared to the Czech Republic. Key findings from the analysis according to each transferability context is below:

- **Population context**: relative to the Czech Republic, populations in OECD and EU countries have a higher ICT index indicating greater confidence using digital tools (7.20 versus 7.34 average). Further, the use of home healthcare services is markedly higher on average across the OECD/EU when compared to the Czech Republic (23% versus 29%).
- **Digital health sector context**: based on available indicators, the digital health sector among OECD/EU countries is just as advanced or more advanced than the Czech Republic. For example, all countries with available data have some form of telemonitoring programme in place and have legislation in place to protect patient data collected digitally (therefore patients are more likely to feel comfortable sharing information on their vital signs remotely).
- **Political context**: unlike Czech Republic, 74% of OECD/EU countries with available data have a national eHealth policy or strategy in place to support telemonitoring programs. Conversely, a large proportion of countries (44%) do not have a plan or strategy specific to telehealth interventions, which may hinder implementation efforts.
- **Economic context**: compared to the Czech Republic most OECD/EU governments contribute a large amount to eHealth programs thereby supporting the financial sustainability of telemonitoring programs. Further, unlike the Czech Republic, the majority of OECD/EU governments (86% with available data) provide additional “special funding” for their eHealth strategy, which again contributes to financial sustainability.

Table 12.7. Transferability assessment by country (OECD and non-OECD European countries) – Telemonitoring for HF patients

A darker shade indicates telemonitoring for HF patients is more suitable for transferral in that particular country

	ICT Development Index	% using the Internet for seeking health information – last 3 m	Self-reported use of home care services by sex, age and level of activity limitation	Remote patient monitoring programmes	Legislation exists to protect the privacy of personally identifiable data of individuals	% tertiary institutions (public and private) that offer ICT for health (eHealth) courses	% institutions or associations offering in-service training in the use of ICT for health as part of the continuing education of health professionals	A national eHealth policy or strategy exists	A dedicated national telehealth policy or strategy exists	% funding contribution for eHealth programmes provided by public funding sources over the previous two years	Special funding is allocated for the implementation of the national eHealth policy or strategy
Czech Republic	**7.20**	**0.56**	**23.00**	**Yes**	**Yes**	**Medium**	**No response**	**No**	**Combined**	**Low**	**No**
Australia	8.20	0.42	n/a	n/a	n/a	Medium	High	Yes	No	Very high	n/a
Austria	7.50	0.53	18.00	Yes	Yes	Low	Low	No	No	Very high	Yes
Belgium	7.70	0.49	45.10	Yes	Yes	Low	Low	Yes	Combined	Very high	Yes
Bulgaria	6.40	0.34	22.30	Yes	Yes	Medium	Medium	Yes	Combined	Low	Yes
Canada	7.60	0.59	n/a	n/a	Yes	High	Low	Yes	No	Very high	n/a
Chile	6.10	0.27	n/a	n/a	Yes	Low	Low	Yes	No	Very high	n/a
Colombia	5.00	0.41	n/a	n/a	Yes	n/a	n/a	n/a	Yes	n/a	n/a
Costa Rica	6.00	0.44	n/a	n/a	Yes	Medium	Medium	Yes	Yes	Very high	n/a
Croatia	6.80	0.53	16.40	Yes	Yes	Low	Medium	Yes	Yes	Very high	Yes
Cyprus	6.30	0.58	23.50	Yes		Medium	Low	Yes	Combined	Very high	No
Denmark	8.80	0.67	51.40	Yes	Yes	Medium	Very high	Yes	Yes	Very high	Yes
Estonia	8.00	0.60	12.70	Yes	Yes	Medium	Low	Yes	No	Very high	Yes
Finland	8.10	0.76	43.60	Yes	Yes	Medium	Medium	Yes	Combined	Very high	Yes
France	8.00	0.50	56.50	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

	ICT Development Index	% using the Internet for seeking health information – last 3 m	Self-reported use of home care services by sex, age and level of activity limitation	Remote patient monitoring programmes	Legislation exists to protect the privacy of personally identifiable data of individuals	% tertiary institutions (public and private) that offer ICT for health (eHealth) courses	% institutions or associations offering in-service training in the use of ICT for health as part of the continuing education of health professionals	A national eHealth policy or strategy exists	A dedicated national telehealth policy or strategy exists	% funding contribution for eHealth programmes provided by public funding sources over the previous two years	Special funding is allocated for the implementation of the national eHealth policy or strategy
Czech Republic	**7.20**	**0.56**	**23.00**	**Yes**	**Yes**	**Medium**	**No response**	**No**	**Combined**	**Low**	**No**
Germany	8.10	0.66	27.60	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Greece	6.90	0.50	20.60	Yes	Yes	Medium	Medium	Yes	Combined	Very high	Yes
Hungary	6.60	0.60	24.80	Yes	Yes	Low	n/a	No	No	Very high	No
Iceland	8.70	0.65	34.20	n/a	Yes	Very high	Very high	Yes	No	Very high	Yes
Ireland	7.70	0.57	51.90	n/a	Yes	n/a	Low	Yes	No	Low	Yes
Israel	7.30	0.50	n/a	Yes	Yes	High	Low	No	Yes	Very high	Yes
Italy	6.90	0.35	35.40	Yes	Yes	Low	High	Yes	Yes	Very high	Yes
Japan	8.30	n/a	n/a	Yes	Yes	n/a	n/a	Yes	No	n/a	n/a
Korea	8.80	0.50	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Latvia	6.90	0.48	15.70		Yes	Low	Low	Yes	Combined	Low	Yes
Lithuania	7.00	0.61	18.30	Yes	Yes	Medium	Low	Yes	Yes	High	No
Luxembourg	8.30	0.58	24.40	Yes	Yes	Low	Low	Yes	Combined	Very high	Yes
Malta	7.50	0.59	42.50	Yes	Yes	Very high	Very high	No	No	Very high	n/a
Mexico	4.50	0.50	n/a	Yes	Yes	Medium	Low	No	No	High	n/a
Netherlands	8.40	0.74	59.20	Yes	Yes	High	High	Yes	Combined	Very high	Yes
New Zealand	8.10	n/a	n/a	Yes	Yes	Medium	Very high	Yes	No	Low	n/a
Norway	8.40	0.69	27.20	Yes	Yes	Low	Medium	Yes	Yes	Very high	Yes
Poland	6.60	0.47	20.80	Yes	Yes	High	Medium	Yes	Combined	Very high	Yes
Portugal	6.60	0.49	17.40	Yes	Yes	Low	Low	No	Yes	High	Yes

	ICT Development Index	% using the Internet for seeking health information – last 3 m	Self-reported use of home care services by sex, age and level of activity limitation	Remote patient monitoring programmes	Legislation exists to protect the privacy of personally identifiable data of individuals	% tertiary institutions (public and private) that offer ICT for health (eHealth) courses	% institutions or associations offering in-service training in the use of ICT for health as part of the continuing education of health professionals	A national eHealth policy or strategy exists	A dedicated national telehealth policy or strategy exists	% funding contribution for eHealth programmes provided by public funding sources over the previous two years	Special funding is allocated for the implementation of the national eHealth policy or strategy
Czech Republic	**7.20**	**0.56**	**23.00**	**Yes**	**Yes**	**Medium**	**No response**	**No**	**Combined**	**Low**	**No**
Romania	5.90	0.33	16.90	n/a	Yes	n/a	n/a	Yes	n/a	n/a	n/a
Slovak Republic	6.70	0.53	18.30	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Slovenia	7.10	0.48	24.70	Yes	Yes	High	High	No	No	Very high	Yes
Spain	7.50	0.60	39.80	Yes	Yes	Low	Medium	No	No	Very high	Yes
Sweden	8.50	0.62	22.30	Yes	Yes	Very high	Very high	Yes	No	Very high	Yes
Switzerland	8.50	0.67	n/a	Yes	Yes	Low	Very high	Yes	No	Low	Yes
Türkiye	5.50	0.51	2.90	Yes	Yes	n/a	n/a	No	Combined	Low	Yes
United Kingdom	8.50	0.67	27.50	Yes	Yes	Medium	High	Yes	Yes	Very high	Yes
United States	8.10	0.38	n/a	Yes	Yes	Low	Low	Yes	No	n/a	n/a

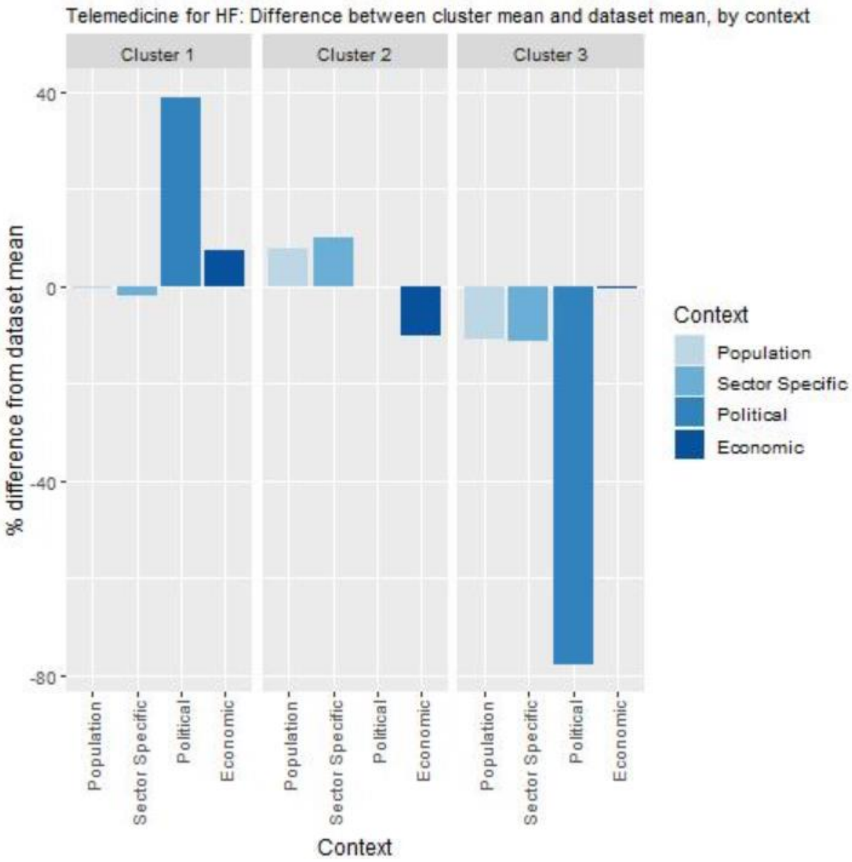
Note: *Combined with eHealth policy or strategy. n/a indicates data is missing.

To help consolidate findings from the transferability assessment above, countries have been clustered into one of three groups, based on indicators reported in Table 12.6. Countries in clusters with more positive values have the greatest transfer potential. For further details on the methodological approach used, please refer to Annex A.

Key findings from each of the clusters are below with further details in Figure 12.1 and Table 12.8:

- Based on chosen indicators, countries in cluster one will likely receive political and economic support for telemonitoring interventions. However, prior to implementation the digital sector's readiness to implement such an intervention should be assessed (e.g. using the TCRM tool). Czech Republic, which is the owner of this intervention, falls under this cluster.
- Countries in cluster two have a population and digital health sector ready to implement telemonitoring interventions. Nevertheless, the financial sustainability of telemonitoring interventions should be confirmed given governments in these countries typically contribute less to eHealth programs (as a proportion of total spending on eHealth).
- Although most countries in cluster three have telemonitoring interventions in place already, policy makers are encouraged to thoroughly assess the potential to transfer this intervention – e.g. to assess workforce readiness and ensure telemonitoring aligns with overall political objectives.

Figure 12.1. Transferability assessment using clustering – Telemonitoring for HF patients



Note: Bar charts show percentage difference between cluster mean and dataset mean, for each indicator.

Table 12.8. Countries by cluster – Telemonitoring for HF patients

Cluster 1	Cluster 2	Cluster 3
Belgium	Australia	Austria
Bulgaria	Canada	Hungary
Costa Rica	Chile	Israel
Croatia	Estonia	Malta
Cyprus	Iceland	Mexico
Czech Republic	Ireland	Portugal
Denmark	Latvia	Slovenia
Finland	Lithuania	Spain
Greece	New Zealand	
Italy	Sweden	
Luxembourg	Switzerland	
Netherlands	United States	
Norway		
Poland		
Türkiye		
United Kingdom		

Note: The following countries were omitted due to high levels of missing data: Colombia, France, Germany, Japan, Korea, Romania and the Slovak Republic.

New indicators to assess transferability

Data from publicly available datasets alone is not sufficient to assess the transferability of public health interventions. Box 12.7 outlines several new indicators policy makers could consider before transferring telemonitoring for HF patients.

In addition to the indicators below, policy makers can refer to the TCRM (Telemedicine Community Readiness Model) tool as previously detailed.

Box 12.7. New indicators, or factors, to consider when assessing transferability – Telemonitoring for HF patients

In addition to the indicators within the transferability assessment, policy makers are encouraged to collect information for the following indicators:

Population context

- Is there a desire among patients to replace traditional healthcare processes with telemonitoring?
- Do patients use existing telemonitoring interventions? (e.g. for other diseases such as diabetes)

Sector specific context (digital health sector)

- Is there a desire among health professionals to replace traditional healthcare processes with telemonitoring?
- What, if any, compatible or competing interventions exist?
- Is the essential infrastructure available to implement telemonitoring for HF patients?
- Does telemonitoring for HF patients comply with regulatory requirements?

Political context

- Has the intervention received political support from key decision-makers?
- Has the intervention received commitment from key decision-makers?

Economic context

- What is the cost of implementing and operating the intervention in the target setting and to whom?

Conclusion and next steps

In 2013, the University Hospital Olomouc in the Czech Republic introduced a telemonitoring intervention for HF patients. The intervention shares patient vital signs with health professionals on a daily basis including blood pressure, medication adherence and weight. The majority of indicators shared with health professionals is collected automatically through either an implanted defibrillator or pacemaker.

No evaluation of this pilot intervention is currently available therefore it is not possible to determine its impact on patient outcomes, experiences as well as costs. A review of similar interventions in the literature indicate telemonitoring for HF patients is effective at reducing all-cause and HF-related mortality, however, its impact on costs is less clear.

The design of Olomouc's telemonitoring intervention aligns with international best practice given it involves frequent transmission of biological parameters including medication adherence, weight and blood pressure. However, prior to scaling-up this intervention across the Czech Republic, a robust outcome and process evaluation is recommended. The types of indicators to measure the intervention's impact are outlined in this case study and include data routinely collected by hospitals.

Several OECD and EU countries have telemonitoring programs for patients with HF including Sweden and Japan highlighting the intervention's transferability potential. In the Czech Republic, administrators in Olomouc believe the intervention is "highly transferable to other hospitals in the region".

Box 12.8 outlines next steps for policy makers and funding agencies in regards to telemonitoring for advanced HF patients.

Box 12.8. Next steps for policy makers and funding agencies – Telemonitoring for HF patients

Next steps for policy makers and funding agencies to enhance telemonitoring for HF patients are listed below:

- Prioritise undertaking an outcome and process of evaluation of this pilot intervention
- Undertaking preliminary analysis to determine which hospitals in the Czech Republic are interested in this intervention and their readiness for telemonitoring
- Identify patients in the Czech Republic who are at risk of being excluded from this intervention and develop strategies to ensure their participation
- Share findings from this case study with policy makers interested in expanding digital health opportunities.

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Notes

[1] New York Heart Association classification III (marked limitation in activity due to symptoms, even during less-than-ordinary activity such as walking short distances) or IV (severe heart limitations – experience symptoms even when resting).

[2] Improve treatment quality, improve patient outcomes and reduce costs (see “Intervention description”).

[3] The proportion of these patients who have advanced HF is not known.

13

ParkinsonNet, the Netherlands

This chapter covers ParkinsonNet in the Netherlands, a programme to deliver high-quality, specialist care for patients with Parkinson’s disease. The case study includes an assessment of ParkinsonNet against the five best practice criteria, policy options to enhance performance and an assessment of its transferability to other OECD and EU27 countries.

ParkinsonNet, the Netherlands: Case study overview

Description: ParkinsonNet was developed in 2004 at Radboud University Medical Centre in the Netherlands to deliver high quality, specialist care for Parkinson's disease. Through regional networks, allied health interventions are delivered by specifically trained therapists who work according to evidence-based guidelines. These specialised therapists become highly experienced, as they manage a high caseload of patients with Parkinson's disease. There are over 70 regional ParkinsonNet networks, covering the entire country, bringing together over 3 500 specialists healthcare professionals.

Best practice assessment:

OECD Best Practice assessment of ParkinsonNet, the Netherlands

Criteria	Assessment
Effectiveness	- Studies have found that ParkinsonNet lowers the rate of hip fractures by 50% and reduces the number of hospital admissions. These impacts were achieved with a lower number of treatment sessions per year – 33.7 compared to 48.0.
Efficiency 🏅	- The start-up cost of the network are estimated at EUR 3 million over five years, with ongoing cost of roughly EUR 25 per patient, per year. - This compares favourably to the cost-savings resulting from the programme, which are estimated at EUR 500 to EUR 1 400 per patient per year.
Equity	- Claims data analysis suggests that the demographic differences between people receiving specialised therapy through ParkinsonNet and those receiving usual care are small. However, this analysis is based on relatively old data, and the programme has significantly expanded since.
Evidence-base	- Throughout its existence, ParkinsonNet has been evaluated in a number of studies. - A retrospective study based on claims data was judged as providing "strong" evidence to support the impact of ParkinsonNet.
Extent of coverage 🏅	- The number of people with Parkinson's disease receiving specialised physiotherapy, speech therapy and occupational therapy increased by 147%, 157% and 187%, respectively, between 2012 and 2017. - In 2017, most regions saw more than 60% of people receiving specialised speech-language and occupational therapy.

Enhancement options: In places where low population density does not support a specialisation model, telehealth options can be explored. To ensure equity, data on uptake and outcomes across different population groups is needed – for example from a registry.

Transferability: ParkinsonNet has already been transferred to a number of other countries and regions highlighting its transferability potential. Countries with a lower population density and fewer physiotherapists should explore whether and how a specialisation model can be implemented. While a single-payer health system makes it easier to capitalise on the cost-savings of the network, other systems could also work.

Conclusion: ParkinsonNet delivers high quality, specialist care for Parkinson's disease, improving outcomes and reducing cost.

Intervention description

Parkinson's disease is a progressive neurodegenerative disorder mostly affecting people in later years of life (Sveinbjornsdottir, 2016[1]). It is the second most common neurodegenerative disease worldwide and affects roughly 1% of people over 60. Parkinson's disease has a complex presentation, which includes motor symptoms (e.g. slowness of movements, muscular rigidity, tremors, postural instability, speech disturbances) and non-motor symptoms (e.g. apathy, sleep problem, memory complaints, loss of smell and taste, mood disturbances, excessive sweating, fatigue and pain).

There is no available treatment that will halt or stop progression of the disease (Sveinbjornsdottir, 2016[1]). Treatment with dopaminergic drugs aims to correct the motor disturbances. Surgical therapy using deep brain electrical stimulation can sometimes be used when drug therapy fails to control the motor symptoms.

However, medical management is only partially effective in controlling the symptoms of Parkinson's disease. Allied health treatments, such as physiotherapy, occupational therapy and speech therapy, can help people with Parkinson's disease in their daily activities and participation in society (Radder et al., 2017[2]). Nevertheless, among allied health professionals there often is a lack of expertise and experience in treating patients with Parkinson's disease (Ypinga et al., 2018[3]).

ParkinsonNet was developed in 2004 at Radboud University Medical Centre in the Netherlands to deliver high quality, specialist care for Parkinson's disease. Through regional networks, allied health interventions are delivered by specifically trained therapists who work according to evidence-based guidelines. These specialised therapists become highly experienced as they manage a high caseload of patients with Parkinson's disease (Ypinga et al., 2018[3]).

There are over 70 regional ParkinsonNet networks covering the whole of the Netherlands. They bring together over 3 500 specialists healthcare professionals, including neurologists, physical therapists, occupational therapists, speech-language therapists, Parkinson's nurses, dietitians and social workers. A regional co-ordination (generally a physiotherapist) manages each network, which comes together three times a year for continuing education. The regional co-ordinators meet yearly at a national level, to exchange knowledge and experiences.

In addition to organising national meetings, a central ParkinsonNet team supports the regional networks by providing consultancy services on how to set up and maintain a disease-specific care network, various forms of education on Parkinson's disease and its treatment, and a one-year "Train the Trainer" curriculum. These trainers also benefit from a yearly skills lab, bringing together experts from around the world to exchange ideas and knowledge on Parkinson's disease.

The ParkinsonNet programme has also developed evidence-based guidelines for Parkinson's disease, including in the fields of nutrition, physiotherapy, occupational therapy, speech and language therapy, and for self-management of the disease.

OECD Best Practices Framework assessment

This section analyses ParkinsonNet against the five criteria within OECD's Best Practice Identification Framework – Effectiveness, Efficiency, Equity, Evidence-base and Extent of coverage (see Box 13.1 for a high-level assessment of ParkinsonNet). Further details on the OECD Framework can be found in Annex A.

Box 13.1. Assessment of ParkinsonNet, the Netherlands

Effectiveness

- Various studies have looked at the effectiveness of ParkinsonNet, and have found that it lowers the rate of hip fractures by 50%, reduces the number of Parkinson's disease-related hospital admissions from 21% to 17%, and increases the continuity of care
- The impacts outlined above were achieved with a lower number of treatment sessions per year – 33.7 compared to 48.0.

Efficiency

- The start-up cost of the network are estimated at EUR 3 million over five years, with ongoing cost of roughly EUR 25 per patient, per year.
- This compares favourably to the cost-savings resulting from the programme, which are estimated at EUR 500 to EUR 1 400 per patient per year.
- These savings are the result of fewer treatment session needed, lower overall Parkinson's disease-related healthcare cost, lower informal care cost and less cost for day-hospital rehabilitation.

Equity

- Claims data analysis suggests that the demographic differences between people receiving specialised therapy through ParkinsonNet and those receiving usual care are small.
- However, this analysis is based on relatively old data, and the programme has significantly expanded since.

