Getting Skills Right

Equipping Health Workers with the Right Skills

SKILLS ANTICIPATION IN THE HEALTH WORKFORCE

OECD

International Labour Organization

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Foreword

The COVID-19 pandemic further exacerbated the long-standing skills shortages in the health workforce across countries. Equipping health workforces with the right skills is essential to responding to future health crises, preparing for increasing use of digital technologies, and planning for demographic change. This work builds on previous initiatives undertaken by the OECD and the International Labour Organisation (ILO) in the area of skills assessment and anticipation. It aims to enable more resilient health workforces by helping countries to assess future demand in terms of both numbers of health workers and skills needs, and to put in place appropriate policy responses.

This report provides a comparative overview of practices in 16 countries to anticipate future skill needs in the health workforce, and of how such information is used by policymakers to foster a better alignment with labour market needs. The analysis is based on initial desk research, interviews with institutions that are responsible for anticipating skill needs in the health workforce, and a virtual peer-learning workshop that included many of the interview participants.

Just over 70 stakeholders participated in interviews or completed questionnaires for this project. The research team is grateful for their time and insights as this report would not have been possible without them. A full list of participating institutions and interviewees is included in the Annex.

The work on this report was carried out jointly by the OECD and the ILO. The authors of the report were Annelore Verhagen (OECD), Katharine Mullock (OECD), and William Kemp (ILO). The work was supervised by Glenda Quintini (Skills Team Manager, OECD), Mark Keese (Head of the Skills and Employability division, OECD), Maren Hopfe (Technical Officer, Public and Private Services Unit, ILO), Christiane Wiskow (Health Services Specialist, ILO) and Olga Strietska-Ilina (Senior Skills and Employability Specialist, ILO). The report benefited from helpful comments provided by colleagues from the OECD Directorate for Employment, Labour and Social Affairs: Stefano Scarpetta (Director), Mark Pearson (Deputy Director), Stefano Piano and Patricia Navarro-Palau (Skills and Employability division), and Gaetan Lafortune and Ece Özcelik (Health division). It also benefitted from comments from colleagues in the ILO Employment Policy Department: Lucas Ng (Skills and Employability branch).

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Table of contents

FIGURES

INFOGRAPHICS

TABLES

Acronyms and abbreviations

ACMMP	Advisory Committee on Medical Manpower Planning (Netherlands)
AI	artificial intelligence
AMS	career information system (Arbeitsmarktservice Österreich, Austria)
ARG	Argentina
AUS	Australia
BGD	Bangladesh
BIBB	Federal Institute for Vocational Education and Training (Germany)
CAN	Canada
CET	continuing education and training
CGE	computable general equilibrium
COL	Colombia
COVID-19	Coronavirus disease
DEU	Germany
ESCO	European classification of skills, competences, qualifications and occupations
ESDC	Employment and Social Development Canada
ETH	Ethiopia
FATSA	Federación de Asociaciones de Trabajadores de la Sanidad Argentina
FIN	Finland
GDP	gross domestic product
GHA	Ghana
GWS	Economics Structure Research (Germany)
HWSETA	Health and Welfare Sector Education and Training Authority (South Africa)
IAB	Institute for Employment Research (Germany)
ILO	International Labour Organization
IRL	Ireland
ISCO	International Standard Classification of Occupations
KOR	Korea
LMIC	low and medium-income country
MLTSSL	Medium and Long-Term Skilled Shortage List (Australia)
NCCWE	National Coordination Committee for Workers' Education (Bangladesh)
NIVEL	Institute for Health Services Research (Netherlands)
NLD	Netherlands
NOR	Norway
O*NET	Occupational Information Network
OPH	Finnish National Agency for Education
ROA	Research Centre for Education and the Labour Market (Netherlands)
SEIU	Service Employees International Union (Pennsylvania, United States)
SSP	Sindicato de Salud Pública de la Provincia de Buenos Aires (Argentina)
SWE	Sweden
TVET	technical and vocational education and training
UEHP	European Union of Private Hospitals
WHO	World Health Organization
ZAF	South Africa

Executive summary

Skills shortages in the health workforce are not a new phenomenon. Over the past two decades, there has been considerable strain on health workforces, both in terms of the numbers of workers and the skills they need to work with new technologies and adapt to new tasks. Skills shortages in the health workforce are a global issue, affecting countries across regions and income levels, and affecting low and middle-income countries (LMIC) in particular. The COVID-19 pandemic has further aggravated these shortages and emphasised the importance of resilient and well-skilled healthcare workforces. Equipping health workforces with the right skills is essential to responding to future health crises, and to preparing for increasing use of digital technologies and demographic change, among other trends.

This report reviews approaches that a selected group of countries are currently taking to anticipate skills needs in the health workforce. It covers 16 OECD and low and medium-income countries: Argentina, Australia, Bangladesh, Canada, Colombia, Ethiopia, Finland, Germany, Ghana, Ireland, Korea, the Netherlands, Norway, South Africa, Sweden, and the United States. The report identifies the types of methodologies that are applied to anticipate skill needs in the health workforce in different countries and examines the ways in which this information is used to shape education, labour, and migration policies as well as collective bargaining processes. The aim of the report is to facilitate knowledge transfer between countries and to assist countries in developing skills anticipation exercises for the health workforce.

This report finds that there is no “one size fits all” approach to anticipating skill needs in the health workforce. The choice of method depends primarily on policy objectives, availability of data and resources, and existing governance structures. Quantitative forecasts project numbers of health workers needed, while qualitative methods, including surveys and Delphi methods, may develop a richer picture of future skills needs within health occupations. In combining the strengths of both, mixed method approaches are considered best practices. They are also the most costly and data intensive, which are major barriers for some countries, and particularly for LMICs.

The way skills anticipation exercises are designed also matters. With health professionals taking between 7-10 years to train, skill anticipation exercises that take long time horizons can better inform the updating of academic curricula and enrolments in education and training programmes. Exercises which take a sectoral approach allow for a more detailed analysis of the specific skill needs of the health workforce than those which take a whole-of-labour-market approach.

To be useful for policymaking, skills needs anticipation exercises for the health sector should be clear about their policy objectives from the beginning. Strong governance mechanisms are needed to validate results and to translate skills intelligence into policy recommendations. Skills anticipation exercises should be user-oriented, involve key social partners and stakeholders, and be well co-ordinated at every level.

The information produced by skills anticipation exercises for the health workforce is used by governments, hospitals, and trade unions for a variety of policy purposes. Quantitative outputs at occupation or qualification level are often used to determine student intake in health education programmes or migrant inflows. Qualitative findings that describe the types of skills that a given occupation will require can be used to define education and training course content and to inform changes to the way tasks are allocated

across occupations. Regulations limiting the scope of tasks a person in a given occupation is legally allowed to perform can act as a barrier to more effective use of this information. Other important barriers include lack of funding, coordination, stakeholder involvement, and poor alignment between the skills intelligence and the desired policy purpose. These barriers may be especially challenging to overcome in LMICs.

The five policy recommendations below can guide countries in developing skills anticipation exercises for the health workforce. Chapter 4 of this report also includes a table summarizing the advantages and disadvantages of different methods for anticipating skill needs in the health workforce, as well as a flowchart summarizing the key decisions that need to be considered when establishing a skills anticipation exercise for the health workforce.

Recommendations

- Design exercises with specific policy objectives in mind, and consider how the choice of method, scope, skills definition, frequency, and time horizon contribute to achieve those objectives.
- Use a combination of qualitative and quantitative methods to achieve the most robust and reliable projections about future skills needs in the health workforce. While costly, investment in mixed method approaches leverages the strengths of both qualitative and quantitative methods.
- Focus on skills needs rather than, or in addition to, proxies for skills, such as occupations and qualifications. Exercises that focus specifically on skills needs are rare, but they facilitate a dynamic approach to health workforce planning that considers which skills are needed to prepare health workers for the demands of new technologies and sectoral drivers of change. More investment is needed in a number of countries to conduct these types of exercises.
- Involvement of social partners is essential to ensure that skills intelligence is fit for policy use and to promote buy-in to the policy response among stakeholders.
- International cooperation is needed to contribute to addressing health workforce shortages. Shortages in the health workforce are widespread. To ensure that migration flows achieve win-win outcomes for both origin and destination countries, international cooperation in both the identification of skill needs and the policy response (such as bilateral agreements, knowledge transfer and development cooperation) is needed.