Evidence-base

- Throughout its existence, ParkinsonNet has been evaluated in a number of studies.
- A retrospective study based on claims data was judged as providing "strong" evidence of its effectiveness.

Extent of coverage

- The proportion of people with Parkinson's receiving specialised physiotherapy, speech therapy and occupational therapy increased by 147%, 157% and 187% between 2012 and 2017.
- In 2017, most regions in the Netherlands saw more than 60% of people with Parkinson's disease receiving specialised speech-language and occupational therapy.

Effectiveness

There are a number of studies evaluating the effectiveness of ParkinsonNet, which look at health outcomes, continuity of care, and daily functioning. Results from prominent studies are summarised below.

One analysis of claims data showed a 50% reduction in the rate of hip fractures as a result of ParkinsonNet treatment (Bloem et al., 2017[4]). Another retrospective analysis of claims data found that people who were treated by a specialised physiotherapist had significantly fewer Parkinson's disease-related hospital admissions than those who received care from a general physiotherapist: 17% of people versus 21%. This was despite receiving fewer treatment sessions – 33.7 compared to 48.0 per year (Ypinga et al., 2018[3]).

This same study also showed how ParkinsonNet improved the continuity of care: people who received specialised care saw the same therapist for 93% of visits, compared to 81% for people receiving usual care (Ypinga et al., 2018[3]).

A randomised controlled trial (RCT) compared people receiving ParkinsonNet's specialised occupational therapy to people receiving no occupational therapy, and found that it led to an improvement in self-perceived performance in daily activities in patients with Parkinson's disease, as measured using the evidence-based Canadian Occupational Performance Measure (Sturkenboom et al., 2014[5]).

Efficiency

The start-up cost of building ParkinsonNet nationwide are estimated at nearly EUR 3 million over five years (see Table 13.1) (Bloem et al., 2017[4]). After this initial start-up period, the annual cost are estimated at around EUR 1 million per year. For the Netherlands, where around 3 000 trained professionals collectively serve a total potential volume of 40 000 Parkinson patients, these ongoing annual cost equate to roughly EUR 25 per patient per year.

Table 13.1. Cost of ParkinsonNet

Start-up costs for the first 5 years of building ParkinsonNet nationwide in the Netherlands; and maintenance costs per year for maintaining ParkinsonNet

	Start-up cost (first 5 years)			Maintenance cost (per year)		
Category	Explanation	USD	EUR	Explanation	USD	EUR
Personnel	The ParkinsonNet start up team for building a sustainable network should consist of at least: Project lead, ParkinsonNet ambassador, IT lead, expert speech therapist, expert physical therapist, expect occupational therapist, care co-ordinator, support. Total: 2.2 FTE (full-time equivalent) annually, at USD 75 000 per year over 5 years	950 000	807 500	The ParkinsonNet co-ordination centre consists of at least the following personnel: Project lead (1 800 hours/year), ParkinsonNet ambassador (350 hr/y), IT lead (350 hr/y), expert speech therapist (700 hr/y), expert physical therapist (700 hr/y), expect occupational therapist (700 hr/y), care co-ordinator (700 hr/y), support (200 hr/y).	265 000	225 250
Building evidence-based practice guidelines	(External) expert personnel, consensus meetings, literature review, writing process (USD 75k per guideline)	777 000	660 450	(External) expert personnel, consensus meetings, literature review, writing process (USD 75k per guideline, two guidelines per year)	173 000	147 050
Training and education	Cost for venues and other expenses involved in training and education of providers who join the ParkinsonNet network	576 000	489 600	Cost for venues and other expenses involved in training and education of providers who join the ParkinsonNet network, plus continuing education of trained providers	273 000	232 050
Promotion	Patient and provider education and promotion activities, approximately USD 30 000 in the start-up phase	173 000	147 050	Patient and provider education and promotion activities	52 000	44 200
Regional support	Active guidance and delivery of tools to facilitate collaboration and communication	58 000	49 300	Active guidance and delivery of tools to facilitate collaboration and communication	86 000	73 100
Selection and qualification (quality control)	Audit cost and cost to study the quality of care provided. During start up, there are cost to set quality standards	115 000	97 750	Audit cost and cost to study the quality of care provided	58 000	49 300
IT cost	ParkinsonNet uses various IT	346 000	294 100	ParkinsonNet uses various IT	173 000	147 050

	Start-up cost (first 5 years)			Maintenance cost (per year)		
Category	Explanation	USD	EUR	Explanation	USD	EUR
	systems. A basic network uses at least the following IT platforms: Member management system, healthcare finder, online community platform, content management platform, patient registry/measurement of quality of care			systems. A basic network uses at least the following IT platforms: Member management system, healthcare finder, online community platform, content management platform, patient registry. There cost are higher after the start-up phase as all systems are in place and being used		
Office cost	Costs for housing and hosting the co-ordination team (inc. computers and other overhead)	461 000	391 850	Costs for housing and hosting the co-ordination team (inc. computers and other overhead)	115 000	97 750
Total		3 456 000	2 937 600		1 195 000	1 015 750

Note: Exchange rate used : 1 USD = 0.85 EUR.
Source: Bloem et al. (2017[4]), "ParkinsonNet: A Low-Cost Health Care Innovation With A Systems Approach From The Netherlands", https://doi.org/10.1377/hlthaff.2017.0832.

ParkinsonNet has been associated with cost savings, as it results in (Bloem et al., 2017[4]):[1]

- Greater efficiency of care, as ParkinsonNet patients require fewer treatment sessions;
- Reductions in disease complications (specifically, fewer inpatient admissions); and
- Improved patient self-management, reducing dependence on medical services.

The retrospective analysis of claims data found that people who were treated by a specialised physiotherapist had significantly fewer Parkinson's disease-related complications than those who received care from a general physiotherapist, despite receiving fewer treatment sessions (33.7 compared to 48.0 per year) (Ypinga et al., 2018[3]). As a result, people receiving physiotherapy from specialised therapists had lower direct cost related to physiotherapy (EUR 933 per year versus EUR 1 329), as well as lower overall Parkinson's related healthcare cost (EUR 2056 versus EUR 2 586).

An earlier cluster randomised trial found that total costs over 24 weeks were EUR 727 lower in ParkinsonNet clusters compared with usual-care clusters (roughly EUR 1 400 per year) (Munneke et al., 2010[6]). This was driven mostly by lower informal care cost (EUR 313) and day-hospital rehabilitation (EUR 123).

Comparing these savings of between EUR 500 and EUR 1 400 per patient per year to ParkinsonNet's ongoing running cost of EUR 25 per patient per year suggests that this is a cost-saving, efficient intervention.

Equity

An analysis of claims data from a large Dutch health insurer (CZ Groep, which has a market share of 21%) selected all patients with a diagnosis for Parkinson's disease, and who had received treatment by any physiotherapist (specialised or usual care) for Parkinson's disease during at least one of the three observation years (2013-15) (Ypinga et al., 2018[3]). This sample could be representative of the wider population, as around 23% of the overall Dutch population with Parkinson's disease was covered by CZ Groep (similar to their market share), and neither CZ Groep nor any other Dutch health insurer applied selective contracting during the study period.

Analysis of this sample shows some demographic differences in patients receiving specialised physiotherapy versus usual care physiotherapy (Table 13.2). Patients receiving specialised physiotherapy were slightly younger, more likely to be male, of a lower socio-economic status, less likely to be depressed and on fewer drugs for Parkinson's disease. However, differences were small and likely not clinically meaningful.

Table 13.2. Comparison of people receiving specialised vs usual care physiotherapy

	Specialised physiotherapy (n=2129)	Usual care physiotherapy (n=2252)	Difference (95% CI)
Age	72.76	73.61	0.58 (0.30 to 1.39)
Women	41%	44%	3.63% (0.67 to 6.53)
Socio-economic status (scale -5.5 (low SES) to 3 (high SES))	0.14	0.22	0.08 (0.01 to 0.14)
Depression	18%	21%	3.2% (0.84 to 5.50)
Number of different Parkinson's disease drugs	1.67	1.80	0.13 (0.08 to 0.19)

Note: Based on data on 4 381 patients insured by CZ Group, who had been diagnosed with Parkinson's disease and who received physiotherapy between 2013 and 2015.
Source: Ypinga et al. (2018[3]), "Effectiveness and costs of specialised physiotherapy given via ParkinsonNet: a retrospective analysis of medical claims data", https://doi.org/10.1016/S1474-4422(17)30406-4.

Evidence-base

Several studies evaluating ParksinonNet are available. For the purpose of this case study, the study undertaken by Ypinga et al. (2018[3]) has been used to assess the quality of the evidence-base. This study was chosen because it is recent, it recorded statistically significant results; and it looks at both effectiveness and efficiency. While there is also an RCT looking at ParkinsonNet – generally considered the gold standard in study design – this study compared people receiving ParkinsonNet's specialised occupational therapy to people receiving no occupational therapy at all (Sturkenboom et al., 2014[5]). Therefore, the effect it measures will be partially due to having any occupational therapy, rather than specialised occupational therapy.

The Quality Assessment Tool for Quantitative Studies rates this study as "strong" in many areas (see Table 13.3) (Effective Public Health Pratice Project, 1998[7]). While it was not a blinded RCT, the researchers adjusted for all confounders and used a large, representative real-life population.

Table 13.3. Evidence-based assessment

Assessment category	Question	Rating
Selection bias	Are the individuals selected to participate in the study likely to be representative of the target population?	Very likely
	What percentage of selected individuals agreed to participate?	80%-100% agreement
Selection bias score: Strong		
Study design	Indicate the study design	Cohort analytic
	Was the study described as randomised?	No
Study design score: Fair		
Confounders	Were there important differences between groups prior to the intervention?	No
	If yes, indicate the percentage of relevant confounders that were controlled (either in the design (e.g. stratification, matching) or analysis)?	80 – 100% (most)
Confounders score: Strong		
Blinding	Was the outcome assessor aware of the intervention or exposure status of	Not applicable

Assessment category	Question	Rating
	participants?	
	Were the study participants aware of the research question?	Not applicable
Blinding score: Not applicable		
Data collection methods	Were data collection tools shown to be valid?	Yes
	Were data collection tools shown to be reliable?	Yes
Data collection methods score: Strong		
Withdrawals and dropouts	Were withdrawals and dropouts reported in terms of numbers and/or reasons per group?	Yes
	Indicate the percentage of participants who completed the study?	80 -100%
Withdrawals and dropouts score: Strong		

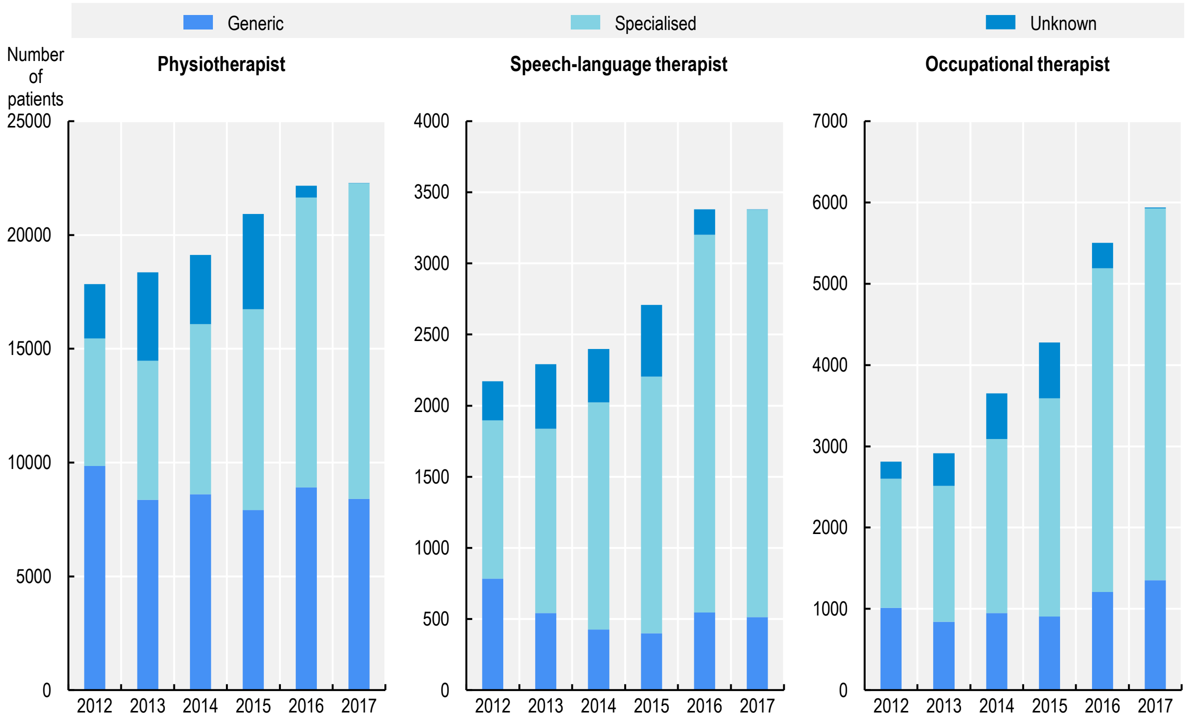
Source: Effective Public Health Practice Project (1998[7]), "Quality assessment tool for quantitative studies", https://www.nccmt.ca/knowledge-repositories/search/14.

Extent of coverage

Analysis of claims data shows that between 2012 and 2017, the percentage of people with Parkinson's disease who receive specialists physiotherapy, occupational therapy or speech therapy, defined as therapy delivered by therapists participating in ParkinsonNet, has increased considerably (see Figure 13.1) (Bloem et al., 2021[8]). For both physiotherapy and speech-language therapy, the overall increase in patients receiving therapy was driven solely by an increase in specialised therapy. For occupational therapy, there was a small increase in the number of people receiving generic therapy, but the increase in specialised occupational therapy far outweighed this. The number of people with Parkinson's receiving specialised physiotherapy, speech therapy and occupational therapy increased by 147%, 157% and 187%, respectively, over the five years studied.

Figure 13.1. Trend in specialised allied health therapy for people with Parkinson's disease

Number of patients with a therapist



Source: Bloem et al. (2021[8]), "From trials to clinical practice: Temporal trends in the coverage of specialized allied health services for Parkinson's disease", https://doi.org/10.1111/ENE.14627.

Across the country, the proportion of people receiving specialised therapy has increased (Bloem et al., 2021[8]). In 2017, most regions saw more than 60% of people receiving specialised speech-language and occupational therapy. The coverage of physiotherapy is lower, but relatively uniformly distributed over the country.

Policy options to enhance performance

In this section, recommendations are given for ParkinsonNet administrators, as well as policy makers in other countries who are considering implementing a similar programme, as to how the performance of the programme could be further enhanced.

Enhancing effectiveness and efficiency

In the Netherlands, which is relatively densely populated, it has generally been possible to increase the number of Parkinson's patients one specialists sees while keeping the average travel time limited. However, this may not be possible in more sparsely populated areas. In this case, the possibilities for using telehealth could be explored to ensure patients still receive specialised care (Bloem et al., 2020[9]). Telehealth can also help increase efficiency by reducing travel time for staff or patients, for example. Previous studies support the use of telehealth to treat patients with Parkinson's disease (e.g. (Chen et al., 2018[10])).

For some parts of the care team and process (e.g. neurologist consultations, personal care managers, peer-to-peer consultations between specialists), this may be more straightforward than for physiotherapy, which is generally more hands-on. To deliver physiotherapy using telehealth solutions, the following considerations should be taken into account (Cottrell and Russell, 2020[11]):

- **Triage**: patient factors such as age, co-morbidities, mobility or balance deficits, language barriers and visual, hearing, or cognitive impairments may determine the eligible for telehealth. For complex patients, a hybrid approach where an in-person assessment is performed initially and subsequent management provided via telehealth may be more successful. Other factors such as the availability of a private space in the patient's residence and internet connection also play an important part.
- **Platform selection**: it is recommended to choose a single videoconferencing platform or software, to limit the amount of training needed for staff and patients. This platform needs to be carefully selected to meet the needs of the service. For example, for physiotherapy a platform offering a wide field of vision may be required. Moreover, some software solutions offer measurement tools (e.g. goniometry) that may be of use. It should also be easy to use for patients with Parkinson's, who may exhibit symptoms such as tremors or speech disturbances, which can complicate the use of teleconferencing software.
- **Physical environment**: the physical environment also needs to be considered to ensure the success of physiotherapy teleconsultations. This includes, for example, ensuring a large enough space free from clutter, where the required equipment is available (e.g. chair, bed, weights). To improve the video and audio quality, it may be necessary to use a headset, eliminate background noise, improve lighting and choose a neutral background.
- **Ethical and professional considerations:** it is important to consider ethical and professional concerns around telehealth for physiotherapy, such as the scope of services that can be delivered remotely, and whether professional indemnity insurance policies explicitly cover the provision of healthcare via telehealth. Patients may need to provide specific consent, or require information on telehealth. As with in-person care, privacy and confidentiality need to assured.

Enhancing equity and evidence base

While the analysis of claims data from 2013-15 did not show major differences in patients in and outside the programme, the programme has since expanded significantly, and the picture may be different now. Moreover, the regional approach of the programme means that there may be local differences in process and outcomes.

A register of participants could provide the data needed for an in-depth analysis of the differences in outcomes across population groups. Contrary to claims data, the register can be designed specifically for the research question, and provide better insights on severity of the disease, treatments received, and demographic factors, as well as collect medical, health, well-being and satisfaction outcomes (Box 13.2). Claims data could be used to create an artificial control group.

Box 13.2. Potential metrics to collect

Below is a list of suggested measures that could be included in the register of patients accessing ParkinsonNet. These are meant as a starting point for discussion, and are not exhaustive. Given the sensitivity of some of these data, any register must be adequately secure to ensure both patients and providers feel comfortable using the platform.

- **Demographics and personal characteristics**: age, gender, income, educational level, location, living situation, age of diagnosis, severity of disease, symptoms
- **Process**: number of visits, type of therapy, missed appointments, guideline compliance, knowledge of disease
- **Medical outcomes**: admissions to hospital, number of Parkinson's drugs and treatments, falls and other injuries, medication errors, mortality
- **Well-being**: depression and mental health, life satisfaction, independent living, activities of daily living
- **Satisfaction**: patient-reported outcomes, patient-reported experience with care, satisfaction with care providers.

Transferability

This section explores the transferability of the ParkinsonNet programme from the Netherlands to other OECD and non-OECD EU countries and is broken into three components: 1) an examination of previous transfers; 2) a transferability assessment using publicly available data; and 3) additional considerations for policy makers interested in transferring ParkinsonNet.

Previous transfers

ParkinsonNet has been transferred to a number of other countries and regions, including California, Luxembourg, the Czech Republic and Norway. A transfer to the Niederrhein region in Germany was less successful, but resulted in valuable lessons learned (see Box 13.3).

Box 13.3. Key elements of a successful transfer

ParkinsonNet was transferred to the Niederrhein region in Germany. The educational materials and software were translated into German, and a three-day training was provided for physiotherapists. However, despite early enthusiasm, the intervention did not take off. Afterward, three key elements of success were identified that were missing in the German transfer.

- **A champion** – generally someone renown in the field of Parkinson's disease, who drives and promotes the programme
- **A super trouper** – someone within the network who receives continued training and can educate the trainers
- **A business case** – there needs to be some mechanism to capitalise on healthcare savings made by the programme to cover the ongoing cost of the network.

Relative to other integrated care models, in particular, macro-level models that change affect multiple levels of care, ParkinsonNet is transferable given it does not require major infrastructure changes or new technologies. However, to ensure ParkinsonNet achieves the same outcomes in a different setting, it must be adapted to suit the needs of the population, health professionals and other stakeholders affected. Further, it is necessary to keep the programme's core features, in particular ensuring health professional are highly trained in delivering care to patients with Parkinson's disease.

Transferability assessment

The following section outlines the methodological framework to assess transferability and results from the assessment.

Methodological framework

Details on the methodological framework to assess transferability can be found in Annex A.

Indicators from publicly available datasets to assess the transferability of ParkinsonNet are listed in Table 13.4. Please note, the assessment is intentionally high level given the availability of public data covering OECD and non-OECD European countries.

Table 13.4. Indicators to assess transferability – ParkinsonNet

Indicator	Reasoning	Interpretation
Population context		
Prevalence of Parkinson's disease (%)	ParkinsonNet is more transferable to countries with a high prevalence of Parkinson's disease, allowing a higher case load	↑ value = more transferable
Population density (people per sq. km of land area)	ParkinsonNet is more transferable to countries with a high population density, allowing a higher case load while limiting travel time	↑ value = more transferable
Sector context (Parkinson's disease care)		
Number of physiotherapists per 1 000 population	ParkinsonNet is more transferable to countries with a high number of allied health professionals, allowing specialisation	↑ value = more transferable
Economic context		
Single-payer health system	ParkinsonNet is more transferable to countries with a single payer, to capitalise on healthcare savings generated by the network	'Yes' = more transferable

Source: OECD (2021[12]), "OECD Health Statistics 2021", https://www.oecd.org/els/health-systems/health-data.htm; World Bank (2020[13]), "Population density (people per sq. km of land area)", https://data.worldbank.org/indicator/EN.POP.DNST; Dorsey et al. (2018[14]), "Global, regional, and national burden of Parkinson's disease, 1990-2016: a systematic analysis for the Global Burden of Disease Study 2016", https://doi.org/10.1016/s1474-4422(18)30295-3; OECD (2016[15]), "Health Systems Characteristics Survey", https://qdd.oecd.org/subject.aspx?Subject=hsc.

Results

ParkinsonNet in the Netherlands benefits from a high number of physiotherapists and a high population density (Table 13.5). Moreover, there is a relatively high prevalence of Parkinson's disease. All of these factors support the model of specialised care with a large Parkinson's disease caseload for specialists. Many other countries have significantly lower population densities and fewer physiotherapists – which should be considered before implementing ParkinsonNet.

While a single-payer health system allows the payer to capitalise on the savings generated by the network through greater efficiency of care and fewer disease complications, in some cases other financial models may work as well. In the Netherlands, ParkinsonNet managed to establish agreements with the major insurers in the country. In California, ParkinsonNet is part of Kaiser Permanente, an integrated managed care consortium.

Table 13.5. Transferability assessment by country (OECD and non-OECD European countries) – ParkinsonNet

Country	Prevalence of Parkinson's disease	Population density (people per sq. km of land area)	Physiotherapists per 1 000	Single-payer system
Netherlands	**0.20%**	**518.0**	**1.9**	**Multiple insurance funds or companies**
Australia	0.17%	3.3	1.07	A national health system covering the country as a whole
Austria	0.18%	108.1	0.45	Multiple insurance funds or companies
Belgium	0.18%	381.6	2.04	Multiple insurance funds or companies
Bulgaria	0.24%	63.8	n/a	n/a
Canada	0.29%	4.2	0.65	A national health system covering the country as a whole
Chile	0.14%	25.7	1.73	Multiple insurance funds or companies
Colombia	0.05%	45.9	0.67	Multiple insurance funds or companies
Costa Rica	0.07%	99.8	n/a	A single health insurance fund (single-payer model)
Croatia	0.23%	71.5	n/a	n/a
Cyprus	0.11%	130.7	n/a	n/a
Czech Republic	0.21%	138.6	0.87	Multiple insurance funds or companies
Denmark	0.16%	145.8	1.72	A national health system covering the country as a whole
Estonia	0.23%	30.6	0.41	A single health insurance fund (single-payer model)
Finland	0.19%	18.2	2.07	A national health system covering the country as a whole
France	0.18%	123.1	1.3	A single health insurance fund (single-payer model)
Germany	0.20%	238.3	2.33	Multiple insurance funds or companies
Greece	0.21%	83.1	0.83	A single health insurance fund (single-payer model)
Hungary	0.21%	106.8	0.57	n/a
Iceland	0.14%	3.6	1.79	A national health system covering the country as a whole
Ireland	0.13%	72.5	1.03	A national health system covering the country as a whole
Israel	0.11%	425.9	0.77	Multiple insurance funds or companies
Italy	0.24%	200.0	1.1	A national health system covering the country as a whole

Country	Prevalence of Parkinson's disease	Population density (people per sq. km of land area)	Physiotherapists per 1 000	Single-payer system
Netherlands	**0.20%**	**518.0**	**1.9**	**Multiple insurance funds or companies**
Japan	0.20%	345.2	n/a	Multiple insurance funds or companies
Korea	0.11%	531.0	n/a	n/a
Latvia	0.24%	30.6	0.45	A national health system covering the country as a whole
Lithuania	0.24%	44.6	1.34	A single health insurance fund (single-payer model)
Luxembourg	0.15%	260.2	2.01	A single health insurance fund (single-payer model)
Malta	0.16%	1641.5	n/a	n/a
Mexico	0.06%	66.3	n/a	Multiple insurance funds or companies
New Zealand	0.13%	19.3	1.15	n/a
Norway	0.14%	14.7	2.51	A national health system covering the country as a whole
Poland	0.20%	124.0	0.7	A single health insurance fund (single-payer model)
Portugal	0.18%	112.5	0.14	A national health system covering the country as a whole
Romania	0.21%	83.8	n/a	n/a
Slovak Republic	0.18%	113.5	0.37	n/a
Slovenia	0.23%	104.3	0.72	A single health insurance fund (single-payer model)
Spain	0.20%	94.8	1.21	A national health system covering the country as a whole
Sweden	0.20%	25.4	1.35	Local health systems that serve distinct geographic regions
Switzerland	0.18%	218.6	n/a	Multiple insurance funds or companies
Türkiye	0.08%	109.6	0.07	A single health insurance fund (single-payer model)
United Kingdom	0.18%	277.8	0.47	A national health system covering the country as a whole
United States	0.22%	36.0	0.71	n/a

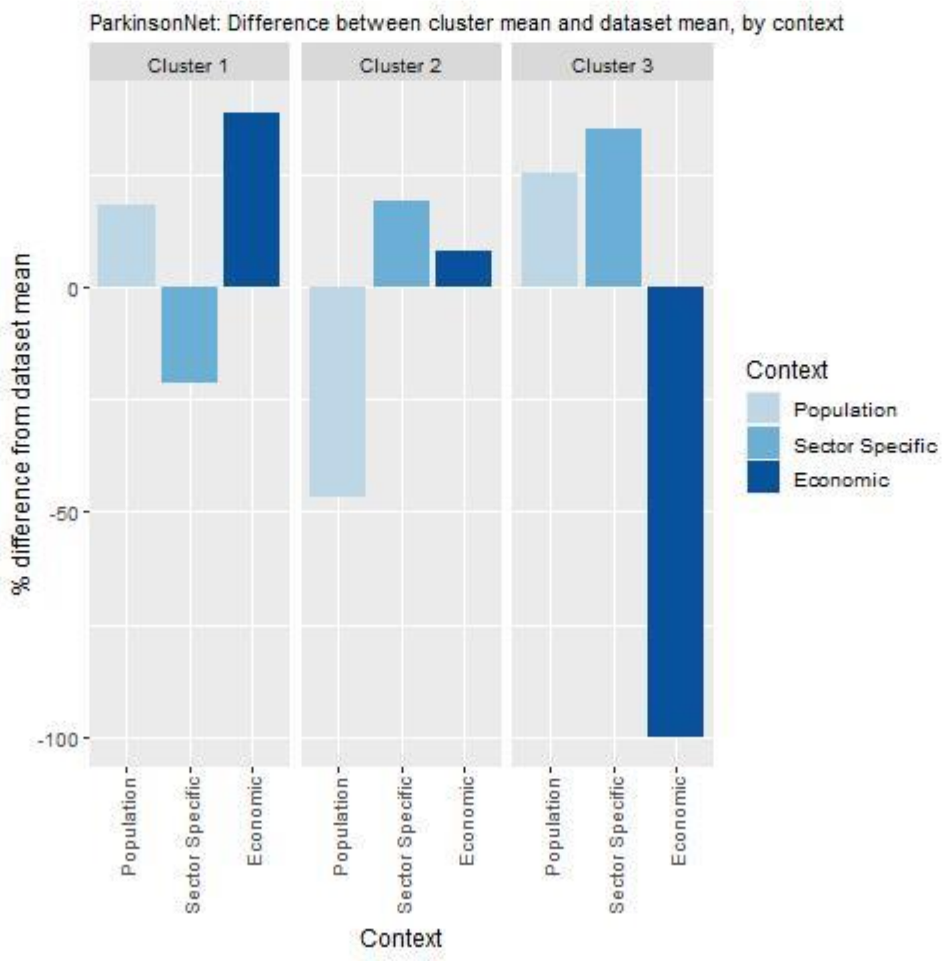
Note: n/a indicates data is missing.
Source: See Table 13.4.

To help consolidate findings from the transferability assessment above, countries have been clustered into one of three groups, based on indicators reported in Table 13.4. Countries in clusters with more positive values have the greatest transfer potential. For further details on the methodological approach used, please refer to Annex A.

Key findings from each of the clusters are below with further details in Figure 13.2 and Table 13.6:

- Countries in cluster one have population and economic factors that are beneficial for the transfer of ParkinsonsNet. On average, these countries have a high population density, a high prevalence of Parkinson's disease, and a single-payer health system. However, a relatively low density of physiotherapists may mean that it is not possible for them to specialise fully.
- Countries in cluster two have a relatively high number of physiotherapists, as well as favourable payment systems. However, before transferring these countries should explore whether the population density and care demand allows for specialisation of care.
- Countries in cluster three score high on both the population and sector factors, but generally do not have a single-payer health system. This means that other ways of capitalising on the econonomic benefit of ParkinsonNet need to be found. The Netherlands, which is the owner of this intervention, falls under this cluster.

Figure 13.2. Transferability assessment using clustering – ParkinsonNet



Note: Bar charts show percentage difference between cluster mean and dataset mean, for each indicator.
Source: See Table 13.4.

Table 13.6. Countries by cluster – ParkinsonNet

Cluster 1	Cluster 2	Cluster 3
Australia	Colombia	Austria
Bulgaria	Costa Rica	Belgium
Canada	Cyprus	Chile
Croatia	Denmark	Germany
Czech Republic	Iceland	Japan
Estonia	Ireland	Malta
Finland	Israel	Netherlands
France	Korea	Slovak Republic
Greece	Luxembourg	Switzerland
Hungary	Mexico	
Italy	New Zealand	
Latvia	Norway	
Lithuania	Türkiye	
Poland		
Portugal		
Romania		
Slovenia		
Spain		
Sweden		
United Kingdom		
United States		

New indicators to assess transferability

Data from publicly available datasets is not ideal to assess the transferability of ParkinsonNet. For example, no internationally comparable data is available on the use of allied health services in the treatment of Parkinson's disease, nor on the political landscape around the condition. Box 13.4 outlines information policy makers should consider before transferring ParkinsonNet.

Box 13.4. New indicators, or factors, to consider when assessing transferability – ParkinsonNet

In addition to the indicators within the transferability assessment, policy makers are encouraged to collect the following information:

Population context

- What is the profile of patients with Parkinson's disease?
- What are the care needs of patients with Parkinson's disease?

Sector specific context (Parkinson's disease care)

- How many people with Parkinson's disease receive care from allied health professionals?
- What type/mix of care do they receive?
- What is the knowledge of allied health professionals on Parkinson's disease currently?
- What is the expected caseload of specialised health professionals?
- Are there "champions" who can drive the establishment and continuation of the network?

Political context

- Is Parkinson's disease a priority for policy makers and funders?
- Is centralised, integrated care a priority for policy makers and funders?

Economic context

- How can ParkinsonNet be funded?
- What is the cost of implementing and operating the intervention in the target setting and to whom?

Conclusion and next steps

ParkinsonNet delivers high quality, specialist care for Parkinson's disease. Through regional networks, allied health interventions, such as physiotherapy, occupational therapy and speech therapy, are delivered by specifically trained therapists who work according to evidence-based guidelines. These specialised therapists manage a high caseload of patients with Parkinson's disease and thus become highly experienced.

Evidence shows that specialised care offered through ParkinsonNet lowers complications such as falls, fractures and hospitalisations. This, combined with a fewer treatment sessions needed, results in considerable cost-savings. The network has expanded quickly to reach national coverage: between 2012 and 2017 the proportion of people with Parkinson's disease receiving specialised physiotherapy, speech therapy and occupational therapy increased by 147%, 157% and 187%, respectively.

While the Netherlands benefits from a high population density, making it possible to increase the number of Parkinson's patients one specialists sees while keeping the average travel time limited, this might not be the case in other countries. The possibilities for using telehealth could be explored to ensure patients still receive specialised care. A register of participants could help understand who is receiving care, and the outcomes for different population groups.

Box 13.5 outlines next steps for policy makers and funding agencies regarding ParkinsonNet.

Box 13.5. Next steps for policy makers and funding agencies – ParkinsonNet

Next steps for policy makers and funding agencies are listed below:

- Explore the opportunities for the use of telehealth, for example through a pilot study under the current ParkinsonNet programme.
- Consider collecting more data on equity, potentially using a register of ParkinsonNet participants.
- When implementing ParkinsonNet, identify a champion, a super trouper and a business case.

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World Bank (2020), *Population density (people per sq. km of land area)*, https://data.worldbank.org/indicator/EN.POP.DNST (accessed on 16 December 2021). [13]

Ypinga, J. et al. (2018), “Effectiveness and costs of specialised physiotherapy given via ParkinsonNet: a retrospective analysis of medical claims data”, *The Lancet Neurology*, Vol. 17/2, pp. 153-161, https://doi.org/10.1016/S1474-4422(17)30406-4. [3]

Note

[1] Of the 10 studies evaluating cost savings, only two showed no significant changes in cost saving.

14 Personalised Action Plans, Andalusia, Spain

This chapter covers Personalised Action Plans (PAPs) in Andalusia, Spain. The case study includes an assessment of PAPs against the five best practice criteria, policy options to enhance performance and an assessment of its transferability to other OECD and EU27 countries.

Personalised Action Plans (PAP): Case study overview

Description: In 2016, Andalusia, Spain, introduced Personalised Action Plans (PAPs) for people living with one or more chronic diseases. The PAP programme outlines a formal process whereby practitioners and patients collaborate to create a longitudinal treatment plan. It has many objectives such as improving patient experience as well as reducing unnecessary use of healthcare services.

Best practice assessment:

OECD best practice assessment of the PAP programme

Criteria	Assessment
Effectiveness 🏅	Patient experiences have improved since the introduction of the PAP programme. Research from the wider literature on personalised care plans show they lead to small improvements in objective health outcomes.
Efficiency	There is an association between the PAP programme and a reduction in healthcare utilisation – i.e. by 23.5%.
Equity	The design of the PAP programme takes into account the needs of individual patients, including those from disadvantaged groups, and standardises care across the region. PAP has the potential to disproportionately benefit lower socio-economic groups as they experience higher morbidity rates.
Evidence-base	A cohort pre/post study design was used to measure the impact of the PAP programme in terms of patient experiences and healthcare utilisation. Although there are many strengths to this study design, the validity of results are weakened by the lack of a control group.
Extent of coverage	At present, 200 700 people are eligible for the PAP programme in Andalusia, Spain

Enhancement options: The PAP programme is well designed, however, to *enhance effectiveness and efficiency*, policies to improve health professional satisfaction may be necessary. To *enhance equity*, the first step is to understand whether inequalities in terms of access, outcomes or experiences exist. To *enhance the evidence-base,* existing data on patient and professional experiences should be complemented by the impact of the PAP programme on objective health outcomes. And finally, to *enhance the extent of coverage*, policy makers could consider widening eligibility to other chronic conditions such as diabetes and asthma.

Transferability: Personalised care plans similar to the PAP programme exist across many OECD countries and have so for several years. Despite their popularity, data continues to show patients do not feel adequately supported by their healthcare team. This finding indicates that in theory, personalised care plans are transferable to different regions, yet in practice are poorly implemented. A transferability assessment using quantitative indicators found health systems that promote multidisciplinary care and are digitally advanced are better equipped to implement the PAP programme.

Conclusion: The PAP programme has shown it can improve patient experiences and reduce utilisation, however, its impact on health outcomes and inequalities is not yet clear. To enhance the overall impact of PAP, policy makers should consider policy options outlined in this case study.

Intervention description

This section briefly summarises the epidemiological changes among OECD/EU27 countries, which has seen the rise of complex healthcare needs. This is followed by a description of Andalusia's, Spain, Personalised Action Plan intervention to address this growing health issue.

The rise of complex chronic health needs

A person living with complex chronic health needs includes those who have one or multiple chronic health conditions such as asthma, diabetes and hypertension. Those with complex chronic health needs often require care from multiple health professionals and are therefore heavy users of healthcare services. For example, in the United States, 71% of healthcare spending comes from patients with at least two chronic conditions, with this figure increasing to 86% among those with at least one chronic condition (Chapel et al., 2017[1]).

The number of people living with complex chronic health needs has been increasing due to ageing populations and changes in lifestyle behaviours, which encourage unhealthy eating and low levels of physical activity. As of 2020, over a third (35.1%) of all adults in EU27 countries reported having a long-standing illness, which represents an increase from 31% in 2011. Over this period (2011-20), Spain recorded the largest proportional increase at 77% (i.e. from 21.1% to 37.3%), which was markedly higher than the EU27 average of +10% (Eurostat, 2022[2]).

Personalised Action Plans in Andalusia, Spain

In response to rising rates of people with complex chronic health needs, in 2012 the Spanish region of Andalusia introduced the "Comprehensive Healthcare Plan for Patients with Chronic Diseases" (Cosano et al., 2019[3]). A key development that stemmed from this Plan was the introduction of Personalised Action Plans (PAPs) in 2016. PAPs, often referred to as personalised care plans in the literature, are "a formal process whereby practitioners and patients collaborate to create a longitudinal treatment plan" (OECD, 2020[4]).

Details on those eligible for a PAP are summarised in Box 14.1.

Box 14.1. Identifying patients eligible for a PAP

PAPs were originally available to people of any age living in Andalusia, Spain, with one or more chronic diseases. However, since January 2021, the programme has focused on patients living with heart failure or chronic obstructive pulmonary disease (COPD). Together these two diseases account for 200 700 people in the region. Patients with either of these diseases were identified as a priority given they heavy users of the healthcare system.

The region's Population Health Data Base identifies eligible patients. The data base includes unique individual level data outlining the patient's disease history and healthcare system use and is updated every three months. A GP-nurse or case management nurse within the patient's reference team at the hospital are responsible for contacting eligible patients.

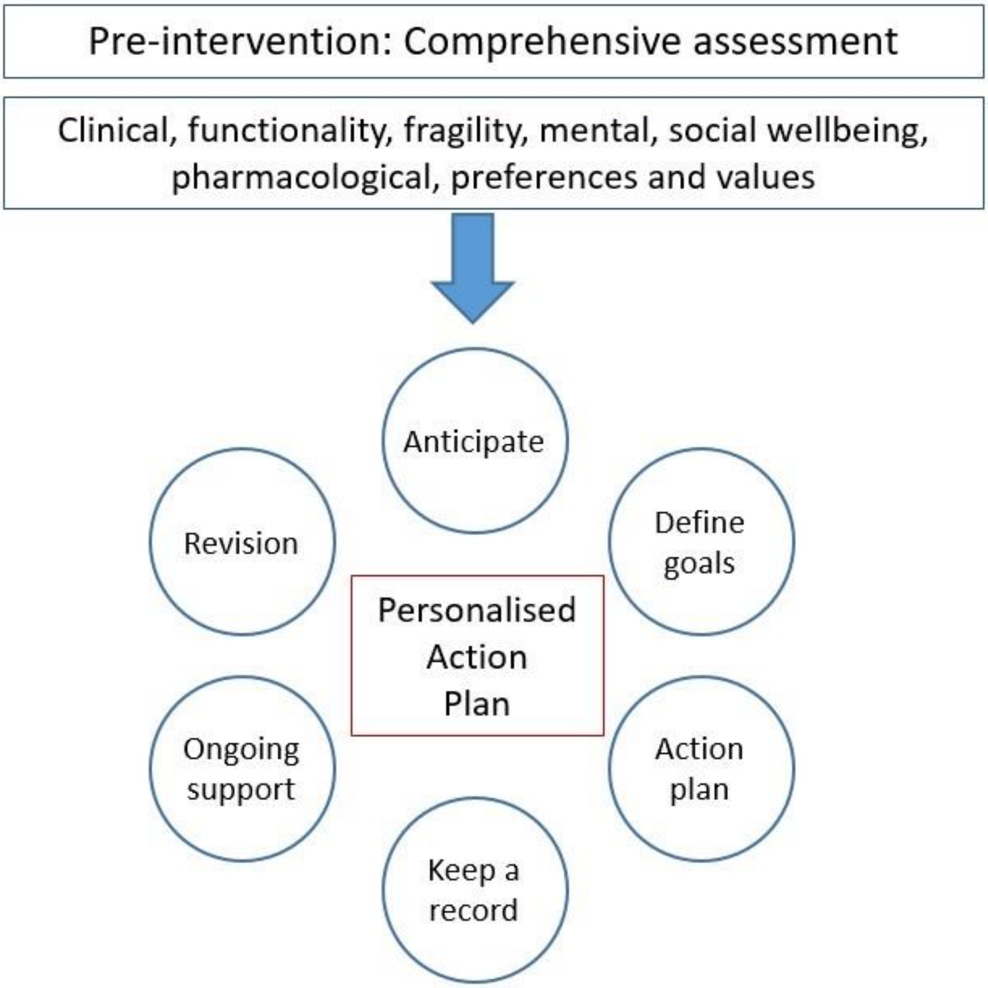
Source: Information provided by administrators of the PAP programme.

Patients eligible for a PAP, or their caregiver, receive a pre-intervention comprehensive assessment with a multidisciplinary care team to ensure all perspectives are taken into account. The assessment covers the patient's clinical, functional (frailty), social and mental ability, as well as their ability to self-manage their condition. It also includes a discussion of the patient's preferences and values. Following the pre-intervention assessment, patients receive a PAP, which is developed using the following six steps (see Figure 14.1) (Servicio Andaluz de Salud, 2016[5]):

- **Anticipate and outline patient health problems**: this requires the patient's multidisciplinary care team to discuss their clinical judgement of the patient and develop a streamlined care plan.

- **Define goals and objectives with the patient or caregiver**: goals and objectives should take into account patient preferences as well as clinical guidelines, while being aware that guidelines may not be appropriate for multimorbid patients (as they are often developed for singular diseases).
- **Agree on an action plan with the patient**: the plan must meet patient preferences but also be clinically feasible, maximise benefits while minimising harm, and ensure, to the extent possible, the patient can self-manage their condition.
- **Keep a record**: a printed or electronic record of the agreed action plan is necessary. The PAP must be accessible to the patient, or caregiver, as well as the multidisciplinary care team.
- **Provide ongoing support for the patients:** the patient, or caregiver, and the care team schedule follow-up meetings either face-to-face, by phone or online. The purpose of these follow-up meetings is to ensure that what was agreed in the PAP is being followed.
- **Revise the PAP**: during the follow-up meetings, the patient, or caregiver, and care team jointly review progress and plan next steps.

Figure 14.1. PAP overview



Source: Adapted from Servicio Andaluz de Salud (2016[5]), “Plan de acción personalizado en pacientes pluripatológicos o con necesidades complejas de salud: recomendaciones para su elaboración”, https://www.opimec.org/media/files/Plan_Accion_Personalizado_Edicion_2016.pdf.

The PAP programme has multiple objectives aimed at improving either processes or health outcomes:

- **Process objectives:**
  - Adapt the use of health resources and services, including the optimisation of pharmaceutical spending and health products
  - Involve patients/families in decision-making and guide self-care.
- **Health outcome objectives**:
  - Reduce adverse events such as falls, pressure ulcers, drug-related problems
  - Reduce preventable admissions, readmissions, hospitalisations and inappropriate use of emergency services
  - Prevent malnutrition, wounds, incontinence, infection control, and control chronic pathologies, delay dependence, and monitor cognitive deterioration
  - Improve quality of life and self-perception of health.