1 Changing demand for skills in the health workforce

This chapter motivates the study by setting the context and reviewing trends in the demand for skills in the health workforce across countries. It discusses how ongoing trends, such as the adoption of new technologies, are likely to change the type of tasks and skills that are required of the health workforce going forward. The chapter also presents an overview of the research methodology.

Context

Most countries were unprepared for the sudden surge in demand for health services brought upon by the COVID-19 pandemic. Health workers were called upon to respond to the needs of COVID-19 patients during the various waves of the pandemic since early 2020. While some sectors of the economy contracted or shut down completely in response to pandemic-related policy measures, many workers in the health sector had to maintain or increase their workload, often under considerable additional pressure. More than two years into the pandemic, health workforces across countries are struggling with high rates of burnout due to the challenging working conditions (Leo et al., 2021[1]; The COVISTRESS network, 2021[2]; Prasad et al., 2021[3]). Moreover, the World Health Organization estimates that between 80 000 and 180 000 health and care workers could have died globally of COVID-19 as of May 2021 (WHO, 2021[4]). The pandemic has both highlighted the importance of the health workforce, as well as the need to strengthen its resilience.

Prior to the pandemic, health workforces in many countries across the world were already under strain, with shortages reported both in terms of numbers of professionals and in terms of the skills needed to work with new technologies and adapt to new tasks. Public health systems were already overburdened in many countries that faced challenges in recruiting, deploying, and retaining sufficiently well trained and motivated health workers (WHO, 2016[5]). In its 2016 report, the World Health Organization recognised health workforce challenges as critical barriers to achieving the Sustainable Development Goal of universal health coverage by 2030 (WHO, 2016[5]).

Changes in the demographic, epidemiological and socioeconomic profile of populations will continue to change the demand for health services going forward and are likely to put further pressure on the demand for health workers. For instance, population ageing will increase the overall demand for healthcare, while also shifting the type of care that is demanded. At the same time, population ageing could strain the supply of health workers, as the size of the working age population declines (ILO, 2019[6]). For some countries, particularly in low and medium-income countries (LMICs), climate change is likely to increase the frequency of new viruses and infectious diseases, putting further pressure on health workforces and increasing the likelihood of future global health crises. Changes in health service utilisation and care delivery models – including a shift towards more people-centred healthcare and preventative healthcare – are also likely to impact the future demand for health services.

Conversely, technological advances have the potential to mitigate shortages in health workforces, with new technologies able to perform some of the tasks currently undertaken by health service workers or increase the efficiency by which particular tasks can be carried out. Health workers will also need to learn new skills to work optimally alongside newly adopted technologies. Some new technologies, like artificial intelligence, may also alleviate health workers of time-consuming tasks such as administrative work, allowing them to spend more time performing tasks that draw upon their uniquely human skills, like empathy and communication skills required in direct patient contact. A European review of skill mix initiatives, including those to update the tasks and roles of health workers in light of new technologies, has shown such initiatives to be linked to improvements in patient outcomes (Maier et al., 2021[7]). Adoption of new technologies is likely to be uneven across countries, with OECD countries currently better prepared to harness their potential than low and medium-income countries.

Box 1.1. Defining the health workforce

In this report, the health workforce is defined as all people engaged in actions whose primary intent is to enhance health, or who are essential to the performance of health systems (WHO, 2006[8]; WHO, 2010[9]). That means that the health workforce includes:

- all personnel trained in health occupations delivering clinical work in health facilities (such as medical doctors, nurses, or dentists);
- all non-health professionals employed in the health sector, public and private, regardless of their occupation (such as managers, ambulance drivers, or teachers of health education); and
- all those whose work supports the delivery of health services, even if they are employed by other sectors or industries (such as cleaning, catering, security or agency staff working in the health sector) (ILO, 2017[10]).

Identifying the health workforce using data is complicated by the fact that health-related occupations are spread across occupation groups under the International Standard Classification of Occupations (ISCO-08), and some of these occupations are not predominantly health-related. For simplicity, data presented in this report refer to the core occupations in the health workforce as defined by ISCO-08 (ILO, 2012[11]; WHO, 2010[9]). These include:

- *Health professionals:* medical doctors, nursing and midwifery professionals, traditional and complementary medicine professionals, paramedical practitioners, and other health professionals such as dentists, pharmacists, nutritionists or speech therapists; and
- *Health associate professionals:* medical and pharmaceutical technicians, nursing and midwifery associate professionals, traditional and complementary medicine associate professionals, and other health associate professionals such as medical records and health information technicians.

Broadly, the current and future supply of the health workforce is a function of the current stock of health workers and their behaviour, and the net impact of inflows and outflows to the health workforce (Ono, Lafortune and Schoenstein, 2013[12]). Sources of inflows include immigration and education, while outflows include retirements, attrition, and emigration.

Misalignment between the supply and demand for skills in the health workforce contributes to various forms of skills mismatches, including over- or under-qualification, skills gaps, and labour shortages. Skills gaps and labour shortages are particularly costly in the health workforce, since they can increase the length of patient waiting lists and waiting times and result in poor patient care, for instance due to increased burnouts and job dissatisfaction among medical staff (Kane et al., 2007[13]; Jun et al., 2021[14]). These costs come in addition to the negative economic consequences usually associated with skill mismatches and shortages in other sectors of the economy, including lost wages and lower productivity and growth (OECD, 2016[15]).

Addressing the skills mismatch challenge in the health workforce can improve healthcare provision and limit these negative economic effects. Countries have a number of policy tools at their disposal to improve the supply of skills to meet demand (OECD, 2016[16]). These include increasing the number of places available to train new health service workers, updating education and training curricula to respond to market needs, offering targeted career guidance for prospective students, altering migration flows, and facilitating the recognition of skills and qualifications of migrants. Improving wages and working conditions can also improve the future supply of health workers by increasing the inflow and reducing attrition rates.

However, such policy efforts require resources, and their impacts may not be immediate or may have adverse consequences. Building and developing skills supply in the health workforce requires forward planning, as it can take several years to train health professionals, particularly highly skilled health workers such as physicians. Further, the highly complex nature of clinical functions means that health workers who are trained in one specialisation cannot simply be redeployed to another to fill existing gaps. Migration flows of health service workers tend to consist of movements from lower-income to higher-income countries, where demand and capacity to pay for health services are higher (OECD, 2019[17]). Migration can provide flexibility for higher-income countries in responding to demand-side pressures and allow workers from lower-income countries to gain new skills abroad. However, this can also lead to a "brain drain" effect away from lower-income countries, which have invested resources to train the health workforce and may have a shortage of trained health workers themselves (ILO, 2017[18]).

Alternatively, other strategies can be deployed in a relatively short period by introducing new categories in the health workforce (such as community health workers), expanding the role of existing categories of health workers, or non-traditional programmes that enable fast entry into the health workforce (such as recruitment programmes for foreign trained health workers). While these types of strategies can offer a means to improve the availability of health workers in a relatively shorter period, they can also involve changes in the ways health services are provided and financed, and re-thinking regulations around scopes of practice, professional education, quality standards and accreditation practices.

Any policy response will only be effective if informed by accurate information about both current and future skill needs in the health workforce. Effective anticipation of future skills needs is crucial in this respect. Improving the resilience of the health workforce involves both increasing the size of the health workforce and equipping it with the relevant emerging skills. In response to these challenges, countries are already starting to assess future health workforce needs in terms of both numbers and skills.

Objective of this study

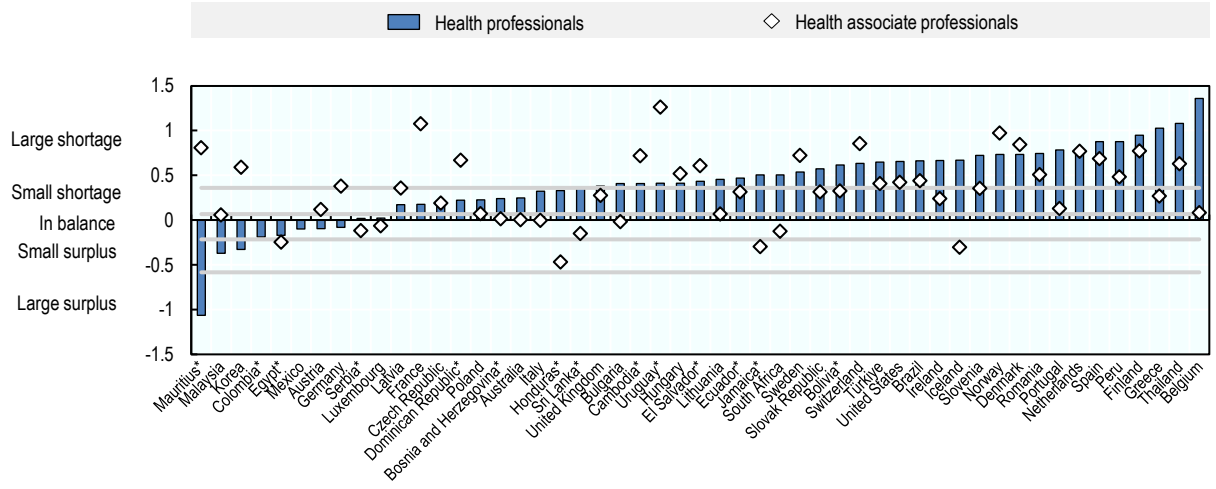
This study is a collaboration between the OECD and the International Labour Organization (ILO). The objective is to map the methods currently used by countries to anticipate health workforce needs – both in terms of numbers of workers and skill requirements. It aims to shed light on the strengths and weaknesses of different methods and highlight how skills intelligence is used to build more resilient health workforces, so that other countries may learn and refine their own approaches to anticipating skill and labour needs in the health workforce.