OECD Best Practices Framework assessment

This section analyses the PAP programme against the five criteria within OECD's Best Practice Identification Framework – Effectiveness, Efficiency, Equity, Evidence-base and Extent of coverage (see Box 14.2 below for a high-level assessment). Further details on the OECD Framework can be found in Annex A.

Box 14.2. Assessment of Personalised Action Plans in Andalusia, Spain

Effectiveness

- Since the introduction of the PAP programme, there has been a statistically significant improvement in patient experiences
- Findings from the wider literature show personalised care plans improve objective health outcomes such as levels of depression and blood pressure

Efficiency

- There is an association between the PAP programme and a reduction in the rate at which healthcare utilisation increases
- By reducing healthcare utilisation, the PAP programme is estimated to reduce costs by 23.5%

Equity

- The design of the PAP programme takes into account the needs of individual patients, including those from disadvantaged groups, and standardises care across the population
- The impact of the programme on health inequalities is not available. However, it has the potential to reduce inequalities given the probability of living with one or more chronic conditions is higher among lower socio-economic groups.

Evidence-base

- A cohort pre/post study design using data collected from a treatment group only was used to evaluate the effectiveness and efficiency of the PAP programme. This study design is strong in some areas, however, the overall study validity is weakened by the lack of a control group.

Extent of coverage

- At present, 200 700 people are eligible for the PAP programme in Andalusia, Spain. The proportion of those who "sign up" to the programme is unclear.

Effectiveness

A 2020 evaluation estimated the impact of the PAP programme from both a patient and health system perspective (Rodriguez-Blazquez et al., 2020[6]). The former relied on changes in the PACIC (Patient Assessment of Care for Chronic Conditions) survey scores measured both pre- and post-implementation, while the latter, using the same methodology, relied on the ACIC (Assessment of Chronic Illness Care) survey. See Box 14.3 for further details on each of these surveys.

Box 14.3. PACIC and ACIC surveys

A description of measures used to evaluate the impact of the PAP programme are summarised below:

- **PACIC survey** aims to measure the change in the quality of care provided to chronic care patients. The PACIC survey used to measure the PAP programme involved a 26-item questionnaire covering five dimensions – the 5As model: assess, advise, agree, assist, and arrange. For each dimension, patients rate their experience from 1 (almost never) to 5 (almost always). In addition to each dimension, an overall summary was calculated.
- **ACIC survey** assesses the strengths and weaknesses of the care delivered to patients with chronic diseases from the perspective of the health system. The ACIC survey used to evaluate the PAP programme covered seven areas: delivery system organisation, community linkages, self-management support, decision support, delivery system design, clinical information systems, and integration of model components

Source: Rodriguez-Blazquez et al. (2020[6]), “Assessing the Pilot Implementation of the Integrated Multimorbidity Care Model in Five European Settings: Results from the Joint Action CHRODIS-PLUS”, https://doi.org/10.3390/ijerph17155268.

The evaluation found that between 2017 and 2019 there was a **statistically significant ($p < 0.001$) improvement in patient experiences measured using the overall PACIC survey score** – i.e. from 2.91 to 3.46. Patient experiences improved in each dimension, in particular for the “Arrange” dimension (+33% increase in dimension score) (Rodriguez-Blazquez et al., 2020[6]). Caution should be taken when interpreting results given the study involved just 42 patients (for further details of the study design, see the “Evidence-based” criterion).

The above results were strengthened by a follow-up PACIC survey undertaken during the post-implementation phase (i.e. patient experiences improved). Results from this survey included additional questions for patients.

Conversely, the overall ACIC score fell from 7.90 to 6.77; however, this fall was not statistically significant. A possible explanation for this unexpected result is that there may have been “uncertainty” among healthcare managers due to political changes occurring during the time of the intervention (Rodriguez-Blazquez et al., 2020[6]).

The impact of the PAP programme on objective health outcomes is not available. Therefore, findings from the wider literature regarding personalised care plans are summarised to highlight PAP’s potential. A Cochrane Review covering 19 studies and over 10 000 patients found **personalised care plans have a positive, albeit small, impact on both physical and psychological health** (Coulter et al., 2015[7]):

- HbA1c was 0.24% lower for those who received personalised care plans
- Systolic blood pressure was 2.64mm/Hg lower for those who received personalised care plans
- No impact on cholesterol or body mass index (BMI)

- Levels of depression were lower among who received personalised care plans (standardised mean difference of -0.36).

It is important to note that the findings above largely relate to personalised care plans targeting patients with asthma, diabetes or depression, which is not the current focus of the PAP programme.

Efficiency

The impact of the PAP programme on healthcare utilisation was measured using a pre/post study design in years 2017, 2018 and 2019. Results from the analysis covered a range of utilisation measures covering primary, outpatient, inpatient and emergency care. A full overview of results are in Table 14.1, which show that **the rate of increase in healthcare utilisation slowed and in some cases declined between years 2017-18 and 2018-19**.

Based on estimates from the Andalusian Health Service, by slowing the increase in healthcare utilisation, **the PAP programme reduced costs by 23.5%.**

Table 14.1. Change in healthcare utilisation between years 2017-18 and 2018-19

Indicator	% change between 2017 and 2018	% change between 2018 and 2019	Did the rate of growth increase at a faster rate, a slower rate, or even decline?
Unplanned, potentially avoidable inpatient episodes	+37.1%	+16.1%	Slower increase
Family physician visits at PHC*	+11.7%	-9.0%	**Negative growth**
Family nurse visits at PHC*	+25.3%	-3.4	**Negative growth**
Family physician home visits	+66.3%	+66%	Slower increase
Family nurse home visits	+44.4%	+12.9%	Slower increase
Emergency episodes at PHC	+12.7%	-3.3%	**Negative growth**
Emergency episodes at hospital	+14.5%	+2.3%	Slower increase
Outpatient visits	+9.7%	-3.9%	**Negative growth**
Inpatient episodes	+23.3%	+1.4%	Slower increase

Note: *Primary healthcare.
Source: Information provided by administrators of the PAP programme.

The economic impact of personalised care plans is limited in the wider literature. Further, the most extensive systematic review to date on the subject noted that the "evidence on the relative cost effectiveness of [personalised care plans] is limited and uncertain" (Coulter et al., 2015[7]).

Equity

The design of the PAP programme takes into account the needs of each individual patient, including those from disadvantaged backgrounds. The programme does this by:

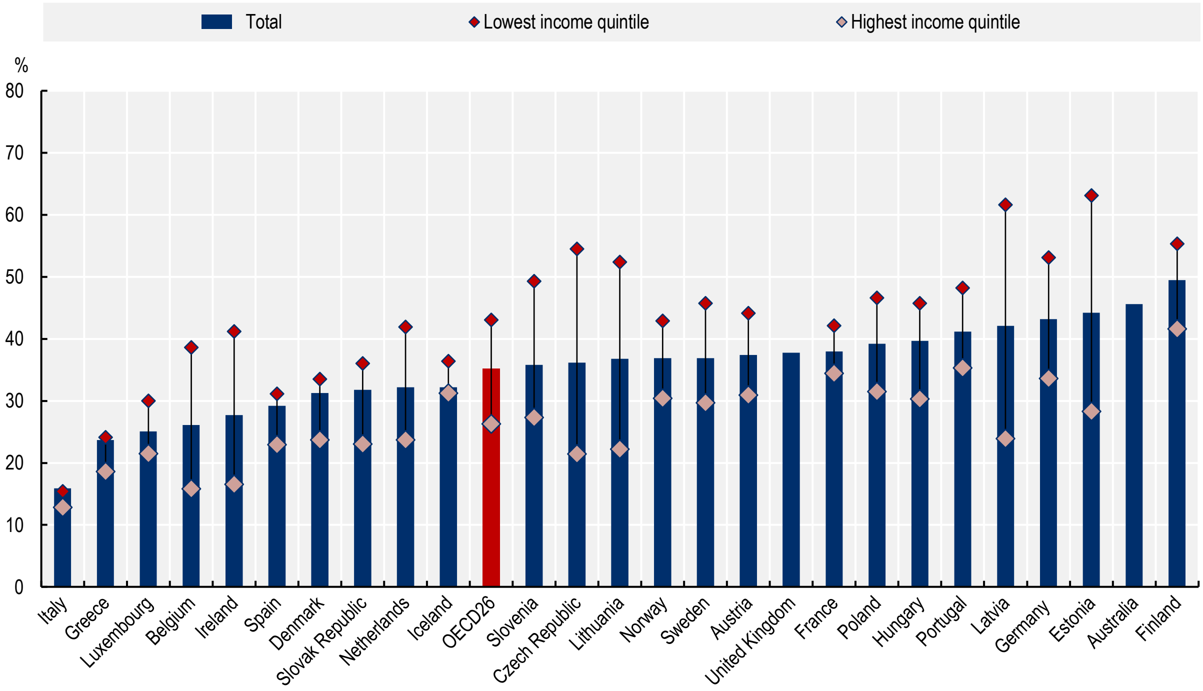
- Developing care plans designed to accommodate to specific patient needs
- Standardising care for all individuals in the region
- Including a social worker within the patient's multidisciplinary care team, who are there to ensure the patient's wider needs are met.

There is no evidence measuring the impact of the PAP programme on equity. Nevertheless, the programme has the potential to reduce health inequalities by targeting patients with one or more chronic diseases, given rates of morbidity are higher among lower socio-economic groups. This disparity is largely due to lifestyle behaviours, with rates of smoking and obesity, for example, higher among these groups. Further, those who are economically disadvantaged are also more vulnerable to the adverse effects of unhealthy lifestyles. For example, a recent study by Mair and Jani (2020[8]) found that, after adjusting for lifestyle factors, those with a low socio-economic status are at an increased risk of developing 18 of the 56 major diseases and health conditions compared to advantaged groups. This finding is supporting by data from OECD countries, which show lower income groups are more likely to report living with a long-standing illness or health problem (see Figure 14.2).

Although the PAP programme promotes health equity, policy makers should be aware of its potential to widen inequalities. For example:

- By using digital means to recruit patients, there is a risk of overlooking population groups who are less likely to access healthcare and who are therefore not identified within the region's Health Data Base.
- People with lower levels of healthy literacy or communication difficulties may be less likely to engage in the programme (Coulter et al., 2015[7]).

Figure 14.2. People reporting a long-standing illness or health problem, by income quintile, 2019 (or nearest year)



Note: Data are self-reported.
Source: EU-SILC 2021 and national health surveys.

Evidence-based

The evidence-based criterion assesses the quality of evidence used to measure the impact of the PAP programme and therefore the validity of the results. This section focuses only on the study design used to assess the effectiveness and efficiency of PAP, given no studies to date have assessed its impact on health inequalities.

Effectiveness evidence base

Rodriguez-Blazquez et al. (2020[6]) evaluated the impact of the PAP programme from both a patient and health system perspective. The quality of the study design is summarised in Table 14.2 using the *Quality Assessment Tool for Quantitative Studies* from the Effective Public Health Practice Project (Effective Public Health Pratice Project, 1998[9]).

In short, the study involved a pre-post study design with a treatment group only, with outcomes measured using reliable and valid tools. The study design is rated as “strong” or “moderate” in many areas, however, the study’s internal validity is downgraded given participants were not randomly selected and that there was no control group.

Table 14.2. Evidence-based assessment – Personalised Actions Plans

Assessment category	Question	Score using Rodriguez-Blazquez et al. (2020[6])
Selection bias	Are the individuals selected to participate in the study likely to be representative of the target population?	Somewhat likely
	What percentage of selected individuals agreed to participate?	Unknown
Selection bias score: Moderate		
Study design	Indicate the study design	Cohort (one group pre + post)
	Was the study described as randomised?	N/A
	Was the method of randomisation described?	N/A
	Was the method of randomisation appropriate?	N/A
Study design score: Moderate		
Confounders	Were there important differences between groups prior to the intervention?	N/A (treatment group only)
	What percentage of potential confounders were controlled for?	80-100%
Confounders score: Strong		
Blinding	Was the outcome assessor aware of the intervention or exposure status of participants?	Yes
	Were the study participants aware of the research question?	Unknown
Blinding score: Weak		
Data collection methods	Were data collection tools shown to be valid?	Yes
	Were data collection tools shown to be reliable?	Yes
Data collection methods score: Strong		
Withdrawals and dropouts	Were withdrawals and dropouts reported in terms of numbers and/or reasons per group?	N/A (no dropouts)
	Indicate the percentage of participants who completed the study?	N/A
Withdrawals and dropouts score: N/A		

Note: N/A = not applicable.
Source: Effective Public Health Practice Project (1998[9]), “Quality assessment tool for quantitative studies”, https://www.nccmt.ca/knowledge-repositories/search/14.

Efficiency evidence base

As outlined under "Efficiency", the PAP programme is associated with a decline in the rate at which healthcare service utilisation grows. Limited information is available regarding the study design that found these results, therefore, this section provides a qualitative assessment of the study's overall design, as opposed to using the Quality Assessment Tool for Quantitative Studies.

The Andalusian Local Implementation Working Group as part of the JA CHRODIS+ used a pre/post study design to evaluate any changes in healthcare utilisation. The study covered 2 788 patients with data recorded in year 2017, 2018 and 2019. Changes in healthcare utilisation among a similar group of patients over the same period were not explored, further it is unclear if selected patients represent the target population. For this reason, results from the study imply an association between PAP and reduced healthcare demand as opposed to the programme being the cause of the fall.

Extent of coverage

Data from the Andalusian Health Service show that **200 700 people in the region are currently eligible for the PAP programme**. Andalusia's sophisticated health data system means most eligible patients are identified. It is unclear what proportion of those who are eligible "sign up" to receive a PAP, however, feedback from health professionals indicate there is a high level of interest and enthusiasm among patients.

Policy options to enhance performance

This section outlines policies to enhance the overall performance of Andalusia's PAP programme. Policies are broken down by the five best practice criteria.

Enhancing effectiveness

Maintain the PAP programme design as it includes all the key features of a well-designed personalised care plan. A 2015 systematic review outlined the necessary components within a personalised care programme – preparation, goal setting, action planning, documenting, co-ordinating, supporting, and reviewing (Coulter et al., 2015[7]). Each of these steps are available within the PAP programme (see "Intervention description"). The same systematic review also identified additional features associated with greater benefits, which also align with the PAP programme, namely: integrated into routine care, comprehensive and intensive. For this reason, changes to the design of the PAP programme are not recommended, rather, policy makers should focus on policy enhancements listed below.

Restart activities to align with pre-pandemic levels. The COVID-19 pandemic halted most PAP related activities given the pressure placed on the healthcare system. For this reason, as highlighted by PAP administrators, the first step in enhancing the effectiveness of the programme is to increase activities back to pre-pandemic levels.

Introduce new PAP training for health professionals to streamline patient records. At present, health professionals vary in how they draft PAPs for their patients. Therefore, additional training has been recommended by PAP administrators in order to ensure all patient information is recorded within the region's electronic health record system (Diraya), and that reporting of patient information is streamlined.

Further support to healthcare professionals may be necessary. As outlined under "Effectiveness", the impact of the PAP programme from a health system perspective declined over the evaluation period. Although these results were not statistically significant, it is important to understand why health professionals didn't express an improvement. The report by Rodriguez-Blazquez et al. (2020[6]) provides a possible explanation for this result (i.e. political uncertainty[1]), but this was not confirmed. Based on reviews of other integrated care models in OECD countries, including Spain, the following strategies may improve health professional experiences:

- Ensure **sufficient resources** to avoid burnout. Health professionals' workload may increase as a result of the PAP programme, therefore, it is important to ensure they receive necessary support, and have the time and resources to take on new activities. This has been recognised by policy makers in Andalusia who are revising the health professional to patient ratio as part of the Regional Ministry of Health's next action plan.[2] Working conditions are also being reviewed as part of Spain's upcoming national plan for primary care.
- Ensure health professionals have the **appropriate skills** to develop a PAP (i.e. know how to work as a team and use necessary digital tools) so that they feel confident delivering this type of care.
- Ensure health professionals are **involved in the design of the programme**, or in this case, any amendments to the PAP programme in order to secure "buy in".

Enhancing efficiency

Efficiency is a measure of effectiveness in relation to inputs used. Therefore, interventions that increase effectiveness without significant increases in costs, or reduce costs while keeping effectiveness at least constant, have a positive effect on efficiency.

Enhancing equity

Collect data to first understand the impact of the PAP programme across different population groups. As outlined under "Equity", the PAP programme is designed to cater to the needs of each individual, including those from disadvantaged groups. However, the impact of the programme across population groups is unknown. A first step to enhancing equity is to first understand whether any inequalities exist in terms of access, health outcomes and patient experiences. Such information is vital for implementing policies that address any known inequities. For further information, see "Enhancing the evidence-base" (Table 14.3).

Enhancing the evidence-base

Enhance the range of indicators used to evaluate the PAP programme. Previous evaluations of the PAP programme have focused on measuring the change in patient and health professional experiences. It is important to complement subjective information with data on changes in objective health outcomes. A list of potential indicators to include in future evaluations are available in Table 14.3. These indicators reflect three of the best practice criteria – effectiveness, efficiency and equity.

Evaluate the PAP programme using a robust study design. To ensure the validity of results, it is important to collect indicators within a well-designed evaluation study. Information on how to undertake a well-designed evaluation are available in OECD's Guidebook on Best Practices in Public Health (OECD, 2022[10]). The best study design for the PAP programme will depend on several factors such as available resources and patient data. However, in general, study designs which randomly allocate patients into treatment and control groups and where data is collected over several periods are generally considered the strongest.

Table 14.3. Evaluation indicators

This table outlines effectiveness, efficiency and equity indicators to measure when evaluating the PAP programme

Best practice criteria	Indicators
Effectiveness Effectiveness indicators will ultimately depend on targeted chronic health conditions. This list below covers several conditions and covers objectives health outcomes (final and intermediate) and subjective health outcomes.	**Final objective health outcomes (reflect the ultimate objective of the programme**): Blood pressure BMI Cholesterol levels HbA1c levels (diabetic patients only) Asthma Therapy Assessment Questionnaire (ATAQ) Number of falls, pressure ulcers and drug-related problems (these align with stated PAP objectives) Disease-related deaths All-cause deaths
	Intermediate objective health outcomes (directly related to final health outcomes) Diet (e.g. consumption of fruit and vegetables per day) Level of exercise (e.g. minutes per week engaged in moderate to intense physical exercise) Cigarettes smoked per day Medication adherence
	Subjective health outcomes Subjective heath status such as the SF-36 or SF-12 For depression and anxiety: Patient health questionnaire (PhQ-9) for depression and anxiety; Hopkins Symptom Checklist 20; Beck Depression Inventory; Center for Epidemiological Studies Depression Scale For self-efficacy: Strategies Used by People to Promote Health (SUPHH); and six-item Self-efficacy for Managing Chronic Disease Scale or the 4-utm Spanish-language version (SEMCD-S)
Efficiency	Disease-related hospital admissions All-cause hospital admissions Disease-related emergency admissions All-cause emergency admissions Use of other healthcare services such as home visits, outpatient visits, and specialist visits
Equity	**To the extent possible, stratify effectiveness and efficiency indicators to assess PAP's impact on health inequalities. Example ways stratify data are outlined below**: Age and gender Income Education level Ethnicity Location (e.g. rural, regional or urban).

For greater insight, outcome evaluations can be paired with a process evaluation which assesses whether the PAP programme was implemented as planned. For example, if an outcome evaluation reveals no major change in key outcome indicators, a process evaluation will inform researchers whether this is due to poor implementation or not.

Enhancing extent of coverage

The proportion of eligible patients who receive a PAP is unknown, as is the level of take up across population groups (e.g. by gender, ethnicity, income status). Therefore, it is unclear whether recommendations on how to extend coverage to eligible patients are necessary or not.

To expand the programme's reach in Andalusia, eligibility criteria could be extended beyond patients with heart failure or COPD (i.e. prioritised complex chronic patients). Based on a high-level review of the literature, PAPs would be particularly beneficial to patients with:[3]

- **Asthma**: a systematic review and meta-analysis found asthma patients who receive self-management interventions reported statistically lower use of healthcare services and a better quality of life (Hodkinson et al., 2020[11]).
- **Diabetes**: a 2015 systematic review found personalised care plans for diabetes patients leads to improvements, albeit small, in objective health outcomes (e.g. HbA1c and systolic blood pressure) (Coulter et al., 2015[7]).
- **Multiple chronic conditions**: personalised care plans are useful for those with multiple conditions as interdependencies between conditions and their collective impact are taken into account when treating the patient (NHS England, 2015[12]).

Transferability

This section explores the transferability of the PAP programme and is broken into three components: 1) an examination of previous transfers; 2) a transferability assessment using publicly available data; and 3) additional considerations for policy makers interested in transferring this programme.

Previous transfers

As outlined by a recent OECD report, **personalised care plans have been widely used across developed countries for many years** (OECD, 2020[4]). For example, in Australia, England (the United Kingdom) and even different regions of Spain (see Box 14.4). Despite "widespread support" for personalised care planning, data reveals that patients continue to feel inadequately supported by health professionals to self-manage their own health conditions (Coulter et al., 2015[7]). This finding indicates that in theory, personalised care plans are transferable to different regions, yet in practice are often poorly implemented.

> *"Even an appropriate and well-designed intervention can fail if it is poorly implemented." (OECD, 2022[10])*

A systematic review of personalised are plans by Coulter et al. (2015[7]) provides insight into why personalised care plans may fail in practice. Specifically, the authors highlight a potential reluctance among health professionals to embark on such a "significant and cultural change" to the way they practice healthcare. Further, healthcare professionals may feel care plans are too cumbersome for either the patient or themselves. This finding highlights the importance of **securing stakeholder "buy in" before transferring an intervention** to a new region.

Box 14.4. Personalised care plans examples among selected OECD countries

This box describes, at a high level, personalised care plan programs implemented in a selection of OECD countries, including the Basque country in Spain.

Australia

In 1999, Australia introduced the Enhanced Primary Care (EPC) package, which outlined a shift towards care planning and therefore a different approach to chronic disease management. Under EPC, the national health insurance scheme reimburses healthcare professionals for the time spent developing multidisciplinary care plans to patients with chronic and complex needs. In 2005, EPC was renamed Chronic Disease Management, however, the policy remained the same.

There is no list of eligible conditions; rather, suitability for the programme is based on a GP's clinical judgement.

Basque country, Spain

In 2010, the Basque Country's Department of Health launched the "Strategy to tackle the challenges of chronicity". In line with the strategy, the Basque Health Service developed an integrated care model for multimorbid patients. The model consists of several characteristics including the development of individualised therapeutic plans between patients and a multidisciplinary care team. Similar to the PAP programme in Andalusia, Spain, the integrated care model in the Basque country identifies eligible patients using electronic patient data.

England, the United Kingdom

Since 2010, in England, patients living with a long-term condition are involved in a care planning process. Eligible patients receive a personalised care and support plan, which must meet the following criteria:

- People are central to developing and finalised the plan
- People proactively verbalise what matters to them to ensure their needs are met
- People agree to the health and well-being outcomes they want to achieve in partnership with health professionals
- The plan is recorded and sharable, and outlines what matters to people and how their outcomes will be achieved
- People have the option to review their plan.

Source: Australian Government Department of Health (2022[13]), "Chronic Disease Management (formerly Enhanced Primary Care or EPC) – GP services", https://www1.health.gov.au/internet/main/publishing.nsf/Content/mbsprimarycare-chronicdiseasemanagement; NHS England (2022[14]), "Personalised care and support planning". https://www.england.nhs.uk/ourwork/patient-participation/patient-centred/planning/; WP5 Jadecare (2020[15]), "Presentation of the original good practice – Basque health strategy in ageing and chronicity: integrated care".

To limit the possibility of implementation failure, administrators from the PAP programme have outlined key factors to consider before transfer and implementation takes place (see Box 14.5).

Box 14.5. Key factors to consider before transferring the PAP programme

The following factors of the PAP programme are considered essential and should therefore be considered by countries interested in transferring this intervention:

- Have a team of experts develop training materials on how to treat patients with complex health needs as well as how to use PAPs
- Ensure there is sufficient training for health professionals and patients in regards to how to use a PAP
- Ensure co-ordination between health professionals working in primary and secondary care
- Systematise PAP processes to avoid variability
- Enable PAPs to be registered within a patient electronic health record that is stored within a strong IT system
- Ensure healthcare professionals have the time and resources to develop PAPs.

Source: Information provided by administrators of the PAP programme.

Transferability assessment

The following section outlines the methodological framework to assess transferability and results from the assessment.

Methodological framework

A few indicators to assess the transferability of the PAP programme were identified (see Table 1.1). Indicators were drawn from international databases and surveys to maximise coverage across OECD and non-OECD European countries. Please note, the assessment is intentionally high level given the availability of public data covering OECD and non-OECD European countries.

Table 14.4. Indicators to assess transferability – Personalised Actions Plans

Indicator	Reasoning	Interpretation
Sector context (primary and secondary care)		
Proportion of GPs who work in single-handed practices	The intervention is more transferable in countries where GPs feel comfortable working with other health professionals. This indicator is a proxy to measure the willingness of GPs to work in co-ordinated teams.	Low = more transferable High = less transferable
Proportion of physicians in primary care facilities using electronic health records (EHRs)	EHRs improve the ability of health professionals to provide integrated patient-centred care. Therefore, the intervention is more transferable in countries that utilise EHRs in primary care facilities.	↑ value = more transferable
Proportion of hospitals using EHRs	As above	↑ value = more transferable
The extent of task shifting between physicians and nurses in primary care	This intervention promotes integrated care provided by multidisciplinary teams. Therefore, the intervention is more transferable in countries where physicians feel comfortable shifting tasks to nurses.	The more "extensive" the more transferable
The use of financial incentives to promote co-ordination in primary care	The intervention is more transferable to countries with financial incentives that promote co-ordination of care across health professionals.	Bundled payments or co-ordinated payment = more transferable

Indicator	Reasoning	Interpretation
Economic context		
Primary healthcare expenditure as a percentage of current health expenditure	The intervention places a stronger emphasis on primary care, therefore, it is likely to be more successful in countries that allocate a higher proportion of health spending to primary care	↑ value = more transferable

Source: WHO (2018[16]), "Primary Healthcare (PHC) Expenditure as percentage Current Health Expenditure (CHE)", https://apps.who.int/nha/database; Oderkirk (2017[17]), "Readiness of electronic health record systems to contribute to national health information and research", https://dx.doi.org/10.1787/9e296bf3-en; Schäfer et al. (2019[18]), "Are people's health care needs better met when primary care is strong? A synthesis of the results of the QUALICOPC study in 34 countries", https://doi.org/10.1017/S1463423619000434; Maier and Aiken (2016[19]), "Task shifting from physicians to nurses in primary care in 39 countries: a cross-country comparative study", https://doi.org/10.1093/eurpub/ckw098; OECD (2020[4]), *Realising the Potential of Primary Health Care*, https://doi.org/10.1787/a92adee4-en; OECD (2016[20]), "Health Systems Characteristics Survey", https://qdd.oecd.org/subject.aspx?Subject=hsc; European Observatory on Health Systems and Policies (2021[21]), "The Health Systems and Policy Monitor", https://eurohealthobservatory.who.int/countries/overview.

Results

Results from the transferability assessment are summarised below, with country-level details available in Table 14.5. Due to data constraints, the "owner" setting is Spain, as opposed to the region of Andalusia, which is limitation of the analysis.

- The proportion of GPs who work in single practices is mixed among potential transfer countries. These results indicate GPs in some countries would more readily accept working in a multidisciplinary team and others not. Similarly, task shifting in primary care is either "limited" or non-existent in most OECD countries (72%), which also inhibits multidisciplinary care work.
- Use of EHRs are relatively high in Spain, including the region of Andalusia, compared to the average of all countries. EHRs are an important element of the PAP programme as they help identify all eligible patients and allow health professionals to easily share patient data.
- Most countries do not employ financing methods that incentivise integrated care, including Spain: among examined countries, 19% employ have bundled payments while a further 16% use financial incentives for co-ordinated care.
- Over 40% of all healthcare expenditure is spent on primary care among analysed countries, which is higher than in Spain (39%). Therefore, long-term affordability issues may not be of significant concern to countries interested in transferring this intervention.

Table 14.5. Transferability assessment by country (OECD and non-OECD European countries) – Personalised Actions Plans

A darker shade indicates the PAP programme is more suitable for transferral in that particular country

Country	% GPs in single practices	% PC* using EHRs	% hospitals using EHRs	Task shifting in PC*	Financial incentives	Primary expenditure percentage CHE**
Spain	**Low**	**99**	**80**	**Limited**	**No incentive**	**39**
Australia	Low	96	20	Extensive	Bundled	37
Austria	High	80	99	None	Co-ordinated payment	37
Belgium	High	n/a	n/a	Limited	Bundled	40
Bulgaria	High	n/a	n/a	None	Bundled	47
Canada	Low	77	69	Extensive	Bundled	48
Chile	n/a	65	69	n/a	No incentive	n/a

Country	% GPs in single practices	% PC* using EHRs	% hospitals using EHRs	Task shifting in PC*	Financial incentives	Primary expenditure percentage CHE**
Colombia	n/a	n/a	n/a	n/a	No incentive	n/a
Costa Rica	n/a	n/a	n/a	n/a	No incentive	33
Croatia	n/a	3	n/a	Limited	No incentive	38
Cyprus	Low	n/a	n/a	Limited	No incentive	41
Czech Republic	High	n/a	100	None	No incentive	33
Denmark	Medium	100	100	Limited	Co-ordinated payment	38
Estonia	High	99	100	Limited	No incentive	44
Finland	Medium	100	100	Extensive	No incentive	46
France	n/a	80	60	None	Bundled	43
Germany	High	n/a	n/a	None	Co-ordinated payment	48
Greece	High	100	50	None	No incentive	45
Hungary	High	n/a	n/a	Limited	No incentive	40
Iceland	Low	100	100	Limited	Co-ordinated payment	35
Ireland	Low	95	35	Extensive	No incentive	47
Israel	n/a	100	100	n/a	Co-ordinated payment	n/a
Italy	Medium	n/a	n/a	Limited	Bundled	n/a
Japan	n/a	36	34	n/a	No incentive	52
Korea	n/a	n/a	n/a	n/a	No incentive	57
Latvia	High	70	90	Limited	Bundled	39
Lithuania	Medium	n/a	n/a	Limited	No incentive	48
Luxembourg	Medium	n/a	n/a	None	No incentive	38
Malta	Medium	n/a	n/a	Limited	No incentive	62
Mexico	n/a	30	49	n/a	Co-ordinated payment	44
Netherlands	Medium	n/a	n/a	Extensive	Bundled	32
New Zealand	Low	95	100	Extensive	No incentive	n/a
Norway	Low	100	100	None	No incentive	39
Poland	Medium	30	10	None	No incentive	47
Portugal	Low	n/a	n/a	Limited	No incentive	58
Romania	Medium	n/a	n/a	None	No incentive	35
Slovak Republic	High	89	100	None	No incentive	n/a
Slovenia	High	n/a	n/a	Limited	No incentive	43
Sweden	Low	100	100	Limited	Co-ordinated payment	n/a
Switzerland	Medium	40	100	None	No incentive	40
Türkiye	Low	n/a	n/a	None	No incentive	n/a
United Kingdom	Low	99	100	Extensive	No incentive	53
United States	n/a	83	76	Extensive	No incentive	n/a

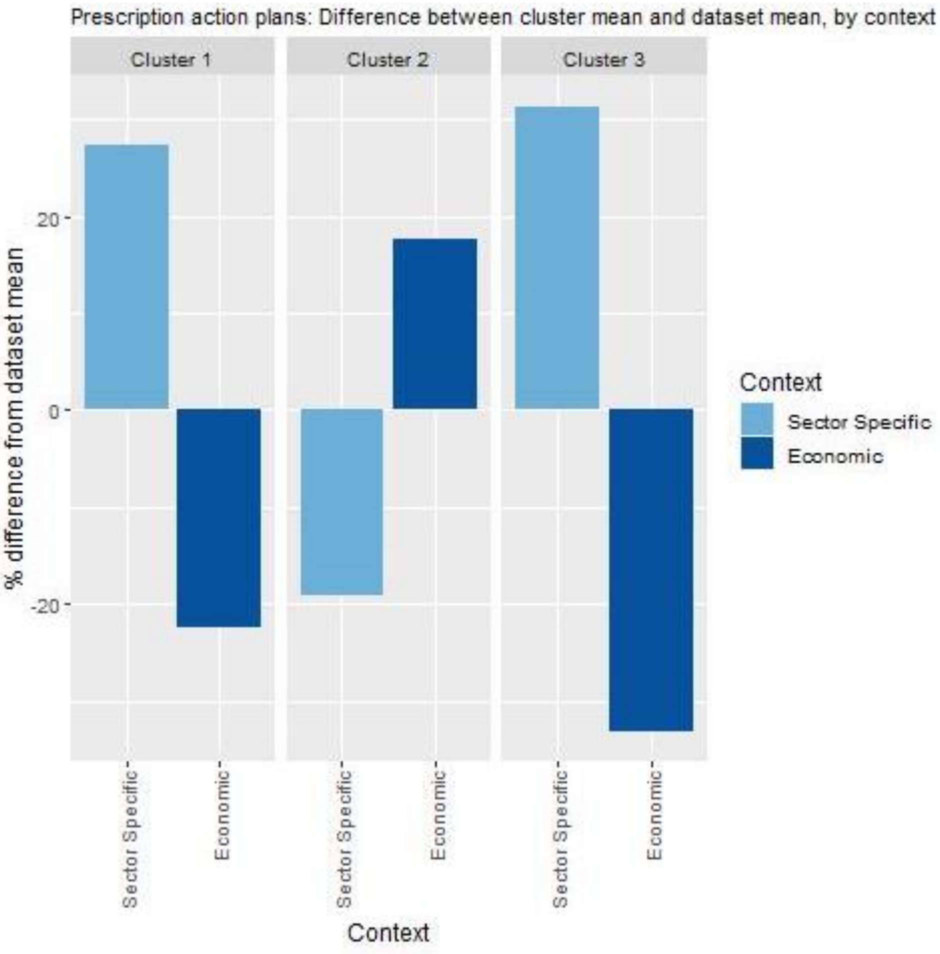
Note: *PC = primary care. **CHE = current health expenditure. n/a = no data available.
Source: See Table 1.1.

To help consolidate findings from the transferability assessment above, countries have been clustered into one of three groups, based on indicators reported in Table 1.1. Countries in clusters with more positive values have the greatest transfer potential. For further details on the methodological approach used, please refer to Annex A.

Key findings from each of the clusters are below with further details in Figure 14.3 and Table 14.6:

- Countries in cluster one typically have primary and secondary care sectors with the capability to implement the PAP programme (e.g. high use of EHRs at both care levels, and greater levels of task shifting). However, these countries also spend relatively less on primary care, which is where the PAP programme is primarily focused.
- Conversely, countries in cluster two spend relatively more on primary care indicating long-term financial sustainability for a PAP programme. However, certain countries in this cluster would benefit from assessing whether their primary and secondary care sectors are ready to implement the PAP programme. It is important to note that Spain falls under cluster two indicating that although it is ideal for different levels of the healthcare system to be integrated, it is not a pre-requisite for a successful transfer.
- Similar to cluster one, countries in cluster three typically have a healthcare system prepared to implement the PAP programme. However, more so than cluster one, countries in this cluster may suffer from long-term affordability issues if spending on primary care remains low.

Figure 14.3. Transferability assessment using clustering – Personalised Actions Plans



Note: Bar charts show percentage difference between cluster mean and dataset mean, for each indicator.
Source: See Table 1.1.

Table 14.6. Countries by cluster – Personalised Actions Plans

Cluster 1	Cluster 2	Cluster 3
Australia	Canada	Austria
Belgium	Chile	Denmark
Bulgaria	Cyprus	Germany
Croatia	Czech Republic	Iceland
Estonia	Finland	Israel
France	Greece	Sweden
Italy	Hungary	
Latvia	Ireland	
Mexico	Japan	
Netherlands	Lithuania	
	Luxembourg	
	Malta	
	New Zealand	
	Norway	
	Poland	
	Portugal	
	Romania	
	Slovak Republic	
	Slovenia	
	Spain	
	Switzerland	
	Türkiye	
	United Kingdom	
	United States	

Note: The following countries were omitted due to high levels of missing data: Costa Rica, Colombia and Korea.

New indicators to assess transferability

Data from publicly available datasets alone is not ideal to assess the transferability of public health interventions. Box 14.6 outlines several new indicators policy makers could consider before transferring the PAP programme.

Box 14.6. New indicators, or factors, to consider when assessing transferability – Personalised Actions Plans

In addition to the indicators within the transferability assessment, policy makers are encouraged to collect information for the following indicators:

Population context

- What is the level of health literacy among patients and caregivers? (i.e. are patients/caregivers likely to engage in shared decision-making?)
- What is the population's attitude towards receiving care from health professionals who are not doctors?

Sector specific context (primary and secondary care)

- What is the level of trust among health professionals to work together as a co-ordinated team?
- What is the level of support among health professionals to introduce personalised care plans?
- Does the clinical information system support: a) sharing of patient data across health professionals? b) Sharing of patient data across healthcare facilities?
- Do health provider reimbursement schemes support co-ordinated care? (E.g. bundled payments, add-on payments that incentivise co-ordinated care)
- Do regulations support integrated care models (i.e. professional competencies and practice scope)?

Political context

- Has the intervention received political support from key decision-makers (e.g. a national strategy to address ageing and chronicity)?
- Has the intervention received commitment from key decision-makers?

Economic context

- What is the cost of implementing and operating the intervention in the target setting and to whom?

Conclusion and next steps

In response to rising rates of people living with chronic conditions, Andalusia, Spain, introduced the PAP programme. The PAP programme was formally introduced in 2016, whereby eligible patients work with a multidisciplinary healthcare team to develop a long-term individual treatment/action plan. Since 2021, the PAP programme has focused on individuals living with heart failure or COPD, which equates to around 110 000-120 000 eligible patients.

An evaluation of the PAP in 2020 revealed an improvement in patient experiences, however the impact on health professionals is unclear. Using the validated PACIC survey, an evaluation by (Rodriguez-Blazquez et al., 2020[6]) revealed the PAP programme led to a statistically significant improvement in patient experiences. The same evaluation recorded a fall in the score used to measure the PAP programme from a health system perspective, however, this result was not statistically significant.

The design of the PAP programme promotes health equality, but this is not yet supported by data. The PAP programme develops care plans specific to individual needs, standardises care across the region and where necessary includes the expertise of a social worker. Further, the programme likely disproportionally benefits disadvantaged groups – e.g. low SES – given rates of morbidity are typically higher among such populations. Robust evidence supporting these claims, however, is not available.

Several options are available to policy makers to enhance the performance of the PAP programme. These include, but are not limited to, improving satisfaction among health professionals, collecting additional health outcome indicators and expanding eligibility to other chronic conditions.

Personalised care plans similar to the PAP programme exist across many OECD countries, but are generally more transferable to countries that promote integrated, digital care. Countries such as Australia, England and also other regions of Spain have been using personalised care programs for many years. For example, in Australia they were first introduced in 1999. Based on publicly available indicators, such programs are more easily transferred to countries that encourage health professionals to work as a team, and who have systems in place that support the use of digital means to share patient data (i.e. electronic health records).

Box 14.7 outlines next steps for policy makers and funding agencies regarding the PAP programme.

Box 14.7. Next steps for policy makers and funding agencies – Personalised Actions Plans

Next steps for policy makers and funding agencies to enhance the PAP programme are listed below:

- Undertake research to understand why health professionals may be less satisfied with the PAP programme compared to usual care
- Prioritise evaluations of the PAP programme that collect data on objective health outcomes as well as data across different population groups
- Support efforts to expand the programme to chronic conditions beyond COPD and heart failure if feasible.

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Notes

[1] The study by Rodriguez-Blazquez et al. (2020[6]) collected data before and after a change in the political team in charge of the Regional Government.

[2] There is both a national plan for primary care (2022-23), which is to be adapted by each regional health system, including Andalusia.

[3] Eligible patients – i.e. those with heart failure or COPD – may also have other chronic conditions such as asthma or diabetes.

15 Mobile Airways Sentinel Network (MASK), mHealth app

This chapter covers MASK (Mobile Airways Sentinel Network), an mHealth app designed to reduce the burden of allergic rhinitis and asthma. The case study includes an assessment of MASK against the five best practice criteria, policy options to enhance performance and an assessment of its transferability to other OECD and EU27 countries.

MASK (Mobile Airways Sentinel Network): Case study overview

Description: MASK (Mobile Airways Sentinel Network) is an mHealth intervention designed to reduce the burden of allergic rhinitis (AR) and asthma. MASK is broken into two components – one for individuals and the other for health professionals. Individuals can download the MASK-air app for free which includes an allergy diary (a daily recording of symptoms and treatment). Health professionals (GPs and specialists) have access to an *MASK-air Companion*, an electric decision support system to promote personalised treatment for patients with AR and asthma (i.e. patients share data from the MASK-air app with their health professional, which then informs treatment).

Best practice assessment:

OECD Best Practice assessment of MASK

Criteria	Assessment
Effectiveness	MASK has enhanced the knowledge base on AR and asthma, which has been used to improve treatment guidelines. Future evaluations of MASK aim to assess the impact of the intervention on work productivity, quality of life, adherence and symptoms
Efficiency	Real-world data (RWD) from the MASK-air app found that 97% of work days are impaired with uncontrolled AR symptoms compared to 20% when controlled An evaluation to estimate the cost per QALY of MASK is underway involving over 17 000 users.
Equity 🏅	MASK promotes equity by offering the same level of care for AR and asthma to people across the world, further, the intervention is designed to boost uptake amongst vulnerable populations (e.g. by making the app free of charge). However, mHealth apps can widen existing health inequalities given they are more popular among younger, higher-educated populations.
Evidence-base	A mixture of prospective observational and cross-sectional studies were used to build the knowledge base on AR and asthma. For example, cross-sectional data from over 90 000 days was used to calculate the correlation between AR/asthma symptoms and work productivity.
Extent of coverage	MASK-air has been downloaded by over 40 000 people across 27 countries. This translates into a participation rate of around 0.1% based on high-level calculations. The proportion of physicians and pharmacists who use MASK in their practice is not known for legal reasons.

Enhancement options: to *enhance effectiveness*, policy makers should continue efforts to boost levels of health literacy (HL) and digital HL, particularly amongst priority populations. Boosting digital HL amongst health professionals is also important to ensure they feel confident using digital products when treating patients. To *enhance equity,* MASK administrators could run promotion campaigns targeting priority populations. Further, to better understand the needs of priority population, new demographic questions could be added to the app allowing data (e.g. education as a proxy for socio-economic status). To *enhance the evidence-base*, an evaluation to determine the impact of MASK on outcomes such as quality of life is encouraged. To *enhance the extent of coverage* a multi-pronged targeted approach is needed.

Transferability: MASK was originally implemented in 18 countries and was subsequently been transferred to a further 10 (most of which are OECD and non-OECD European countries – e.g. Japan, Australia, Canada, Mexico, Brazil, Argentina). MASK is considered highly transferable given its simple design, further, experts from an international AR/asthma workgroup (ARIA) are located across the world who take responsibility for adapting the intervention to the local context.

Conclusion: MASK is an equity enhancing digital health intervention which has improved the knowledge base on AR and asthma. Subsequent evaluations of MASK using adherence, productivity and quality of life as outcomes, should be of key interest to policy makers and therefore strongly supported.

Intervention description

Allergic rhinitis (AR) and asthma are two of the most common chronic diseases in the world. Asthma affects approximately 339 million people worldwide and is attributable to an estimated 417 000 deaths and 24.8 million disability-adjusted life years (DALYs) annually (WHO, 2020▯).

Despite high levels of AR and asthma, self-management of AR and asthma, as reflected by adherence to medication, is poor. Further, shared decision-making is limited between patients with AR and asthma and health professionals.