Past and changing demand for skills in the health workforce

The OECD and ILO Skills for Jobs databases provide internationally comparable measures of skills shortages and surpluses (Box 1.2), and Figure 1.1 highlights that health workforces in most countries are under strain. Most countries included in the OECD and ILO Skills for Jobs databases already experienced large shortages of health professionals and/or health associate professionals prior to the COVID-19 pandemic, suggesting that it was hard to find sufficient numbers of workers with the right skills in health services occupations. Shortages in health workforces are relatively large compared to other occupations, with only three occupations demonstrating larger shortages: teaching professionals, skilled forestry fishery and hunting workers, and street and related sales and service workers.

The greatest shortages of health professionals were found in Belgium, Thailand and Greece, and the greatest shortages of health associate professionals were found in Uruguay, France and Norway. Some countries, such as Finland, Spain, the Netherlands, and Denmark, show relatively large shortages for both groups of health services workers.

Figure 1.1. Shortages in the health workforce in 2019 (or nearest year)



Note: Based on the re-weighted occupational imbalance indicator (see Box 1.2). Positive values indicate shortages, negative values indicate surpluses. The categorisation of small/large shortages and surpluses is based on the distribution of the OECD average of the composite occupational needs indicator across years. Within this distribution, the bottom 10% of the OECD average values across occupations are 'large surpluses' and the top 10% are 'large shortages'. When shortages or surpluses are so small that they could be considered negligible (i.e. values in the middle 40% of the distribution of the OECD average, or the 30th to the 70th percentile) the occupation is considered 'in balance'. These cut-off values are then applied to all countries. Data refer to 2019, with the following exceptions: they refer to 2021 for BIH, BOL, DOM, ECU, SLV, SRB, URY; 2020 for HND; 2018 for CHE, FRA, IRL, ITA, MUS, POL, THA; 2017 for DEU, GBR, KHM, KOR; 2016 for AUS; 2015 for BRA, TUR; 2014 for JAM; 2012 for ISL and SVN. Health professionals include veterinarians and health associate professionals include veterinary technicians and assistants – and none of these are part of the health workforce. The data for health associate professionals in Colombia and Mexico are suppressed from the graph due to insufficient data reliability.
Source: Elaborations based on the OECD Skills for Jobs database 2022; *Elaborations based on the ILO Skills for Jobs database.

Box 1.2. Skills for Jobs database

Originally launched in 2017, the OECD Skills for Jobs database is an internationally comparable index of skill needs (such as medicine, communication, or physical skills). The data indicate which skills are in shortage (hard-to-find) or surplus (easy-to-find) across countries. The indicator measuring skills shortages and surpluses is constructed following a two-step approach.

Step 1. An "occupational imbalance indicator" is a composite indicator of occupational imbalance that is calculated for occupation groups at the 2-digit ISCO-08 level. This calculation is based on labour market information from household surveys and consists of five sub-components: i) wage growth, ii) employment growth, iii) hours worked growth, iv) change in unemployment rate, and v) change in under-qualification rate. For every country, occupational group and sub-component, long-run trends are compared to the economy-wide trend. This standardisation sheds light on whether the specific occupational group is outperforming/underperforming the rest. When combining the standardised sub-components into the composite occupational imbalance indicator, each sub-component is weighted equally, except for employment growth, which has a lesser weight than the others.

Step 2. The composite occupational imbalance indicator is then linked to a mapping of skill requirements by occupation (for more information, see (OECD, 2022[19])). By aggregating the data by skill, using number of employed by occupation as a weight, a skill imbalance indicator is created for each country. For instance, if there are shortages of health professionals in a country, then there are likely to be shortages of medical knowledge (a skill), provided the health professional occupational group is relatively large, and that job postings for health professionals often mention knowledge of medicine. Conversely, large surplus occupations that require physical skills will contribute to surpluses of physical skills.

Extension of the OECD Skills for Jobs database for this report

Exceptionally for this report, some changes were made to the weighting scheme in Step 1. A lesser weight is given to the sub-components of wage growth and change in the under-qualification rate, while a greater weight is given to change in the unemployment rate. Wage growth may not be a reliable indicator of health workforce shortages in countries with large public healthcare systems. Similarly, due to a high degree of occupational licensing in the health workforce, hiring workers with a lower qualification than is required is not usually a viable option when labour is scarce. Unemployment rates of health services workers, on the other hand, appear to be sensitive to changing demand in the health workforce, which is why the weight for that sub-component is increased. The weights of the sub-components for employment and hours worked remain unchanged.

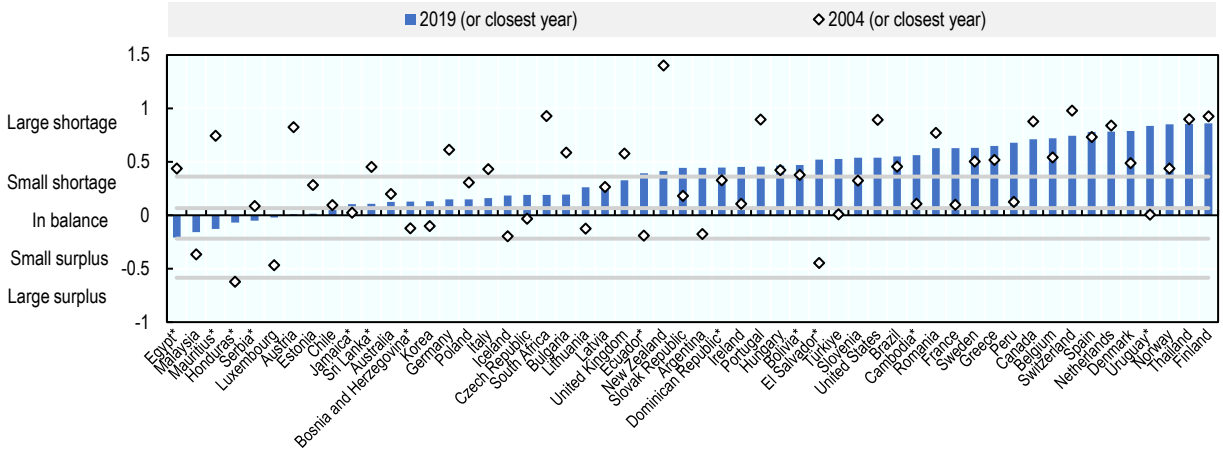
The ILO Skills for Jobs database extends the methodological approach used by OECD to low-and-middle income countries (for more information, see (ILO, 2021[20]).

Source: OECD Skills for Jobs database, https://www.oecdskillsforjobsdatabase.org; ILO Skills for Jobs database, https://www.ilo.org/skills/areas/skills-training-for-poverty-reduction/WCMS_835486/lang--en/index.htm.

Shortages in the health workforce are far from a new phenomenon. On average, most countries experienced large shortages of health service occupations persistently over the past 15 years (Figure 1.2). In some countries, shortages of health services workers not only persisted but also increased (Dominican Republic, Slovenia, the Slovak Republic, Peru, Ireland, and France). In other countries, large shortages emerged within the past 10 to 15 years (Türkiye, Uruguay, El Salvador, and Argentina). For some countries, surpluses of health services workers found in the past have since disappeared (Luxembourg and Malaysia). Shortages of health services workers decreased in size in countries such as New Zealand, South Africa, Austria, and Mauritius.

These developments, and the way in which they differ across countries, highlight the challenge of aligning the future supply of health workers to long-term demand correctly. For all countries, reforming training and employment strategies to better respond to changing skill and health needs can help meet demand. For OECD countries, this can also reduce reliance on foreign-trained health workers from low and medium-income countries, thereby promoting sustainable outcomes across countries (OECD, 2016[16]).

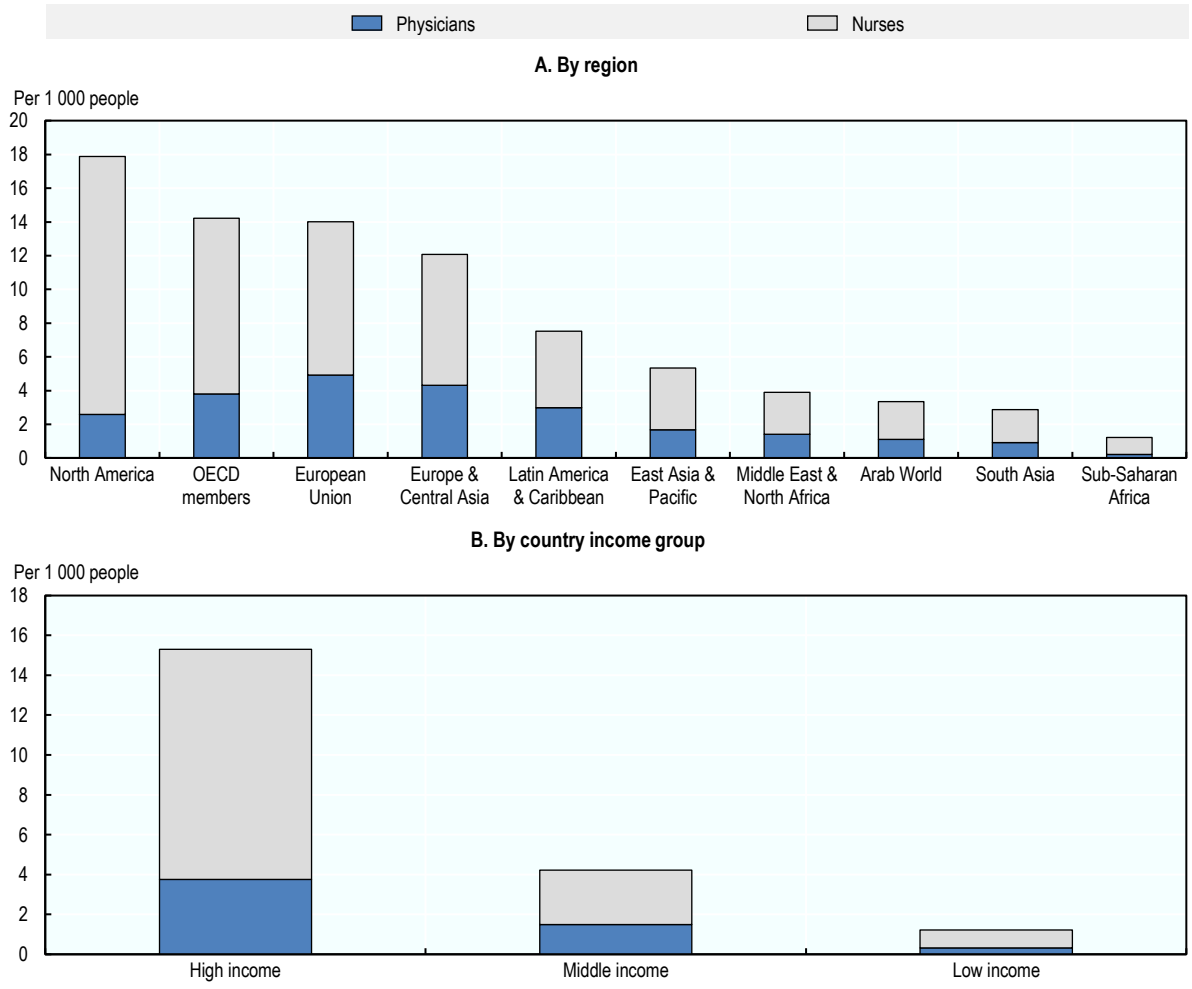
Figure 1.2. Average shortages in health service occupations, 2004 and 2019 (or nearest years)



Note: Unweighted average across health professionals and health associate professionals. Based on the re-weighted occupational imbalance indicator (see Box 1.2). Positive values indicate shortages, negative values indicate surpluses. The first year refers to 2004, with the following exceptions: they refer to 1999 for KOR; 2001 for CAN, CHL; 2003 for BRA; 2005 for AUT, CZE, DEU, GBR, LTU, SVK, SVN, TUR; 2006 for ESP; 2007 for BGR, GRC, HUN, ITA, LVA, NOR, POL, PRT, ROU; 2008 for CHE, PER; 2009 for JAM, NLD; 2010 for EGY, KHM, NZL; 2011 for AUS, BIH, ZAF; 2012 for BOL, MUS, MYS, THA, URY; 2013 for SRB; 2014 for ECU, LKA, SLV; 2016 for DOM, HND. The final year refers to 2019, with the following exceptions: they refer to 2021 for BIH, BOL, DOM, ECU, SLV, SRB, URY; 2020 for HND; 2018 for CHE, FRA, IRL, ITA, MUS, POL, THA; 2017 for DEU, GBR, KHM, KOR; 2016 for AUS; 2015 for BRA, TUR; 2014 for JAM; 2012 for ISL and SVN.
Health associate professionals include veterinarians and veterinary technicians and assistants, who are not part of the health workforce. The data for Colombia and Mexico are suppressed from the graph due to insufficient data reliability for health associate professionals.
Source: Elaborations based on the OECD Skills for Jobs database 2022; *Elaborations based on the ILO Skills for Jobs database.

While shortages of skilled health workers are a serious and widespread problem, they affect LMICs especially severely. The size of the health workforce varies dramatically across the globe by region and income group (see Figure 1.3). From a regional perspective, Europe and North America perform significantly better than other regions in terms of physicians and nurses per 1 000 people, while the Middle East and North Africa, South Asia and particularly Sub-Saharan Africa perform worse. The contrast between high-, middle- and low-income countries is stark: high-income countries had 15.3 physicians and nurses per 1 000 people in 2017, while this figure was only 4.2 per 1 000 for middle-income countries, and 1.2 per 1 000 for low-income countries. It is evident that globally, millions more doctors and nurses need to be trained to meet the Sustainable Development Goals (SDGs) and global goals for universal health coverage, particularly in low and middle-income countries.

Figure 1.3. Physicians and nurses per 1 000 people, 2017

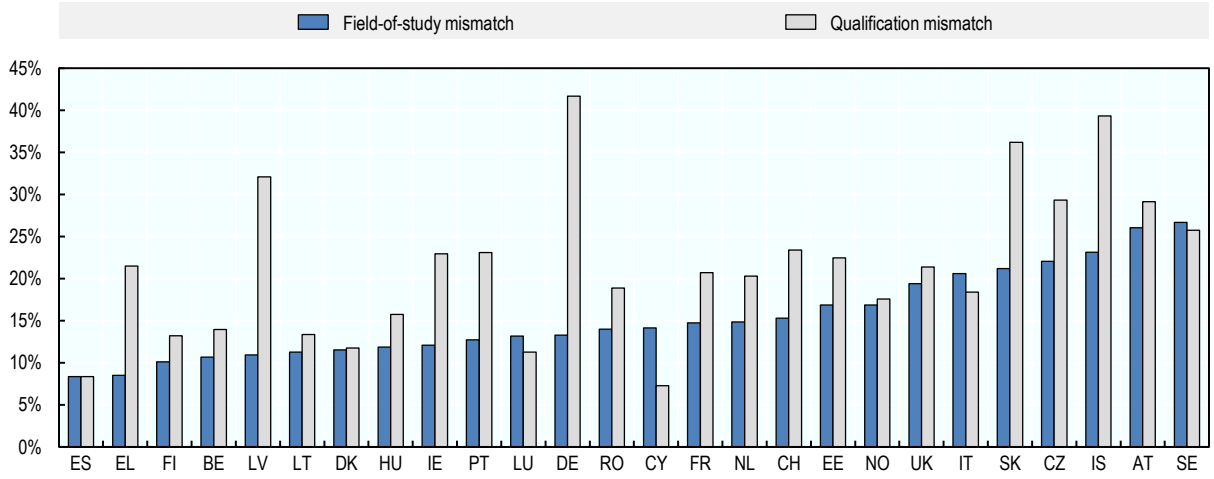


Note: For some countries, more recent data are available in the OECD Health Statistics 2022. These data show that, for most countries included in the database, the number of physicians and nurses per 1000 people increased over time (see https://stats.oecd.org/Index.aspx?ThemeTreeId=9#)
Source: World Bank Databank.