To improve self-management of AR and asthma, there has been a growing shift towards mHealth apps. Digital innovations, such as mHealth, are growing increasingly popular given their potential to simultaneously improve patient outcomes and reduce pressure on healthcare systems. The growing role of mHealth apps is reflected at the international policy level, for example, the WHO in 2012 created the “Be He@lthy, Be Mobile” initiative, which produced a handbook on how to implement mHealth apps directly targeting asthma and COPD (WHO and ITU, 2017▯). MASK is one of the examples presented in this document.

MASK (Mobile Airways Sentinel Network) is a digital intervention designed to reduce the burden of AR and asthma. The MASK intervention is broken into two components – a component for individuals and another for health professionals.

MASK is the IT tool of the ARIA (Allergic Rhinitis and its Impact on Asthma) initiative developed from a WHO workshop in 1999. It has been further deployed to 52 countries by the WHO Collaborating Centre on asthma and rhinitis, Montpellier (2004-14). The third revision of ARIA guidelines (2017) [1] has been taken as the case scenario of the users’ guides to the medical literature on how to interpret and use a clinical practice guideline or recommendation recently published in the JAMA.

MASK for individuals

The MASK-air mHealth app is an online allergy diary designed for individuals with AR or asthma and is the central component of the MASK intervention (Bousquet et al., 2020▯). The app encourages users to record their symptoms by answering a range of questions daily. Specifically, users are prompted to answer questions related to:

- **Allergy symptoms**: rate nose, eye, asthma, and overall allergy symptoms using a visual analogue scale (VAS) (i.e. from “not at all bothersome” to “extremely bothersome”)
- **Work**: work today (yes/no) and if yes how allergies affected productivity (VAS from “not at all bothersome” to “no work possible”)
- **Education**: attend classes in an academic setting (yes/no) and if yes how allergies affected productivity
- **Treatment**: note down the treatments used that day (the app includes a full list of over-the-counter (OTC) and prescribed medications specific to each country).

Users of the app can “go further” and answer additional questionnaires, although not on a daily basis – for example, the CARAT (Control of Allergic Rhinitis and Asthma Test) and the EQ-5D. The former is a validated instrument to summarise the clinical status of AR and asthma in the previous month (users are prompted to answer the questionnaire after the first app use), while the latter is a commonly applied questionnaire to assess health-related quality of life.

A new pollen feature was uploaded to the app early 2021. The new feature describes the level of pollen exposure in the user’s local area allowing for an “easy and fast documentation of pollen allergy counts”. Users can therefore plan daily outdoor activities to minimise pollen exposure (Bousquet et al., 2019▯).

MASK is a Class 2 Medical Device therefore it is possible to upload information from the app to the user's electronic health record (EHR).

The app is available in 28 countries (most of which are OECD countries) and 18 languages, and is free of charge. In May 2021, the International Pharmaceutical Federation, the global body representing pharmacy, and pharmaceutical sciences and education, agreed to join MASK.

MASK for health professionals

Physicians and pharmacists will have access to the digital tool, the *MASK-air Companion*, via their tablet and a physician web-based questionnaire. These tools are inter-operable with the app. The Companion is an electronic decision support system to assist health professionals diagnose and provide personalised treatment to patients. Based on this information, health professionals can work with patients to develop tailored treatment using guidelines embedded within MASK.

OECD Best Practices Framework assessment

This section analyses MASK against the five criteria within OECD's Best Practice Identification Framework – Effectiveness, Efficiency, Equity, Evidence-base and Extent of coverage (see Box 15.1 for a high-level assessment of MASK). Further details on the OECD Framework can be found in Annex A.

Box 15.1. Assessment of MASK e-platform, multiple countries

Effectiveness

- MASK has enhanced the knowledge base of on AR and asthma, which has been used to improve treatment guidelines
- Future evaluations of MASK will assess the impact of the intervention on work productivity, quality of life, adherence and symptoms
- The impact of mHealth apps for AR and asthma on final outcomes (e.g. quality of life) is limited in the broader literature

Efficiency

- Real-world data (RWD) from the MASK-air app detail the extent to which AR and asthma symptoms affect productivity
- An evaluation to estimate the cost per QALY of MASK is underway involving over 17 000 users

Equity

- MASK promotes equity by offering the same level of care for AR and asthma to people across the world, further, the intervention has been designed to boost uptake amongst vulnerable populations (e.g. by making the app free of charge).
- Conversely, mHealth apps, such as MASK, have the potential to widen existing health inequalities given they more popular amongst younger, higher educated populations.

Evidence-base

- A mixture of prospective observational and cross-sectional studies were used to build the knowledge base on AR and asthma. For example, cross-sectional data from thousands of participants was used to calculate the correlation between AR/asthma symptoms and work productivity.

Extent of coverage

- The MASK-air app has been downloaded by over 40 000 people across 28 countries. This translates into a participation rate of around 0.1% based on high-level calculations.
- The proportion of physicians and specialists who use MASK is not known for legal reasons

Effectiveness

The effectiveness criterion reflects whether outcomes (final or intermediate) of the intervention were achieved. Final outcomes reflect the ultimate objective of policy makers, for this reason, they can take many years to achieve. In the interim, intermediate outcomes are collected which directly relate to final outcomes.

Intermediate and final outcomes of interest to the MASK intervention are summarised in Box 15.2. The remainder of this section explores MASK's progress towards achieving these outcomes, with a specific focus on intermediate outcomes given this is where most progress has been made.

Box 15.2. MASK intervention intermediate and final outcomes

Intermediate outcomes

- Improved treatment for people with AR and asthma through:
- → Better knowledge of symptoms and treatments
- → Better self-management of AR and asthma / patient empowerment
- → Development of personalised treatment plans (shared decision-making)

Final outcomes

- Reduce AR and asthma symptoms
- Improve patient quality of life
- Improve work productivity and indirect costs
- Reduce pressure on healthcare systems

Intermediate outcomes

To date, the main achievement of MASK has been its contribution towards enhancing the knowledge base on AR and asthma using real-world data (RWD).

Better knowledge of symptoms and treatments: the impact allergic airway diseases have on multimorbidity is well established, however, until recently less was known on the dynamics of daily symptoms (Sousa-Pinto et al., 2022▯). The MASK-air allergy diary collects daily data on symptoms and is therefore well-placed to address this knowledge gap. For example, a one-year prospective observational study using symptom data from 4 210 users (and 32 585 days) discovered considerable intra-individual variability of allergic multimorbidity, including a previously unrecognised extreme pattern of uncontrolled multimorbidity (MACVIA working group, 2018▯).

In terms of treatments, two cross-sectional studies using MASK-air data confirmed hypotheses that people do not use treatment on a daily basis, rather, they increase treatment with the onset of symptoms – i.e. VAS scores (which reflect symptom severity) were higher on days when patients used treatment (Bousquet et al., 2018) (Bédard et al., 2019). This finding led to a change in treatment guidelines for AR and asthma patients.

The novel discoveries using MASK-air data were confirmed in epidemiologic studies and genomic studies (Lemonnier et al., 2020). Example discoveries include knowledge that:

- Eye symptoms are more common in polysensitised patients (i.e. those who are sensitive to more than one allergen family), regardless of whether they have asthma (Siroux et al., 2019)
- Eye symptoms are positively associated with the severity of nasal symptoms and predict severe asthma (Amaral et al., 2018; Raciborski et al., 2019)
- The severity of allergic diseases increases with the number of allergic multimorbidities (Amaral et al., 2018)
- Some medications work better when taken simultaneously (Toppila-Salmi et al., 2019).

A better understanding of symptoms and treatments allows health professionals to provide more appropriate care to patients. The direct impact this has had on final patient outcomes is not yet known.

Better self-management of AR and asthma: a cross-sectional, observational study with approximately 6 000 MASK-air users found adherence to pharmacological treatment is approximately 10% (The MASK Group, 2019). Data linking the impact of MASK-air on adherence to medication is not available. More recently, data from the MASK-air app was used to assess adherence in patient reporting inhaled corticosteroid (ICS) and long-acting ß2-agonist (ICS+LABA) use. The analysis of the data found 30% of patients treated by inhaled steroids have an adherence rate between 60-70% depending on the medication (Sousa-Pinto et al., forthcoming).

Development of personalised treatment plans: next-generation guidelines to treat patients with AR were based on RWD from MASK-air in addition to existing GRADE-based guidelines as well as data from randomised controlled trials. Specifically, these information sources were used to develop the MACVIA (Contre les Maladies Chroniques pour un VIeillissement Actif) algorithm for AR treatment (MACVIA is one of the implementation tools of the European Innovation Partnership on Active and Healthy Ageing). The algorithm is built into the electronic decision support system for health professionals – the Allergy Diary Companion – therefore, health professionals will be able to prescribe personalised treatment based on patient-specific data. For example, the algorithm recommends treatments based on VAS scores (i.e. symptom severity), current medications and patient preferences (Bousquet et al., 2020) (see Annex 15.A). Since the upgrade of MASK to a C2MD, health professionals have had access to these guidelines in their Allergy Diary Companion.

Development of symptom medication scores (SMSs). SMSs are needed to investigate effect sizes of allergic rhinitis (AR) treatments. A combined symptom-medication score (CSMS) for allergic rhinitis (ARIA-EAACI Task Force) has been designed from MASK RWD. This approach is unique and allows for a standardisation of randomised controlled trials, RWD and clinical practice. In a 2021 paper, CSMS data from the MASK air app was found to be valid, reliable and accurate, therefore, it can be used as a primary endpoint for future rhinitis trials (Sousa-Pinto et al., 2022). Further, a daily electronic symptom medication score for asthma has been recently validated (Sousa-Pinto et al., 2023).

Deployment to asthma phenotypes: Eight novel phenotypes of asthma have been identified in 8 000 users of MASK-air. A new asthma-resistant phenotype associates uncontrolled asthma despite treatment and uncontrolled rhinitis and conjunctivitis (Bousquet et al., 2022).

Final outcomes

The impact of MASK final outcomes is not yet known given, to date, the focus has been to build the knowledge base on AR and asthma. The impact of similar mHealth apps on final outcomes is limited in the literature (WHO and ITU, 2017). For example, a systematic review undertaken by the WHO identified just two examples of where mHealth apps improved outcomes for users with asthma (both of which were in the United States):

- Farooqui et al. (2015▯) evaluated an asthma management mHealth app for children and adolescents and found it improved measures by users to avoid asthma triggers
- Britto et al. (2017▯) evaluated an intervention that used text messages to improve outcomes and found it led to modest improvements in asthma control, adherence to treatment and quality of life.

Efficiency

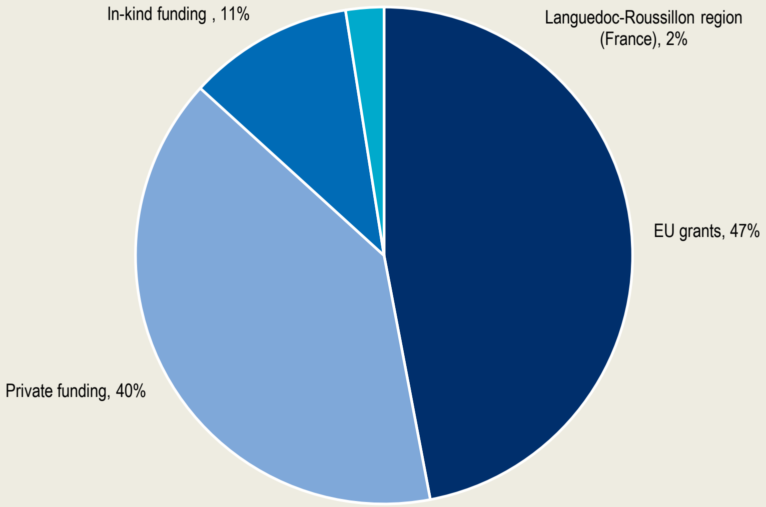
Given the relatively low cost of mHealth interventions and the high societal costs of AR and asthma, MASK has the potential to be highly efficient. Previous economic evaluations conclude productivity losses are the primary cost associated with AR (i.e. impaired performance and presenteeism) (Bousquet et al., 2018▯). For example, a systematic review on the impact of rhinitis on work productivity found that 3.6% of people with AR missed work time while symptoms impaired work performance for 35.9% of people (Vandenplas et al., 2018▯). In Europe work productivity losses due to AR are estimated to cost between EUR 30-50 billion per year (Zuberbier et al., 2014▯).

Data from the MASK-air app support previous findings on the economic impact of AR. A cross-sectional study using data from MASK-air (n=1 136 users over 5 659 days) assessed the impact of work productivity on uncontrolled AR. Results from the analysis found that when AR symptoms are controlled, work impairment occurs in less than 20% of all days compared to over 90% when symptoms are not controlled (Bousquet et al., 2017▯). The same study also measured the correlation between work productivity and specific AR symptoms. Results from the analysis found positive, strong correlations between work impairment and rhinitis (r=0.73) and asthma symptoms in users with asthma (r=0.60) (Bousquet et al., 2017▯). A study comparing the costs of MASK (see Box 15.3) to the impact it has on quality of life is underway involving nearly 18 000 users. Results from Bousquet et al. (2017▯) are supported by a more recent study involving over 7 000 users (The MASK Study Group, 2020▯).

Box 15.3. Cost of developing and implementing MASK

The cost of implementing MASK between 2014-20 was EUR 6.04 million, which was funded primarily through EU grants and private funding (Figure 15.1). The estimated cost for adding a country that wishes to transfer MASK is EUR 19 000 (or EUR 26 000 if MASK is not available in the local language). This includes various services such as project supervision, regulatory verification, terms of use translation, and app store implementation. For the full price list, see Annex 15.B.

Figure 15.1. Cost of developing and implementing MASK



Source: Data provided by MASK administrators.

Equity

MASK promotes equity by offering the same level of care to people across the world, further, the intervention has been designed to boost uptake amongst vulnerable populations. MASK is a demonstration project part of the WHO Global Alliance against Chronic Respiratory Diseases (GARD), which places a strong emphasis on ensuring equity of access to healthcare. MASK promotes equity by offering people across the world (including those in low- to high-income countries) access to the same quality of care for treating patients with AR and asthma (i.e. the clinical guidelines are the same across the world). Further, the app has been designed to accommodate the needs of certain priority populations by making it easy-to-use and free of charge.

In the region of Puglia, Italy, a specific effort to engage older people in the app is underway. The region's "Allergy Unit", which is dedicated to older patients, has invested in boosting health literacy levels. Initial research into the uptake of the MASK-air is promising with 60% of older age people stating they have the skills to use the app.

Despite efforts to boost uptake amongst priority populations, mHealth apps have the potential to widen existing health inequalities. Digital health interventions such as mHealth apps are more popular amongst younger, higher educated populations (Bol, Helberger and Weert, 2018▯; Azzopardi-Muscat and Sørensen, 2019▯). For example, research undertaken by OECD estimated adults in the highest income quartile are 50% more likely to use the internet to research health information, compared to adults in the lowest income quartile (OECD, 2019▯). Other groups less likely to use digital health interventions include older populations and those living in rural areas due to factors such as cost, lower digital health literacy skills and limited broadband access (Bol, Helberger and Weert, 2018▯; Azzopardi-Muscat and Sørensen, 2019▯; Oliveira Hashiguchi, 2020▯)

Evidence-base

Evidence to assess the effectiveness and efficiency of MASK relates to the intervention's contribution towards enhancing the knowledge base on AR and asthma. Therefore, it is not appropriate to assess the evidence-base of MASK using the *Quality Assessment Tool for Quantitative Studies* from the Effective Public Health Practice Project. Instead, this section summarises the methodology for a selection of articles cited under the section assessing the 'Effectiveness' and 'Efficiency' of MASK (see Box 15.4).

Box 15.4. Quality of evidence supporting MASK

A description of the methodology for a selection of studies outlined in the sections on "Effectiveness" and "Efficiency" are summarised below.

Better knowledge of symptoms and treatments

- MASK-air data was used to assess how people with AR and asthma treat themselves (i.e. patient behaviour). To undertake this analysis, a prospective observational study using MASK-air data was used. All users who were registered between May 2015 and November 2018 were included (no inclusion criteria) in order to maximise the sample size (n=9 122 users across 22 countries). Given an insufficient number of users reporting data over five days, a longitudinal analysis was not possible, instead non-parametric tests and medians were used to undertake the analysis (Bousquet et al., 2018▯).
- A similar methodology using data from over 9 000 users across 122 054 days was used by Bèdard et al. (2019▯) to assess how people treat themselves.
- A 2022 longitudinal study covering over 16 000 weeks of data collected from the MASK-air app concluded that patients were treating themselves according to their symptoms (Sousa-Pinto et al., 2022▯).

Self-management of AR and asthma

- Adherence to medication for users of MASK was assessed using a cross-sectional study over a period of 20 months. Users were included in the study if they recorded symptoms for at least seven days (not necessarily consecutively) within the MASK-air app. Data from 1 195 users across 22 countries were included in the study. Secondary adherence was measured using the Medication Possession Ratio (MPR) (ratio of days that medication was reported to have been used over a set period of time) and the Proportion of Days Covered (PDC) (days of reporting medication divided by the time interval defined by the first and last day the app was used) (The MASK Group, 2019▯).
- Adherence was also assessed in a forthcoming paper by Sousa-Pinto et al. (forthcoming▯). The analysis relied on real-world data collected from 100s of patients over several hundreds of weeks.

Impact of AR on work productivity

- The impact of AR on work productivity was analysed using a cross-sectional study using data from the MASK-air app. Data was collected from (over 7 000 users, 98 303 days) across 25 countries over the period 1 June 2016 to 31 October 2018. Correlations between symptoms and work productivity were calculated using Spearman's Rank test.
- A similar methodology was used by Bèdard et al. (2020▯) involving over 14 000 users across nearly 206 000 days.

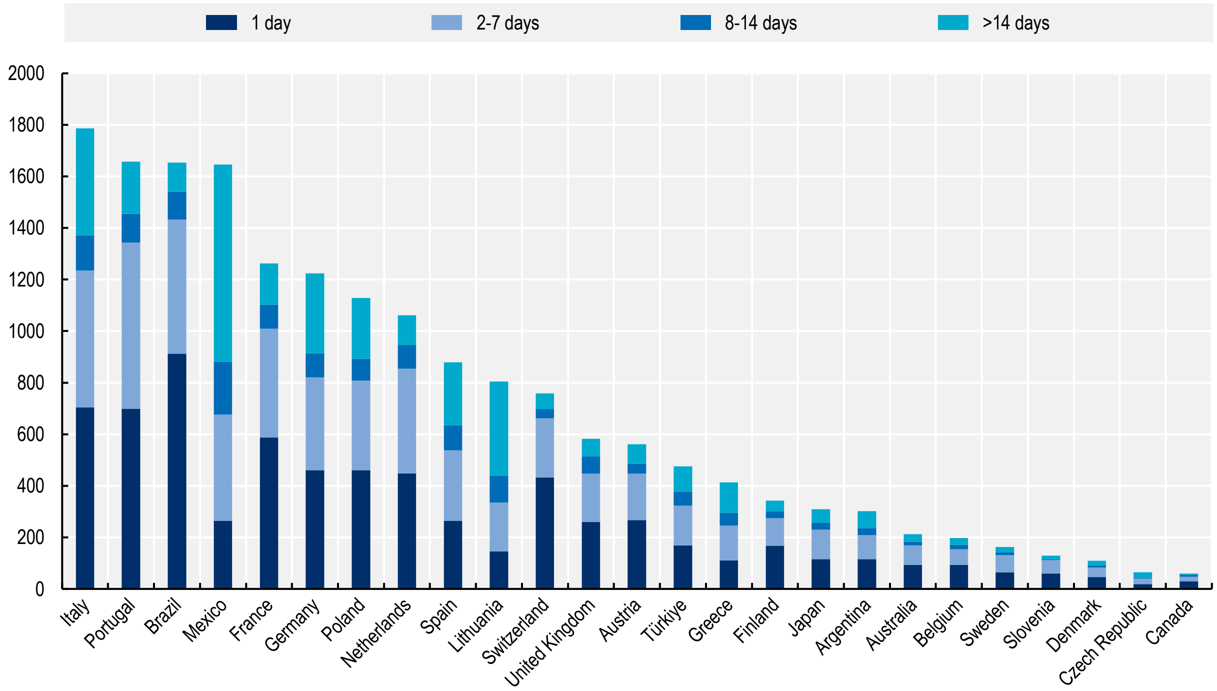
Extent of coverage

Individuals

As of December 2020, the MASK-air app had been downloaded by over 40 000 people across 27 countries. Of these users, 45% are aged 16-90 years and regularly use the app by logging their symptoms via the VAS questions (Figure 15.2). The total number of users is highest in Italy (1 786), however, prolonged use is highest in Mexico where over 700 people have used the app for 14 days or more. On a daily basis, MASK-air has approximately 1 000 users, which increases during the pollen season.

The participation rate (the proportion of the eligible population who access an intervention) in MASK-air ranges from 0.004% in Canada to 1.22% in Lithuania, based on high-level calculations[1] (average 0.11% across all countries) (OECD.Stat, 2018▯; World Bank, 2019▯; Institute for Health Metrics and Evaluation, 2019▯). This level of participation aligns with existing information on mHealth uptake, for example, previous research by OECD revealed around 2.2% of the adult population (15-64 years) use mobile apps to improve their health and fitness (Goryakin et al., 2017▯; OECD, 2019▯).

Figure 15.2. MASK-air users by days of use



Source: Data provided to OECD by MASK-air administrators.

Health professionals

The number of physicians and pharmacists who use MASK is not known due to privacy laws. This information will become available when MASK is upgraded to a C2MD.

Policy options to enhance performance

Policy options available to high-level policy makers (e.g. region / state / national governments) and MASK administrators are outlined in this section and refer to each of the five best practice criteria.

Enhancing effectiveness

Higher levels of population health literacy (HL) will enhance the effectiveness of mHealth apps such as MASK-air. HL refers to an "individual's knowledge, motivation and skills to access, understand, evaluate and apply health information" (OECD, 2018▯). When people are health literate they are more likely to act on health information they receive, take greater responsibility for their own health (e.g. by adhering to medication), as well as engage in shared decision-making. Recent analysis estimated that more than half of OECD countries with available data had low levels of HL (OECD, 2018▯). To address low rates of adult health literacy, OECD have outlined a four-pronged policy approach (OECD, 2018▯):

- *Strengthen the health system role*: establish national strategies and framework designed to address HL
- *Acknowledge the importance of HL through research*: measure and monitor the progress of HL interventions to better understand what policies work
- *Improve data infrastructure:* improve international comparisons of HL as well as monitoring HL levels over time
- *Strengthen international collaboration*: share best practice interventions to boost HL across countries.