Compared to occupations in other sectors, qualification and field-of-study mismatches are relatively uncommon in the health workforce (Figure 1.4). Among health professionals and health associate professionals, about 13% are over-qualified for their occupation (compared to 15% on average across all occupations), 8% are under-qualified (compared to 18% across all occupations), and 15% have a qualification in a field-of-study that does not directly match their occupation (compared to 32% across all occupations). This reflects a high degree of occupational licensing in the health workforce, particularly in health service occupations. Occupational licensing ensures that health services workers meet minimum skill and knowledge requirements, which is important for ensuring patient safety. At the same time, occupational licensing reduces flexibility in task allocation and in recruitment, which complicates the response to reducing or preventing shortages. While over-qualification is relatively uncommon among native workers, it is more widespread amongst migrant workers, often due to strict qualification requirements and a lack of recognition of foreign qualifications. Coupled with “brain drain,” the emigration of highly qualified people, this contributes to an underutilisation of skilled labour at a national and global level.

Figure 1.4. Qualification mismatches in the health workforce in OECD countries, 2019

Share of health services workers with a qualification or field-of-study mismatch

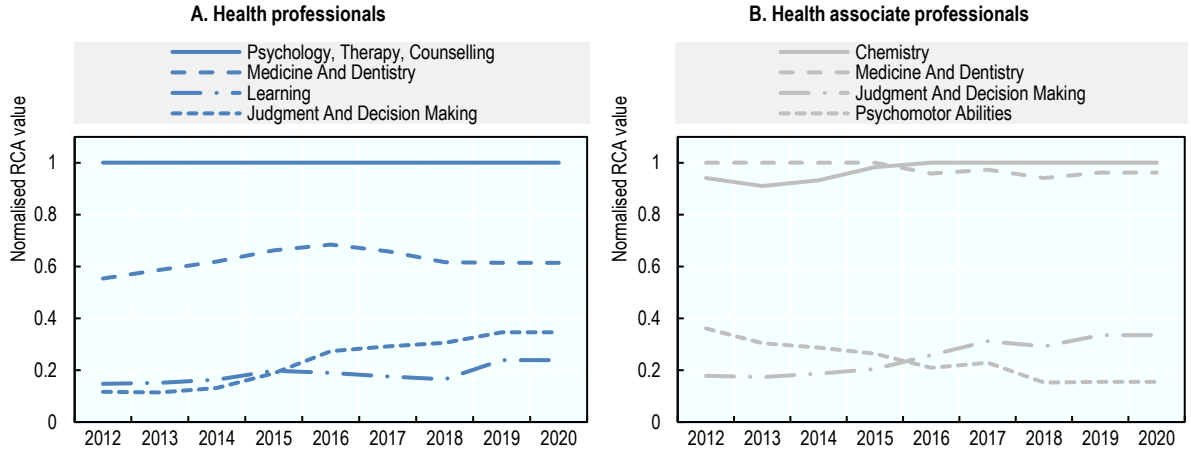


Note: Average across Medical doctors, Nursing and midwifery professionals, Traditional and Complementary Medicine Professionals, Paramedical Practitioners, Other Health Professionals, Medical and Pharmaceutical Technicians, Nursing and Midwifery Associate Professionals, Traditional and Complementary Medicine Associate Professionals, Other Health Associate Professionals, Personal Care Workers in Health Services, Professional Services Managers (incl. Health Services Managers and Aged Care Services Managers), Social and Religious Professionals (incl. Psychologists) and Administrative and Specialised Secretaries (incl. Medical Secretaries).
Source: OECD Skills for Jobs database 2022

Online job vacancies reveal change in the relative importance of some skills for health services occupations over time. Job-specific knowledge of psychology, therapy and counselling, and medicine and dentistry consistently show up as important in job vacancies for health service occupations (Figure 1.5). This reflects that the minimum qualification requirements of health service workers are relatively stable over time. That said, some skills have become more important for health services workers, while others have become less important over time. For instance, learning, judgment and decision making skills are becoming increasingly important for health services workers, while the relative importance of physical skills like psychomotor abilities is decreasing. This could reflect the increasing use of technology in health service delivery, which can lighten some of the physical burden on health service workers, while putting a greater emphasis on their social and decision-making skills.

Figure 1.5. Change in the relative importance of skills within health services occupations

Selection of skills extracted from online vacancies in AUS, CAN, GBR, NZL, SGP and USA



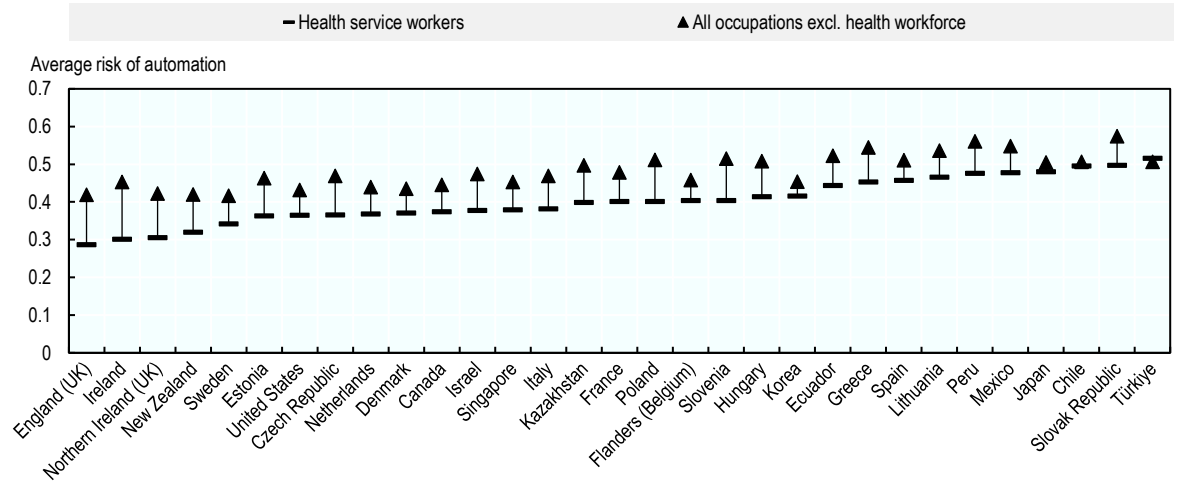
Note: A normalised Relative Comparative Advantage (RCA) value of 1 indicates the most important skills for a given occupation, compared to other skills; while a value of 0 indicates the least important skills. See OECD (2022[19]) for more details.
Source: Elaborations based on the OECD Skills for Jobs database 2022.

Future trends in the health workforce

A number of trends will affect the future supply and demand for health workers, and these must be taken into account when anticipating skill and labour needs. Three notable trends include technological change, demographic change and environmental change.

Adoption of new technologies in the health sector could increase the productivity of health workers, and potentially mitigate shortages, but automation in the sector remains limited. While new technologies may lead to the automation of some tasks, they are unlikely to fully replace health workers and are instead more likely to augment their capabilities. Figure 1.6 highlights that the health workforce – and health service occupations in particular – is less likely to be automated than other occupation groups. This is partly because healthcare professionals and technicians are highly dependent on customer- or patient-serving skills and interpersonal skills that cannot easily be routinised, substituted by digital technologies or offshored (Nedelkoska and Quintini, 2018[21]).

Figure 1.6. Risk of automation within and outside of the health workforce

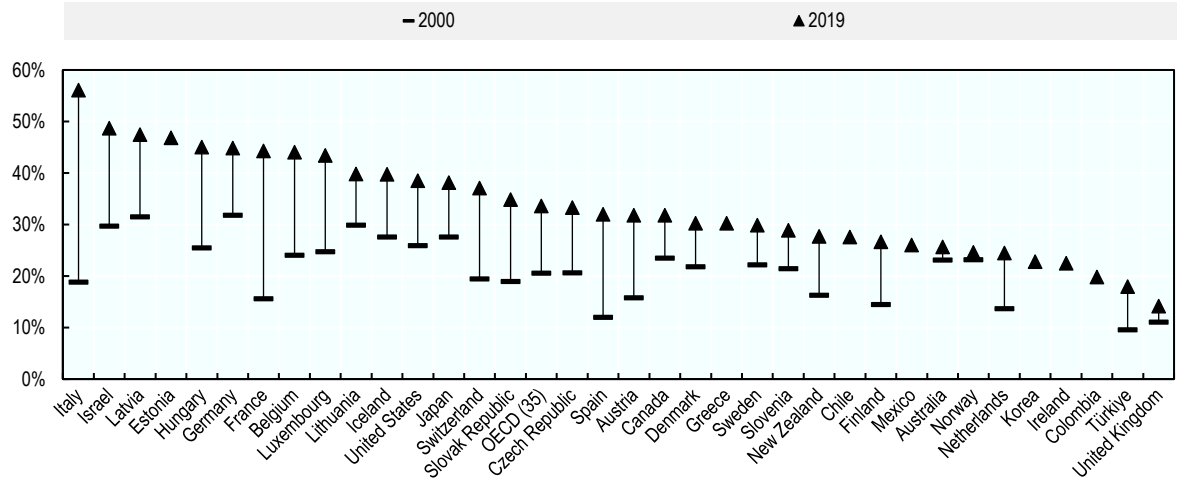


Note: Average risk of automation across 3-digit ISCO-08 occupations.
Source: OECD Survey of Adult Skills (2011/12, 2014/15, 2017/18).

An OECD report summarizing literature on the impact of artificial intelligence (AI) on the labour market concludes that it is likely to complement rather than substitute high-skilled workers and enable them to increase their productivity (Lane and Saint-Martin, 2021[22]). For instance, AI can support health service workers with administrative activities, freeing up their time for more direct patient contact or work that uses their specialised skills. With many highly skilled workers in the sector and ethical issues relating to the application of AI that are likely to slow widespread adoption, AI is unlikely to displace large numbers of health service workers (Davenport and Kalakota, 2019[23]). Potential ethical issues include the risk that using this technology may put patients' digital security and privacy at risk or systematise human biases in diagnosis, among others (Salvi Del Pero, Wyckoff and Vourc'h, 2022[24]; WHO, 2021[25]). Policies will need to be put in place to mitigate these risks in the health sector. Meanwhile, uniquely human skills like empathy, persuasion and big-picture integration, alongside digital skills, are likely to be increasingly required in order to complement and operate new technologies as they are adopted. AI can support diagnosis and treatment recommendations, for instance, with several studies showing that algorithms are already outperforming radiologists in spotting malignant tumours (Davenport and Kalakota, 2019[23]). AI can also improve patient engagement and adherence with treatment plans via messaging alerts and personalised content.

Demographic changes, including ageing societies and population growth, will continue to influence the health sector and shape the future demand for workers. Ageing populations will create many challenges for health systems, including increased demand for healthcare, long-term care and end-of-life services. Furthermore, the health workforce itself is ageing in many countries. In 2019, 35% of all doctors in OECD countries were over 55 years of age, an increase from 20% in 2000 (see Figure 1.7). Ageing health workforces could affect the ratio of health workers to patients if a sufficient number of newly trained workers is not available to replace those who will retire and lead to further demand in OECD countries for trained health workers from LMICs that are projected to have younger populations (primarily in sub-Saharan Africa).

Figure 1.7. Share of doctors aged 55 and older, 2000 and 2019 (or nearest years)



Source: OECD (2021[26]), Health at a Glance 2021: OECD Indicators, https://doi.org/10.1787/ae3016b9-en.

Environmental factors, including climate change and air pollution, will also affect the future demand for health services (ILO, 2019[6]). Climate change has been indirectly linked to an increased risk of vector-borne diseases and cholera and can increase the prevalence of diseases transmitted through food and water (Costello et al., 2009[27]). Among the conditions most likely to increase demand for health services are heat stress, dengue, malaria, and malnutrition, particularly in low and medium-income countries situated in warmer climates. Health issues related to climate change and environmental factors are likely to continue to impact both the demand for health services and the health workforce itself, including occupational safety and health of workers.

Research methodology

This study is based on three sources of data. First, it is based on a series of semi-structured interviews with institutions that are involved in developing or using skill needs assessments in the health workforce. Second, it is based on a review of the international literature on methods that countries use to anticipate future skill needs, in the health sector and more generally. Third, it draws from discussions during a virtual peer-learning workshop in June 2022 which brought together representatives from 20 countries to discuss the methods used to anticipate skill needs in the health workforce, and how the resulting skills intelligence is used in policymaking. The next sections describe how countries and institutions were selected for interviews and provides some additional information about the interviews themselves.

Selection of countries and institutions for interviews

A mix of high-income, middle-income, and low-income countries were selected for interviews to showcase a range of skill anticipation exercises with different resource requirements. Countries were selected based on desk research revealing that skill anticipation exercises were being carried out for the health workforce, and with an aim to have broad representation of different types of exercises. The following 16 countries participated in the study: Argentina, Australia, Bangladesh, Canada, Colombia, Ethiopia, Finland, Germany, Ghana, Ireland, Korea, the Netherlands, Norway, South Africa, Sweden, and the United States. Data collection for the United States focused on the use of skills anticipation exercises for policymaking and not on the development of the exercises. For this reason, Chapter 2 does not include the United States.

Respondents and semi-structured interviews

Respondents were typically individuals who were actively involved in conducting skill assessments for the health workforce within their respective institutions. The types of institutions that conduct skill assessments vary substantially. The institutions that participated in this study included ministries of education, ministries of employment/labour, health sector skills committees, workers' unions, government-appointment committees, education and training institutions, and research institutions. Trade unions and employer representatives were invited to participate in the study via the OECD's Trade Union Advisory Committee and the Business and Industry Advisory Committee. The ILO conducted its work in LMICs by carrying out interviews with tripartite constituents, consisting of respondents from relevant ministries, employers' and workers' organizations and consulting with sector skills bodies in the countries where they were in place. Consultants were hired in these countries who could carry out the interview in the respondent's language.

As part of the semi-structured interviews, respondents were asked a series of open-ended questions about the methods they used to anticipate health workforce skill needs. An interview guide that was developed to support these interviews is included in the Annex. Interviews generally lasted one hour and were conducted over videoconference or face to face. They were informal in nature and not all questions in the interview guide were asked during each interview, as questions were selected according to the respondent's interest or expertise. In cases of language or time constraints, the respondents were sent the interview guide following the interview and asked to provide further responses to the questions they felt equipped to answer.

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2 How countries anticipate skill needs in the health workforce

This chapter reviews the types of skills anticipation exercises that countries and regions employ to generate information about future skill needs in the health workforce. Exercises are characterised along five dimensions: how skill needs are defined, time horizon and frequency, scope, the method used, and how uncertainty is managed and findings are validated.

Introduction

Skills assessment and anticipation exercises are tools used to generate information about the current and future skills needs of the labour market, the available skill supply, and how the two diverge. Their purpose is to make markets work better by informing labour market and education and training participants (Wilson, 2011[1]). Skills anticipation enables a range of stakeholders, including training providers, policymakers, employers, young people and adults, to make better informed education and training choices, leading to improvement in the use of skills and human capital development (ILO, 2015[2]). It enables a more proactive response to factors shaping future skills demand and supply, such as those identified in Chapter 1. While it is not possible to predict the future, skills assessment and anticipation exercises can help actors to plan and prepare for it and minimise the gap between the supply and demand for skills.

Previous studies have scoped out the various skills assessment and anticipation exercises that countries and regions use to measure and anticipate skill and labour demand and supply in the general labour market (OECD, 2016[3]; ILO, 2017[4]; CEDEFOP, 2008[5]). These include employer surveys, quantitative forecasting, qualitative methods, collection and analysis of labour market statistics, surveys of workers or graduates, and sector studies. Each of these methods has advantages and disadvantages, and is best suited to different types of policy uses. Using a combination of methods is therefore viewed as best practice to leverage the advantages of each method (OECD, 2016[3]; ILO, 2017[4]; CEDEFOP, 2008[5]).

This report provides a review of country practices in assessing and anticipating skill needs in the health workforce. The focus is on anticipating future skill needs, rather than assessing current skill needs. That said, an assessment of current skill needs is sometimes a starting point to anticipating future skill needs. In some countries in this review, assessing current skill needs in the health workforce was a more pressing priority than anticipating future skill needs, given limited resources.