In addition to the above, high-level policy makers could consider actions directly targeting individuals, for example, encouraging HL at schools, and providing HL counselling and training in community and workplace settings. Enhanced HL will also increase uptake (i.e. extent of coverage) of MASK-air.

Digital health products, such as MASK, require users to be digitally health literate. Healthcare systems are growing increasingly digital as evidenced by the growing number of countries with national eHealth strategies (WHO, 2015▯). Therefore, in addition to improving HL, policy makers should promote digital HL so that people can apply their health knowledge/skills to digital products. Any policy efforts should have a specific focus on groups of the population who face barriers to accessing and utilising eHealth products, such as mHealth apps, given these groups often stand to benefit most (e.g. those with a lower socio-economic status) (Oliveira Hashiguchi, 2020▯).

Health professionals must also be digitally health literate in order to feel confident using digital products when treating patients. Among OECD countries, one-third of health workers do not feel accustomed to using digital solutions "due to gaps in knowledge and skills in data analytics" (OECD, 2019▯). To ensure health professionals can "safely and effectively" adopt digital work tools (e.g. mHealth apps), it is important they receive adequate support via training and education, for example by (OECD, 2019▯):

- *Developing digital health competency frameworks* that inform what changes to the education of health professionals are needed, with a particular focus on physicians. For example, the *EU*US eHealth Work Project* (2016-18) developed an international competency framework and aligning education content to enhance the digital skills of health professionals (EU*US eHealth Work Project, 2019▯).
- *Developing concrete guidelines on how to integrate digital health topics into education and training programs for health professionals*, for example, as done by the Swiss Competence and Co-ordination Centre of the Confederation and the Cantons.
- *Integrating digital skills into Continuous Professional Development (CPD) programs,* to ensure health professional skills align with latest digital developments.

Enhancing efficiency

Efficiency is calculated by obtaining information on effectiveness and expressing it in relation to inputs used. Therefore, policies to boost effectiveness without significant increases in costs will have a positive impact on efficiency.

Enhancing equity

Policies to increase access and utilisation of MASK among priority population groups can reduce health inequalities. There are groups in the population who are less likely to utilise and therefore benefit from digital health products, such as MASK-air – e.g. the older population are less likely to be digitally health literate, while economically disadvantaged groups may not have regular access to the internet (Bol, Helberger and Weert, 2018▯; Azzopardi-Muscat and Sørensen, 2019▯; Oliveira Hashiguchi, 2020▯). Governments and other relevant policy makers can respond by focusing efforts to build HL and digital HL on priority population groups. More direct action that can be implemented by MASK administrators include:

- targeted promotion campaigns as well as the provision of detailed, tailored, advice on how to use the app and its benefits
- collecting data that can be disaggregated by priority population groups (e.g. information on level of education as a proxy for SES status). This information can subsequently be used to amend MASK to suit the needs of priority populations.

Failing to address the needs of priority population groups risks widening existing health inequalities.

Enhancing the evidence-base

The impact of MASK on final outcomes will be of key interest to policy makers and is therefore encouraged. To date, studies evaluating the impact of MASK have focused on the intervention's impact on building the knowledge base around AR and asthma. Going forward, an evaluation to understand the impact of MASK on final outcomes (e.g. patient quality of life, work productivity and health system costs) is encouraged given this of key interest to policy makers.

Key steps involved in undertaking an evaluation are outlined in OECD's *Guidebook on Best Practices in Public Health*. These steps are summarised below to assist MASK administrators in future evaluation efforts:

Design the evaluation study

- *Develop a logic model*: a logic model summarises the main elements of an intervention and provides a visual overview of the relationship between inputs, activities, outputs and outcomes. Example programme logics for mHealth apps can be found in WHO's *Be He@lthy, Be Mobile* handbook for asthma and COPD (WHO and ITU, 2017▯).
- *Select evaluation indicators*: indicators for each element within the programme logic need to be specified. Example outcome indicators for MASK may include EQ-5D (patient quality of life) and work productivity. Indicators should be SMART (specific, measurable, achievable, relevant and time-bound) and where possible be stratified to understand the intervention's impact on inequalities (as discussed under "Enhancing efficiency").
- *Choose a study design*: process evaluations assess whether an intervention was implemented as intended whereas an outcome evaluation assesses the impact the intervention had on outcomes. Regarding the latter, it is necessary to choose a study design that is appropriate for the intervention.
- *Choose a data collection method*: any evaluation of MASK will largely rely on real-world data collected from the app. Additional primary sources of data may also be collected, for example, from user surveys.

Execute the evaluation study

- *Collect the data*: data collection methods should consider logistics, consent, privacy, data security and other ethical considerations. Given data from MASK has been used in numerous studies, no significant barriers are foreseen. In regards to timeline, data is typically collected at the start, middle and end of an intervention. This is less relevant for MASK given it has already been implemented and is ongoing. Nevertheless, it may be useful when evaluating the impact of MASK in a new country.
- *Analyse the data*: it is not possible to detail all the various methods available to analyse data here, however, a first step for any intervention is to analyse descriptive statistics including a look at the pattern of missing data.

Act on evaluation results

- *Follow-up action*: results from the evaluation will provide useful information on how the intervention can be adapted to improve performance.
- *Disseminate results*: evaluation results should be conveyed to the target audience via appropriate channels. In particular, it is important to convey "lessons learnt" and how these will be incorporated into the future design of MASK.

Enhancing extent of coverage

A multi-pronged approach is needed to boost uptake of MASK-air among the public. Several strategies exist to boost uptake of mHealth apps amongst the public. For example, ensuring the app is easy-to-use, free-of-charge and safe (i.e. privacy is ensured), all of which are characteristics of MASK-air. More specific strategies that are relevant to MASK-air are outlined in WHO's *Be He@lthy, Be Mobile: a handbook on how to implement mHealth for asthma and COPD* (see Box 15.5) (WHO and ITU, 2017▯).

Box 15.5. Promotion and recruitment for asthma and COPD mHealth apps

WHO has developed a "Be He@lthy, Be Mobile" handbook on how to implement mHealth for asthma and COPD. Within the handbook there are several recommendations on how to optimise an mHealth's promotion and recruitment strategy, specifically by considering (WHO and ITU, 2017▯):

- The **target audience** and the most effective method for reaching them
- Who the public view is the **"owner" of the intervention** as this will guide the promotional campaign
- Whether the promotional campaign can be **linked to or leveraged by organisations or public figures** with a high media profile related to respiratory disease control or prevention
- **Previous lessons learnt** in terms of effective promotional techniques
- The **local mobile network environment** (e.g. can unsolicited text messages be sent to those with mobile phones?)
- Whether **incentives** are appropriate to boost uptake (preferably non-monetary)
- Whether marketing and promotional campaigns can be **leveraged by stakeholder agencies**
- The **timing of the campaign**, for example, by first running a "soft launch" to address any unforeseen issues.

To increase uptake amongst health professionals, MASK must continue to be trusted and non-burdensome. Several strategies exist to boost uptake of digital products amongst health workers. Salient examples include (OECD, 2019):

- ensuring the digital product is developed based on robust evidence in order to build trust
- involving health professionals (i.e. end-users) in the design of the digital product given they are best placed to understand patient needs and wants
- ensuring the digital product is easy-to-use and can be integrated into current practices given health professionals are often under significant time pressure.

The above examples are current features of the MASK intervention. Nevertheless, before implementing any new features (e.g. updates to the app), the needs of health professionals should be taken into account.

Transferability

This section explores the transferability of MASK and is broken into three components: 1) an examination of previous transfers; 2) a transferability assessment using publicly available data; and 3) additional considerations for policy makers interested in transferring MASK.

Previous transfers

MASK was initially deployed across 18 countries and has been transferred to a further 10. The majority of MASK countries are also OECD members (see Table 15.1). The intervention will continue to be scaled-up across Europe as part of the European Innovation Partnership on Active and Healthy Ageing (EIP-AHA) Twinning Project (see Box 15.6) and globally by the ARIA group and the Global Alliance Against Chronic Respiratory Diseases (GARD), a WHO alliance.

Box 15.6. EIP-AHA Twinning Project

As part of the EIP-AHA Twinning Project, the MASK-air app is being transferred to 25 reference sites. A reference site may be a country, region or organisation. The purpose of the Twinning Project is to assess the transferability of MASK-air to a range of different contexts and to better understand the burden, diagnosis and management of rhinitis (Bousquet et al., 2019).

The core components of MASK-air are the same across all countries, however, the app is adapted to suit the needs of each country. MASK relies on its experts from the ARIA (Allergic Rhinitis and Its Impact on Asthma)[2] workgroup to adapt the intervention – at present there are nearly 700 ARIA experts across 92 countries. Experts are responsible for translating the app into the local language, wording questions appropriately and adapting the medication list to align with available over-the-counter medicines.

Table 15.1. Countries where MASK is available

Country group	Countries
OECD	Argentina, Austria, Australia, Brazil, Belgium, Canada, the Czech Republic, Germany, Denmark, Spain, Finland, France, Japan, Greece, Hungary, Italy, Lithuania, Mexico, the Netherlands, Poland, Portugal, Slovenia, Sweden, Switzerland, Türkiye, the United Kingdom *Implementation underway in*: Romania
Other	Lebanon

Transferability assessment

Methodological framework

Details on the methodological framework to assess transferability can be found in Annex A.

Several indicators to assess the transferability of MASK were identified (Table 15.2). Indicators were drawn from international databases and surveys to maximise coverage across OECD and non-OECD European countries. Please note, the assessment is intentionally high level given the availability of public data covering OECD and non-OECD European countries.

MASK is available in most OECD countries (Table 15.1), therefore results from the transferability assessment can instead be used to identify areas to enhance the impact of MASK.

Table 15.2. Indicators to assess the transferability of MASK

Indicator	Reasoning	Interpretation
Population context		
% of individuals using the internet for seeking health information in the last 3 months	MASK is more likely to be successful in a population comfortable seeking health information online	↑ value = more transferable
ICT Development Index*	MASK is more likely to be successful in digitally advanced countries	↑ value = more transferable
Sector context (digital health sector)		
Legislation exists to protect the privacy of personally identifiable data of individuals, irrespective of whether it is in paper or digital format	mHealth apps work in settings where users feel their personal data is safe. Therefore, MASK is more transferable to countries with legislation to protect patient data.	'Yes' = more transferable
eHealth composite index of adoption amongst GPs**	MASK users can share results from the app with their GP, therefore, MASK is more transferable to countries where GPs are comfortable using eHealth technologies	↑ value = more transferable
Entity providing incentives and guidance for mHealth apps	MASK is more likely to be successful in countries where there is an entity responsible for promoting mHealth apps	'Yes' = more transferable
mHealth programs for clinical decision support are available	MASK is more transferable to countries where health professionals utilise mHealth apps to support clinical decision making	'Yes' = more transferable
Political context		
A national eHealth policy or strategy exists	MASK is more transferable to countries with national policies to support eHealth	'Yes' = more transferable
A dedicated national telehealth policy or strategy exists	MASK is more transferable to countries with national policies to support telehealth	'Yes' = more transferable
Economic context		
Special funding is allocated for the implementation of the national eHealth policy or strategy	TEC is more likely to be successful if there already is allocated funding for eHealth	'Yes' = more transferable

Note: *The ICT development index represents a country's information and communication technology capability. It is a composite indicator reflecting ICT readiness, intensity and impact (ITU, 2020). **The eHealth composite index of adoption amongst GPs is made up of adoption in regards to electronic health records, telehealth, personal health records and health information exchange (European Commission, 2018).
Source: ITU (2020), "The ICT Development Index (IDI): conceptual framework and methodology", https://www.itu.int/en/ITU-D/Statistics/Pages/publications/mis/methodology.aspx; WHO (2015), "Atlas of eHealth country profiles: The use of eHealth in support of universal health coverage", https://www.afro.who.int/publications/atlas-ehealth-country-profiles-use-ehealth-support-universal-health-coverage; European Commission (2018), "Benchmarking Deployment of eHealth among General Practitioners (2018)", https://op.europa.eu/en/publication-detail/-/publication/d1286ce7-5c05-11e9-9c52-01aa75ed71a1; OECD (2019), "Individuals using the Internet for seeking health information – last 3 m (%) (all individuals aged 16-74)"; WHO, "Existence of operational policy/strategy/action plan to reduce unhealthy diet related to NCDs (Noncommunicable diseases)", https://apps.who.int/gho/data/node.imr.NCD_CCS_DietPlan?lang=en; World Bank (2017), "GNI per capita, PPP (constant 2017 international $)", https://data.worldbank.org/indicator/NY.GNP.PCAP.PP.KD.

Results

Sweden has been chosen as the “owner setting” given it scores well against criteria relevant for assessing the transferability of MASK (i.e. contextual factors in the country are conducive to the success of MASK) (Table 15.3). For example, Sweden has good information and communication technology capability (ICT score of 8.5 versus 7.4 average across all countries). Given MASK already operates in the majority of countries analysed, findings from the assessment can inform countries on areas to improve to enhance the impact of MASK.

Key areas countries could improve include boosting eHealth adoption amongst health professionals (such as GPs) (see section “Enhancing effectiveness”); compared to Sweden, eHealth adoption is approximately 20% lower in countries with available data. Improving levels of digital HL in the public is also important as it increases the proportion of people seeking health information online (currently 62% of people in Sweden seek health information online versus 54% on average amongst other countries).

Table 15.3. Transferability assessment by country (OECD and non-OECD European countries) – MASK

A darker shade indicates MASK may operate better in that particular country

Country	Individuals using the Internet for seeking health information – last 3 m (%)	ICT Development Index (2015)	Legislation exists to protect the privacy of personally identifiable data of individuals, irrespective of whether it is in paper or digital format	eHealth composite index of adoption score amongst GPs in Europe	An entity providing incentives and guidance for innovation, research and evaluation of health apps exists	mHealth programmes that provide clinical decision support (operating levels and types)	A national eHealth policy or strategy exists	A dedicated national telehealth policy or strategy exists	The proportion of funding contribution for eHealth programmes provided by public funding sources over the previous two years
Sweden	**62**	**8.50**	**Yes**	**2.52**	**Yes**	**National**	**Yes**	**No**	**Very high**
Australia†	42	8.20	n/a	n/a	n/a	n/a	Yes	No	Very high
Austria†	53	7.50	Yes	1.91	No	n/a	No	No	Very high
Belgium†	49	7.70	Yes	2.07	No	National	Yes	Combined*	Very high
Bulgaria	34	6.40	Yes	1.81	No	n/a	Yes	Combined	Low
Canada†	59	7.60	Yes	n/a	n/a	National, local	Yes	No	Very high
Chile	27	6.10	Yes	n/a	n/a	n/a	Yes	No	Very high
Colombia	41	5.00	Yes	n/a	n/a	National, intermediate	n/a	Yes	n/a
Costa Rica	44	6.00	Yes	n/a	n/a	n/a	Yes	Yes	Very high
Croatia	53	6.80	Yes	2.18	Yes	n/a	Yes	Yes	Very high
Cyprus	58	6.30		1.93	No	n/a	Yes	Combined	Very high
Czech Republic†	56	7.20	Yes	2.06	Yes	n/a	No	Combined	Low
Denmark†	67	8.80	Yes	2.86	No	Regional	Yes	Yes	Very high
Estonia	60	8.00	Yes	2.79	Yes	Intermediate	Yes	No	Very high
Finland†	76	8.10	Yes	2.64	n/a	Regional	Yes	Combined	Very high
France†	50	8.00	n/a	2.05	n/a	n/a	n/a	n/a	n/a
Germany†	66	8.10	n/a	1.94	n/a	n/a	n/a	n/a	n/a
Greece†	50	6.90	Yes	1.79	No	n/a	Yes	Combined	Very high
Hungary†	60	6.60	Yes	2.03	No	n/a	No	No	Very high

Country	Individuals using the Internet for seeking health information – last 3 m (%)	ICT Development Index (2015)	Legislation exists to protect the privacy of personally identifiable data of individuals, irrespective of whether it is in paper or digital format	eHealth composite index of adoption score amongst GPs in Europe	An entity providing incentives and guidance for innovation, research and evaluation of health apps exists	mHealth programmes that provide clinical decision support (operating levels and types)	A national eHealth policy or strategy exists	A dedicated national telehealth policy or strategy exists	The proportion of funding contribution for eHealth programmes provided by public funding sources over the previous two years
Sweden	**62**	**8.50**	**Yes**	**2.52**	**Yes**	**National**	**Yes**	**No**	**Very high**
Iceland	65	8.70	Yes	n/a	No	National	Yes	No	Very high
Ireland	57	7.70	Yes	2.10	n/a	n/a	Yes	No	Low
Israel	50	7.30	Yes	n/a	n/a	n/a	No	Yes	Very high
Italy†	35	6.90	Yes	2.19	No	Local	Yes	Yes	Very high
Japan†	n/a	8.30	Yes	n/a	n/a	National	Yes	No	n/a
Korea	50	8.80	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Latvia	48	6.90	Yes	1.83	No	National	Yes	Combined	Low
Lithuania†	61	7.00	Yes	1.65	Yes	National	Yes	Yes	High
Luxembourg	58	8.30	Yes	1.78	No	Local	Yes	Combined	Very high
Malta	59	7.50	Yes	n/a	Yes	n/a	No	No	Very high
Mexico†	50	4.50	Yes	n/a	n/a	n/a	No	No	High
Netherlands†	74	8.40	Yes	n/a	Yes	Local	Yes	No	Very high
New Zealand	n/a	8.10	Yes	n/a	n/a	International, National, local	Yes	Combined	Low
Norway	69	8.40	Yes	n/a	No	n/a	Yes	Yes	Very high
Poland†	47	6.60	Yes	1.84	No	Local	Yes	Combined	Very high
Portugal†	49	6.60	Yes	2.12	Yes	Local	No	Yes	High
Romania	33	5.90	Yes	1.79	No	n/a	Yes	n/a	n/a
Slovak Republic	53	6.70	n/a	1.76	n/a	n/a		n/a	n/a
Slovenia†	48	7.10	Yes	2.00	No	n/a	No	No	Very high
Spain†	60	7.50	Yes	2.37	Yes	Regional	No	No	Very high
Switzerland†	67	8.50	Yes	n/a	No	Local	Yes	No	Low
Türkiye†	51	5.50	Yes	n/a	Yes	National	No	Combined	Low

Country	Individuals using the Internet for seeking health information – last 3 m (%)	ICT Development Index (2015)	Legislation exists to protect the privacy of personally identifiable data of individuals, irrespective of whether it is in paper or digital format	eHealth composite index of adoption score amongst GPs in Europe	An entity providing incentives and guidance for innovation, research and evaluation of health apps exists	mHealth programmes that provide clinical decision support (operating levels and types)	A national eHealth policy or strategy exists	A dedicated national telehealth policy or strategy exists	The proportion of funding contribution for eHealth programmes provided by public funding sources over the previous two years
Sweden	**62**	**8.50**	**Yes**	**2.52**	**Yes**	**National**	**Yes**	**No**	**Very high**
United Kingdom†	67	8.50	Yes	2.52	Yes	Intermediate	Yes	Yes	Very high
United States	38	8.10	Yes	n/a	n/a	National	Yes	No	n/a

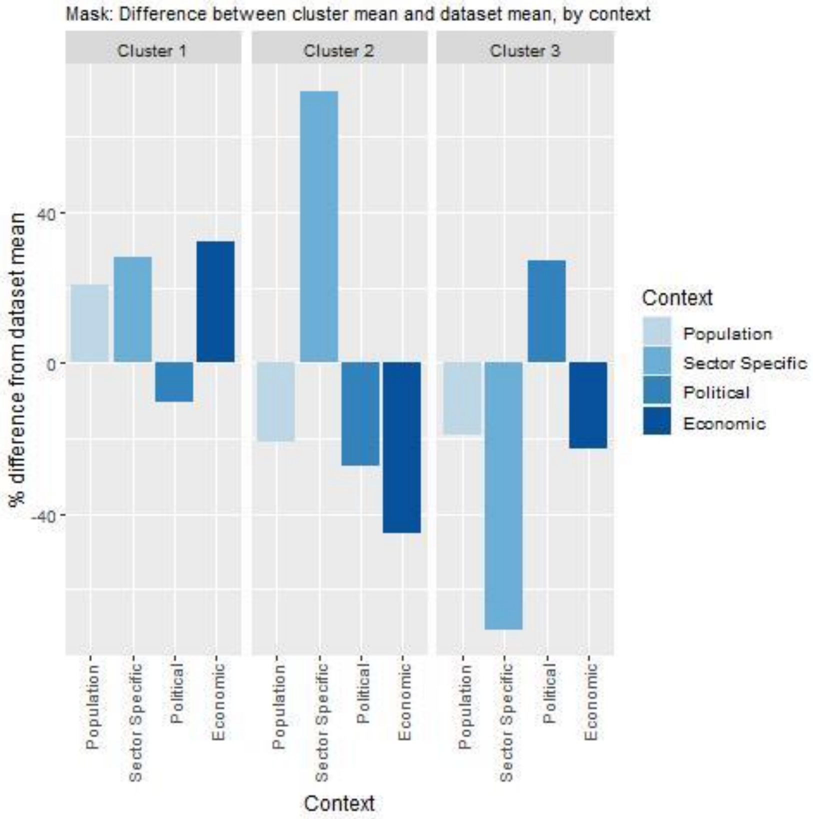
Note: n/a indicates data is missing. * Combined with eHealth policy or strategy. † indicates MASK currently operates in the country.
Source: See Table 15.2.

To help consolidate findings from the transferability assessment above, countries have been clustered into one of three groups, based on indicators reported in Table 15.2. Countries in clusters with more positive values have the greatest transfer potential. For further details on the methodological approach used, please refer to Annex A.