This chapter reviews the types of exercises that are used by countries to anticipate skill needs in the health workforce. It draws upon available literature as well as semi-structured interviews with representatives from institutions that carry out such exercises in Australia, Argentina, Bangladesh, Canada, Colombia, Ethiopia, Finland, Germany, Ghana, Ireland, Republic of Korea, the Netherlands, Norway, South Africa and Sweden. Exercises are characterised along five dimensions: how skill needs are defined, time horizon and frequency, scope, the method used, and how they deal with uncertainty in their design. Annex 1 summarizes the skills anticipation exercises covered in this study along these five dimensions.

Definition of “skills” used in the exercises

The term “skill” is understood as having the ability to carry out mental or manual activities, acquired through learning and practice. Skill is an overarching term which includes knowledge, competency and experience as well as the ability to apply these in order to complete tasks and solve work-related problems. Generic skills (also called core skills) are valued in every job, occupation and sector, and include social skills, cognitive skills and basic digital skills (ILO, 2021[6]). Specific skills, by contrast, are not transferrable from one job/occupation/sector to another and refer, for example, to industry-specific knowledge, technical knowledge, or practical competencies that are specific to a particular sector. The OECD Skills for Jobs database finds that certain generic skills are becoming increasingly important for health occupations, such as judgment and decision making, while other generic skills such as psychomotor skills are decreasing in importance (see Chapter 1).

Exercises that focus on skill needs per se, rather than proxies for skills needs such as occupations, have several advantages. First, skill requirements within health occupations may shift over time due to technological change, and focusing on skills enables a better understanding of how these skill requirements are changing. Second, if health workforce skill requirements are changing, focusing on skills allows for a more dynamic policy response than focusing on qualifications or occupations, which typically

assume a static bundle of skills. Finally, a focus on skills is relevant for planning task allocation between medical jobs – for instance, to address sudden increases in demand as occurred in the context of the COVID-19 pandemic.

A key challenge for skills anticipation exercises is that skills can be difficult or costly to measure directly. Individual skills are not always easily understandable or quantifiable: it can be unclear what a given skill entails and how it can be learned or assessed. In practice, skills needs are often approximated by estimating which occupations (such as doctors or nurses) will be in greater or lesser demand. Indeed, many exercises in this review of country approaches start by projecting which occupations in the health workforce will be in greater or lesser demand in the future, as an approximation of skill needs. Occupations have the advantage of being easily understandable and they allow for manpower planning within the health workforce. A limitation with exercises that focus on occupations, however, is that it is not always clear which skills or qualifications are required to perform a given occupation. They also have the potential to overlook the ways in which the requisite skills of a given occupation may evolve over time, for instance, to enable a professional to operate new and emerging technologies.

Other common approximations of skills are levels of educational qualifications (such as technical/vocational, university), and/or fields of study (such as medicine, psychiatry, nursing). As with occupations, qualifications are easily understandable and data on the number of new graduates by qualification and educational attainment of the labour force are often readily available. That said, individuals with the same qualification can have different skills, and the available education programmes in a given country do not necessarily teach all the skills needed for a given job. Further, mapping from occupations to qualification needs is not straightforward, though some countries have developed methodologies to do this. For instance, the Advisory Committee on Medical Manpower Planning (ACMMP) in the Netherlands uses a combination of quantitative forecasting, surveys and Delphi methods to anticipate labour demand for 80 health service occupations (*Capaciteitsplan*), before mapping to qualifications to make recommendations about desired intake in medical programmes.

Exercises that focus specifically on skills needs in the health workforce are rare. As noted above, skills are harder to measure than qualifications or occupations and are less easily understood. A key challenge is that there is not a common language for referring to skills that is widely understood and accepted. Interviewees provided various reasons why their exercise focused on proxies of skills (such as occupations or qualifications) rather than skills per se. Germany's Federal Institute for Vocational Education and Training (BIBB) and Ministry of Labour attempted to forecast skills by mapping occupations to 16 competencies (Krebs and Maier, 2022[7]), but concluded that a reliable skills forecast would also require sound data on how skill needs are changing within occupations. Korea cited not yet having a National Competency Standard for the health sector as a limiting factor in developing skills forecasts. Another cited barrier was that it was difficult to identify a clear policy use for information about skill needs in the health workforce. This could reflect that strict occupational licensing requirements in health occupations limit the potential for task and labour reallocation and optimal use of skills within the workplace (a limitation that is discussed further in Chapter 3).

Though rare, this study nevertheless unearthed some initiatives that focus directly on future skill needs in the health workforce. For the most part, exercises that focused on skill needs relied on qualitative methods. For instance, in tandem with their quantitative occupational forecasts, Finland's Skills Anticipation Forum uses qualitative methods to anticipate future skill needs in nine sectors, of which one is social, health and welfare services. Their definition of skills includes both generic skills and occupation-specific skills derived from O*NET. They use a variety of frameworks to define skills, including Austria's AMS career information system (*Arbeitsmarktservice Österreich*); the European classification of skills, competences, qualifications and occupations (ESCO); O*NET; and DigComp 2.0, a digital competence framework developed by the European Commission to define digital skills. Australia's Industry Skills Forecasts, too, take a direct approach to assessing skill needs. Industry skills committees for specific health occupations poll employers about which skills they are missing and which skills they expect will increase in demand, using a list of 12

generic skills and occupation-specific skills as a reference. Finally, while the focus of most initiatives in Norway is on occupations, the Directorate of Health carries out some initiatives that focus on skills in order to support their work in defining the learning outcomes for doctors and other health care personnel. Colombia's project to update their occupational profiles of professional and transferable skills for health professionals, led by the Ministry of Health, focuses on both current skills and future skills needs that are likely to arise due to technological advances in the sector. In South Africa, in addition to assessing future demand at the occupation and qualification level, the Health and Welfare Sector Education and Training Authority (HWSETA) uses employer surveys to assess the skills needed on average in high, medium and low-skilled occupations, respectively.

Table 2.1. Definition of "skills" used in the exercises covered in this study

	Skills	Qualifications	Occupations
Argentina			X
Australia	X		
Bangladesh			X
Canada	X		X
Colombia	X		X
Ethiopia			X
Finland	X		
Germany	X	X	X
Ghana			X
Ireland		X	X
Korea			X
Netherlands		X	X
Norway	X	X	X
South Africa	X	X	X
Sweden			X

Source: Interviews with stakeholders. Data not available for the United States.

Time horizon and frequency

Time horizon

Several exercises that anticipate future skill needs in the health workforce consider longer-term time horizons (10 years or more). This is most important for the use of skills intelligence for education and training policies and curricula (i.e. planning or updating curricula or determining training places), since it can take at least 7-10 years to train a health professional, once programmes and/or curricula are in place. In Germany, the QuBe-consortium, consisting of BIBB, the Institute for Employment Research (IAB) and Economics Structure Research (GWS) conduct 20-year quantitative forecasts to anticipate labour demand and supply of 63 sectors, including health, in addition to the Ministry of Labour's five-year mid-term forecast. The Netherlands Institute for Health Services Research (NIVEL) and the Advisory Committee on Medical Manpower Planning (ACMMP) conduct forecasts for 12 to 18 years. Canada's occupational forecast (Canadian Occupational Projection System) does 10-year projections for all occupations in the economy, including those in health. In Ethiopia, work to ensure the availability of a sufficient number of health professionals and appropriate skills mix falls under a 10-year National Human Resource for Health Strategic Plan, and labour market supply and demand projections have been carried out to 2030 to help inform education and training policy within the strategic plan.

Several countries consider shorter time horizons when anticipating skill needs in the health workforce. Shorter time horizons are appropriate for informing certain shorter-term policy responses: updating the content of upskilling and reskilling training programmes for the existing health workforce, regulating temporary migration flows, and reallocating tasks between medical jobs. Australia's Industry Skill Forecasts for Enrolled Nursing carries out 5-year anticipation exercises. Statistics Norway's projections have a long time horizon (15 years, and sometimes 30-40 years) while national and regional health planning exercises have a time frame of 4 years. In Finland, the focus used to be on longer term skill anticipation (10-15 years), but the approach has since changed to focus on medium-term skill anticipation (5-9 years). They made this change in response to an evaluation that concluded that a shorter time horizon could better facilitate matching skill supply to skill demand. In South Africa, the HWSETA has a five-year sector skills plan, which aligns with other mid- and longer-terms government strategic frameworks. The sector skills plans are supplemented by biannual studies to assess current sector skills development needs. Similarly, while rudimentary in terms of skills analysis, the health sector programme for planning human resources in Bangladesh follows five-year cycles.