Key findings from each of the clusters are below with further details in Figure 15.3 and Table 15.4:

- Several factors important for implementing and operating MASK are present in countries that fall under cluster one. For example, access to digital tools and digitally literate populations, as well as relatively high levels of funding for eHealth tools. Certain countries in this cluster could experience issues implementing MASK if the tool fails to align with high-level political objectives. Cluster one includes several countries that have previously transferred MASK including Australia, Austria, Canada, Denmark and Sweden.
- Based on available data, countries in cluster two typically have strong digital health sectors that promote tools such as MASK (e.g. high levels of digital literacy among GPs and incentives to use mHealth apps). However, these countries may experience implementation barriers due to economic and political factors. It is important to note that certain countries in cluster two currently use MASK, indicating the factors used to assess transferability, although important, are not critical to the tool's success.
- Political objectives in countries that fall under cluster three tend to promote the use of mHealth apps such as MASK (e.g. A national eHealth and telehealth policy). Nevertheless, the readiness of the population and health sector utilise digital health tools may act as implementation barriers.

Figure 15.3. Transferability assessment using clustering – MASK



Note: Bar charts show percentage difference between cluster mean and dataset mean, for each indicator.
Source: See Table 15.2.

Table 15.4. Countries by cluster – MASK

Cluster 1	Cluster 2	Cluster 3
Australia	Czech Republic	Belgium
Austria	Israel	Bulgaria
Canada	Lithuania	Chile
Croatia	Mexico	Costa Rica
Denmark	Portugal	Cyprus
Estonia	Türkiye	Greece
Finland		Ireland
Hungary		Italy
Iceland		Latvia
Luxembourg		New Zealand
Malta		Poland
Netherlands		Romania
Norway		Switzerland
Slovenia		
Spain		
Sweden		
United Kingdom		
United States		

Note: The following countries were omitted due to high levels of missing data: Colombia, France, Germany, Japan, Korea and the Slovak Republic.

New indicators to assess transferability

Data from publicly available datasets is not sufficient to assess the transferability of MASK. For example, there is no publicly available information the level of public acceptability of mHealth interventions. Therefore, Box 15.7 outlines several new indicators policy makers should consider before transferring MASK.

Box 15.7. New indicators, or factors, to consider when assessing transferability – MASK

In addition to the indicators within the transferability assessment, policy makers are encouraged to collect data for the following indicators:

Population context

- How acceptable are mHealth interventions amongst the public?
- Do patients have the skills to access healthcare online?
- What proportion of the population has access to a smartphone and the internet?
- Does the population trust their personal health information will be used, stored and managed appropriately?

Sector-specific context (digital health)

- What, if any, compatible interventions exist?
- What, if any, competing interventions exist? (e.g. other asthma/AR mHealth apps)
- Are healthcare providers supportive of using digital products to treat patients with asthma/AR among the health profession?
- Do regulations support integration of MASK into the healthcare guidelines? (relevant for countries who do not fall under GDPR rules (Genders Data Protection Regulation))

Political context

- Has the intervention received political support from key decision-makers?
- Has the intervention received commitment from key decision-makers?

Economic context

- Are there additional cost of implemented the intervention in the target setting beyond those estimated by MASK administrators (see Box 15.3)?

Conclusion and next steps

MASK is a digital intervention designed to reduce the burden of AR and asthma. The MASK intervention is broken into two components – one for individuals and the other for health professionals. Individuals can download the MASK-air app, free-of-charge, which includes a series of questions users fill out in regard to their daily symptoms and treatments. This information can be shared with health professionals who will have access to a compatible MASK-air Companion, which will act as an electronic decision support system once MASK is upgraded to a C2MD and a physician's web-based questionnaire.

Data collected from the MASK-air app has been used to enhance the knowledge base related to AR and asthma. Key examples include the impact of AR/asthma symptoms on work productivity as well as a better understanding of how people adhere to medication. This information has been used to improve care guidelines to reflect real world experiences. In coming years, MASK administrators plan to undertake outcome evaluations which will examine the impact of MASK on symptoms, adherence, quality of life and work productivity.

MASK performs particularly well against the equity criterion. MASK reduces health inequalities by, first, offering people across the world access to the same quality of care for treating patients with AR and asthma. And, second, by accommodating the needs of priority populations in the design of the app, for example, by making it easy-to-use and free of charge.

To enhance the performance of MASK several policy options are available. One key policy, which falls under the responsibility of high-level policy makers (e.g. at the national level), is to boost levels of digital HL amongst the public and health professionals. Policies available to MASK administrators include imputing features that allow data to be disaggregated by priority population groups, as well as using a multi-pronged, targeted approach to boost uptake.

MASK is a highly transferable digital health intervention. MASK was initially implemented in 18 countries and was subsequently transferred to a further 10, most of which are OECD and non-OECD EU countries. The highly transferable nature of MASK is accredited to its simple design and the network of AR and asthma experts who take responsibility for adapting the intervention to the local context.

MASK is an innovative digital health intervention with the potential to significantly improve outcomes (e.g. through change management) for those with AR and asthma while simultaneously reducing pressure on healthcare systems. Next steps for policy makers and funding agencies to promote MASK are outlined in Box 15.8.

Box 15.8. Next steps for policy makers and funding agencies – MASK

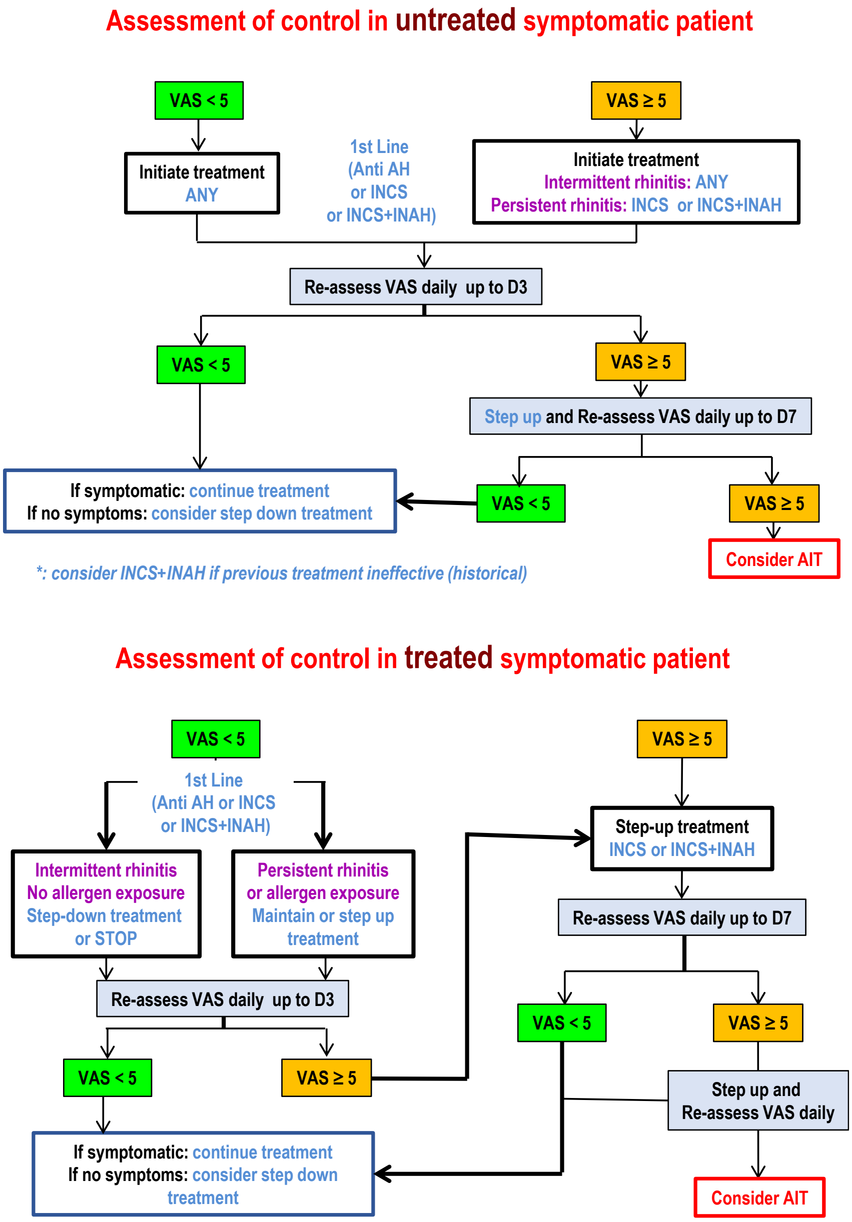
Next steps for policy makers and funding agencies to enhance MASK are listed below:

- Support policy efforts to boost population health literacy and digital health literacy in order to increase uptake of mHealth apps such as MASK-air
- Ensure health professionals receive ongoing education on digital health literacy, for example, by integrating digital health topics into training programs
- Promote findings from the MASK case study to better understand what countries/regions are interested in transferring the intervention
- Promote "lessons learnt" from countries that have transferred MASK to their local setting.

Annex 15.A. MACVIA algorithm for AR treatment

The figure below shows the step-up/step-down MACVIA algorithm to guide pharmacotherapy clinical decisions for patients with AR.

Annex Figure 15.A.1. MACVIA algorithm to guide pharmacotherapy for patients with AR



Note: AH = H1-anti-histamine; INAH = Intra-nasal H1-anti-histamine; INCS = Intra-nasal corticosteroid; AIT = Allergen immunotherapy; VAS = Visual analogue scale.

Source: Updated version of Bousquet et al. (2020[1]), "Next-generation Allergic Rhinitis and Its Impact on Asthma (ARIA) guidelines for allergic rhinitis based on Grading of Recommendations Assessment, Development and Evaluation (GRADE) and real-world evidence", https://www.doi.org/10.1016/j.jaci.2019.06.049.

Annex 15.B. MASK-air app price list

Annex Table 15.B.1. MASK-air price list (as of 2021)

Services	Standard pack	Advanced pack	Options
Project supervision and follow up after launching	✓	✓	
Regulatory verification	✓	✓	
Terms of use translation	Provided by your service	✓	
Application translation (interface-daily follow-up profile)	Provided by your service	✓	
Multi-official languages (optional) app availability	EUR 2 500 / languages	EUR 2 500 / languages	✓
Additional questionnaires (translation (EQ5D / WPAI: AS / EPWORTH / CARAT): Available in English/Optional translated in your language	Provided by your service	✓	✓
Medication list – appropriate in your country- providing	Provided by your service	✓	
Graphic interface adaption	✓	✓	EUR 2 500 for specific alphabet
App store implementation and SO (IOS-Android)	✓	✓	
App store app description translation (IOS-Android)	Provided by your service	✓	
Database adaptation	✓	✓	
Website translation and adaptation	Provided by your service	✓	✓
Technical Updates (IOS-Android) in the first year	✓	✓	
	EUR 19 000	EUR 26 000	

Source: Price list provided by MASK-air administrators.

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Notes

[1] Participation rate by country = total number of users / eligible population (% of the population aged 15 and over with asthma).

[2] ARIA was developed in 1999 following an expert group workshop held at the WHO. ARIA is responsible for developing guidelines for treating asthma and AR.

Annex A. Methodology

Selecting case studies

OECD assessed several case study interventions to promote integrated care. Together, the case studies cover several OECD and non-OECD European countries.

Selected case studies represent strategic, high-priority interventions among policy makers in the OECD and EU27.

Table A A.1. Overview of selected case study interventions

Name	Description	Country
OptiMedis, regionally based integrated care model	Population based integrated care model operating in regions of Germany	European Commission Joint Action on implementation of digitally enabled integrated person-centred care (JADECARE)
Hospital-at-Home programme	Integrated care model designed to reduce demand for inpatient care services	JADECARE Catalonia, Spain
Oulu's Self Care Service	Digital patient-provider portal	Finland
Integrated care model for multimorbid patients	Population-based integrated care model	Basque Country, Spain
Badalona Healthcare Services	Integrated care organisation	Badalona, Spain
Medical Diagnostic Centre	Primary care integrated care model for patients with chronic diseases	Poland
TeleHomeCare	Telemonitoring and teleconsultation for patients who suffer from one or more of the following chronic diseases: heart failure, chronic obstructive pulmonary diseases, and diabetes	Italy
Digital Roadmaps towards an integrated healthcare system	The initiative comprises several digital care interventions such as TeleCOPD, Telepsychiatry, virtual rehabilitation services and an mHealth app	Southern Denmark
Technology Enabled Care	Programme designed to mainstream successful digital health and care initiatives	Scotland
Telemonitoring for patients with advanced heart failure	Telemonitoring for advanced heart failure patients	Czech Republic
ParkinsonNet	A programme to deliver high quality, specialist care for patients with Parkinson disease	Netherlands
Personalised Action Plans (PAPs)	The PAP programme outlines a formal process whereby practitioners and patients collaborate to create a longitudinal treatment plan	Andalusia, Spain
Mobile Airways Sentinel Network (MASK)	mHealth intervention designed to reduce the burden of allergic rhinitis (AR) and asthma	Several OECD and EU-27 countries

Note: *The case study may operate across the country or in specific regions within that country. **Interventions evaluated using OECDs Strategic Public Health Planning for NCDs model.

Assessing the performance and transferability of case studies

This section outlines two complementary frameworks used to assess case studies, both of which were developed by the OECD – the Best Practice Framework and the Transferability Framework. Limitations associated with the analysis are also discussed.

Best Practice Framework

The Best Practice Framework outlines five criteria to assess whether an intervention is "best practice" – namely **E**ffectiveness, **E**fficiency, **E**quity, **E**vidence-base, and **E**xtent of coverage (Table A A.2). A review of the academic and grey literature, existing best practice frameworks and feedback from delegates to OECD's expert Group on the Economics of Public Health informed the selection of criteria.

Table A A.2. OECD's Best Practice Framework – the 5 E's

Criteria	Definition
1. Effectiveness	Extent to which intervention objectives were achieved
2. Efficiency	Extent to which inputs were used to achieve desired outcomes
3. Equity	Extent to which the intervention reduced inequalities in society
4. Evidence-base	The strength and validity of evidence used to develop or evaluate the intervention
5. Extent of coverage	Extent to which the intervention reached the target population

An intervention can be awarded a "stamp of approval" against one or multiple criteria if it performs particularly well relative to similar interventions. 🏅

Up and coming interventions (i.e. those that show promise but have not yet collected any of their own data) can be awarded a "promising best practice" stamp of approval for relevant criteria. 🌱

Transferability Framework

Public health interventions are complex given they involve multiple stakeholders, often target heterogeneous groups, and have outcomes affected by various direct and indirect factors. Therefore, positive outcomes achieved in one setting aren't necessarily transferable to a different setting.

OECD has developed a Transferability Framework to assist policy makers assess whether a best practice intervention can be transferred from where it has been implemented (i.e. best practice "owner setting") to a different country/region (i.e. the "target setting"). Specifically, whether the desired outcomes achieved in the owner setting are achievable in the target setting (Trompette et al., 2014▯; Burchett, Umoquit and Dobrow, 2011▯).

The Transferability Framework includes four contextual factors that affect transferability:

- **Population context**: covers population characteristics such as sociodemographic factors as well as broader cultural considerations
- **Sector specific context**: covers governance/regulation, financing, workforce, capital and access arrangements in the sector the intervention operates
- **Political context**: political will from key decision-makers to implement the intervention
- **Economic context**: the affordability of the intervention in the target setting.

In each case study, indicators to assess transferability are grouped under one of these four contextual factors. For the case studies presented in this document, countries are allocated into a group based on how far the indicator's value is from the best practice owner setting. This method is referred to as the “distance from reference country” and is explained in Box A A.1. In addition, OECD developed a clustering methodology to group countries according to their potential to transfer a best practice intervention (Box A A.2).

Indicators were sourced from international databases to maximise coverage across OECD and non-OECD European countries (e.g. OECD Stat, Eurostat, World Bank Indicators, and the WHO). Relevant indicators were excluded if data was missing for the best practice owner setting and could not be identified through desktop research, or, if more than 50% of data was missing across countries.

By using international data, the scope of the analysis was inevitably limited – i.e. indicators from international sources are high-level and don’t cover all relevant information for assessing transferability. Therefore, each case study also includes a set of “new indicators” (i.e. those with no publicly available information) policy makers should consider before transferring the intervention.

Box A A.1. Transferability methodology using distance from reference country

Quantitative indicators

Quantitative indicator values have been normalised using distance to a reference country, that is, the country in which the best practice intervention is currently implemented (also referred to as the best practice “owner” setting) (OECD/European Union/EC-JRC, 2008▯).

The normalisation equation is below:

$NV_{ci} = \frac{(X_{ci} - X_{oi})}{X_{oi}}$ (Equation 1)

Where:

- NV_{ci} = normalised value for target setting (country c) for indicator i
- X_{ci} = original value for target setting (country c) for indicator i
- X_{oi} = original value in the owner setting for indicator i.

Normalised values for equation (1) can be interpreted as percentage distance each country is from the best practice owner setting, whose value is centred on 0. Normalised values were used to allocate countries into one of five groups for each indicator, with a darker shade indicating greater transferability potential:

Value equal or greater than 0 = █

Value less than 0 but greater than -25% = ▓ (+25% when a lower value indicates better transferability)

Value less than -25% but greater than -50% = ▒ (>+25% but less than <+50%)

Value less than -50% but greater than -75% = ░ (>+50% but less than <+75%)

Value less than -75% = □ (>75%)

Binary indicators

For binary indicators, countries that respond ‘Yes’ to the indicator are allocated the darkest shade (█) while countries that respond ‘No’ are allocated the lightest shade (□).

Categorical indicators

For categorical indicators, any country that responds at least as well as the best practice owner are allocated the darkest shade (█), while the remaining countries are allocated a lighter shade based on the number of remaining categories.

Box A A.2. Transferability methodology using clustering

OECD has developed a methodology to cluster countries and to make personalised recommendations on which member states and member countries are more likely to successfully transfer a recognised best practice intervention. A high-level summary of the clustering methodology is below.

Cluster analysis helps to identify countries which could successfully be transferred a best practice intervention

Cluster analysis partitions data into homogenous groups, based on similarities in the data. In this case it was used to separate countries into groups with similar characteristics, based on how well adapted or suited they are for transfer of a best practice intervention from a host country. For each cluster, specific recommendations can then be made to address potential obstacles for implementation. This can help guide decision makers and potentially lead to the smoother implementation and increased success of interventions.

K-medoids clustering was found to be the optimal methodology

To select the best methodology, four different cluster methods were compared: k-means, k-medoids, hierarchical and DBSCAN (Density-Based Spatial Clustering of Applications with Noise). K-medoids using Gower distance was found to be the most effective method for clustering countries taking into account validation statistics, data characteristics, interpretability of the results and flexibility to use with other datasets. This is because it works with small, imbalanced datasets with missing data, and can accommodate categorical data as well as continuous data.

The K-Medoids Clustering Algorithm

The k-medoids algorithm is based on the medoid: this is the most central observation (country in this case) in the cluster, where the total distance between it and all the other countries in the cluster is smallest. Distance is a quantitative measure of dissimilarity, where the larger the distance between two observations, the more different they are from each other. The number of clusters (k) must be chosen prior to running the algorithm.

The k-medoids algorithm has the following steps:

- Randomly assign k countries as medoids
- Repeat until there is no change in assignment of medoid

Assign each country to a cluster, based on distance to the closest medoid:

For each cluster, test whether selecting another country as the medoid decreases the total distance from the medoid to all other points in the cluster. If it does, reassign this country as the new medoid.

Gower Distance is used to measure similarity between countries

Gower distance was chosen because it is able to compute the difference between both categorical and continuous variables. Gower distance is calculated from the mean of the partial pairwise distances between observations (countries). The partial pairwise distance is the difference between two observations at a single variable and is calculated differently depending on whether the variable is continuous or categorical.

Continuous Variables: The partial pairwise distance, $d_{ii'}^{(j)}$, between two observations i and i', for variable j is the difference between the two values x_{ij} and $x_{i'j}$, divided by the maximal range (R_j) of all the values for variable j, as follows:

$$\boldsymbol{d_{ii'}^{(j)}} = \frac{|x_{ij} - x_{i'j}|}{R_j}$$

Categorical Variables: If two countries have the same value for a categorical variable then the partial pairwise distance is 0 (identical). Otherwise, it is 1.

The Gower distance between two observations is then calculated as the mean of the partial pairwise distances. The partial pairwise distances can be weighted differently. Here, the variables were weighted so that each contextual factor had equal weighting and therefore equal influence on the Gower distance. The resulting value lies between 0 and 1, with values closer to 0 indicating greater similarity between countries and values closer to 1 indicating greater dissimilarity. If one or both values are missing for a given variable in a pair of countries, the partial distance for that variable will not be included in the Gower distance, meaning there is no need for data imputation. However, if a country had over 50% variables missing it led to inaccurate Gower distances and so these countries were removed.

Interpreting and comparing clusters by indicator and by contextual factor

The clusters were compared by calculating the difference between the mean of each cluster and the mean of the dataset, for each indicator. A positive difference meant a higher likelihood of successful transfer for that indicator, allowing the characteristics of each cluster to be identified. To more broadly compare clusters, identifying the contextual factors (or domains) where clusters were stronger or weaker, domain scores were created and used to compare cluster means. Domain scores were created using the following steps:

- Assign categorical variables dummy values (0 = no, 1 = yes).
- Normalise using min-max scaling.
- Aggregate by the mean of the variables in each contextual factor.

Summary of steps in Clustering process

In summary, the following steps are required:

- Remove countries where >50% variables are missing.
- Compute a Gower Distance Matrix, with each contextual factor having equal weighting.
- Determine optimal value of clusters (k) between 3 and 5.
- Run k-medoids clustering using the optimal number of clusters from step 3.

Create domain scores in order to compare cluster means with the dataset means, and identify strength and weakness of each cluster.

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Integrating Care to Prevent and Manage Chronic Diseases

BEST PRACTICES IN PUBLIC HEALTH

People today are living longer with complex health needs but often receive fragmented care. This has prompted countries to support patient-centred, integrated care models. As part of OECD's work on best practices in public health, this report outlines policy recommendations to prevent and manage chronic diseases by integrating care. Policy recommendations were drawn from a review of key integrated care models implemented in OECD and EU27 countries.

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