Frequency

Anticipation exercises for the health workforce are generally updated every two to four years. For instance, the Industry Skills Forecasts in Australia are carried out roughly every four years for each occupation. A technical report is produced on health sector skills assessment and analysis in South Africa every two years. In Korea, the frequency of exercises for the health workforce is set by law: under the 2019 Act on Providing Assistance to Health Professionals, the Ministry of Health and Welfare is now under a statutory obligation to conduct a survey and forecast every three years. There are no examples in this review of exercises that are updated annually.

The frequency of exercises sometimes varies upon their intended policy use. Colombia's evaluations of job performance for clinical and administrative staff, which include skills assessments, have taken place every two years since 2004. Meanwhile, their exercises to update professional and transversal skills profiles of health professionals are targeted to take place every seven years to inform the renewal of health education programmes.

In a number of cases, exercises are carried out on a one-time basis with no intention of updating them regularly. For example, Norway's new government-appointed Health Workforce Commission is charged with producing an assessment of the needs of personnel and skills in the health sector to 2040, taking into account ongoing trends in the sector and the need to make the health sector economically sustainable. The committee is made up of key stakeholders, including representatives from hospital administrations, health occupation bodies and academics familiar with health technology. The committee has one year to produce the one-off report on the skill needs of the health workforce. This can also be the case where studies are conducted by employers or workers organizations and are funded on an ad hoc basis. For instance, a one-off skill gap analysis of nurses to 2030 in the health care sector in South Africa is being carried out through the National Department of Health alongside the Public Private Growth Initiative.

Table 2.2. Time horizon and frequency of the exercises covered in this study

	Time horizon			Frequency		
	< 5 years	5-9 years	≥ 10 years	One-off	< 2 years	2-4 years
Argentina	X				X	
Australia	X					X
Bangladesh		X			X	
Canada			X	X		X
Colombia	X	X			X	
Ethiopia	X		X	X		
Germany		X	X		X	X
Ghana	X				X	
Finland		X				X
Korea		X				X
Netherlands		X	X			X
Norway	X		X	X		
South Africa	X	X		X	X	

Source: Interviews with stakeholders. Data not available for Ireland, Sweden and the United States.

Scope

Whole-of-labour market or health workforce specific

When forecasting future skill needs of the health workforce, some exercises focus exclusively on the health workforce, whereas others take a broader perspective of the entire labour market, including health alongside non-health occupations and sectors. A whole-of-labour market approach can account for transitions between a wide range of occupations and qualifications within and outside of the health workforce. It also allows for internally consistent comparisons of labour and skill demand across different sectors. However, whole-of-labour market approaches may not be detailed enough to serve the purpose of health workforce planning for specific health service occupations, depending on the extent of focus on health within the broader multi-sector analysis. Exercises that focus specifically on the needs of the health workforce have several advantages. They can provide more detailed information about skill and qualification requirements in the health workforce and are able to define the health workforce at a more granular level (i.e. more detailed occupations) than if the health workforce is just one sector in the exercise. Given their clear focus, these exercises can also be more effective at promoting and facilitating social dialogue and quickly generating results on the future skills needs of the sector.

Several exercises included in this study adopt a whole-of-labour market approach. Many of these are multi-sector quantitative forecasts of future occupational or qualification needs. Some studies that adopt a whole-of-labour market approach have a thematic focus, such as digital skill needs. For instance, the government of South Africa, in collaboration with the ILO, ITU and UNDP, has designed a future skills strategy and implementation programme that aims to assess digital skill needs in education and training programmes throughout the labour market, including in the health sector.

Health workforce specific exercises often use qualitative methods and are often facilitated by sector skills councils or industry skills councils. Such councils have become a critical part of the overall national system of skills anticipation in many countries. For instance, Australia's industry reference committees develop Industry Skills Forecasts for key sectors in the economy, including health, using foresight and survey methods. However, qualitative approaches are costly to implement for a large number of occupations and sectors because they require significant time and human resources.

Conducting both whole-of-labour market and health workforce specific exercises is a common practice in OECD countries, as the two complement each other. In the Netherlands, the Research Centre for Education and the Labour Market (ROA) forecasts future skill needs for 114 occupations across the entire labour market, of which 13 are health occupations. Also in the Netherlands, the Advisory Committee on Medical Manpower Planning (ACMMP) conducts a health workforce specific exercise that is able to cover 80 health occupations/qualifications, and these are grouped together into nine clusters of specialisations. In Finland, the Finnish National Agency for Education (OPH) combines the two approaches in the same exercise. As a first step, future drivers of change are identified, such as digitalisation or population ageing that apply to all occupations and sectors. This is done qualitatively using Delphi methods, as well as quantitatively using statistical forecasting models. The results from these whole-of-labour market exercises feed into nine sector-specific exercises, including one on social, health and welfare services. The sector-specific exercises identify future trends and skill needs that are specific to each sector.

In low- and middle-income countries (LMICs), conducting skills anticipation exercises is made challenging by weaker institutions, capacities and governance systems. Many developing countries have limited labour market information and require significant investment to develop robust information systems. In these cases, more limited sectoral skills anticipation exercises, such as sector surveys, can help provide useful information to fill data gaps and prepare the sector's workforce for the future.

National or sub-national

Practically all countries included in this study anticipate future skill needs of the health workforce at the national level, and many also produce sub-national results (Table 2.3). Within national studies, several countries studied had sub-national components, even if specific sub-national exercises had not been conducted. Australia and Canada were exceptions within the countries studied, in that specific sub-national exercises are conducted independently from national ones. In Australia, the National Skills Commission (NSC) conducts national-level quantitative forecasts by occupation and sector; the Department of Health conducts long-term, national workforce projections for doctors; and the states use qualitative methods to anticipate future skill needs by sector. In Canada, the provinces conduct quantitative labour market forecasts independently from those produced by Employment Social Development Canada (ESDC), though, the forecasting methods used by the provinces are similar to those of ESDC. In the LMICs studied, the majority of the countries implemented exercises at a national level, with some including regional or sub-regional components.

The decision to anticipate future skill needs of the health workforce at either the national or the sub-national level depends on the governance of health systems and the expected use of the skills intelligence. When regional governments are responsible for health services (such as in Sweden and Canada) or health education (as in Germany, where continuing education and training for nurses is a federal state responsibility) there is more demand for results at the sub-national level. In addition, when skills intelligence is used for career guidance or to plan for an adequate representation of health workers across the country (including in rural and remote areas), sub-national data are essential. In Ethiopia, labour market analysis was initially conducted only at the national level, but the ILO recently recommended that they start to develop sub-national level assessments, given that much of the management of the public health sector has been decentralized, creating challenges for policies, standards, and training programmes. The decision between national or sub-national coverage may also depend on the heterogeneity of the labour market across regions, and in particular the heterogeneity in demand for health services. Several countries indicate that they conduct sub-national forecasts because certain regions have a much higher demand for specific health services than others (for instance, due to different demographics), which implies that shortages in specific health occupations differ across regions. In LMICs, including Ethiopia, Ghana and South Africa, a sub-national component was either included or identified as a priority, due to an urban-rural divide. Healthcare in rural areas in these countries suffer disproportionately from a lack of skilled workers who are less attracted to working in these areas.

Limitations exist at both levels of assessment. On the one hand, national-level assessments may overlook specific skill needs that exist in some regions but not in others. On the other hand, sub-national assessments may be considered unnecessarily detailed when decisions about the content of curricula and the number of students entering health education programmes are made at the national level. Sufficient sample size and statistical infrastructure are particularly important for producing sub-national data, since disaggregating data for the health workforce by region requires robust and valid information at both the occupation and sub-national levels.

Table 2.3. Scope of the exercises covered in this study

	Whole-of-labour market incl. health	Health workforce specific	National	Regional
Argentina		X	X	X
Australia		X	X	X
Bangladesh				
Canada	X	X	X	X
Colombia	X	X	X	X
Ethiopia	-	X	X	
Germany	X	X	X	X
Ghana	-	X	X	
Ireland		X	X	X
Finland	X	X	X	
Korea		X	X	
Netherlands	X	X	X	X
Norway	X	X	X	X
South Africa	X		X	
Sweden		X		X

Source: Interviews with stakeholders. Data not available for the United States.

Methods used

Quantitative methods

Quantitative skills anticipation exercises involve analysing various indicators of current and/or past demand for and supply of health workers and their skills or qualifications, in order to project future trends under given assumptions. Time series models make use of historical trends in the number of health workers, and extrapolate these trends to project the future supply of health workers. Regression models assume that the forecasted variable (such as the demand for health workers) is related to other variables in the environment (such as demographic changes), and create forecasts based on those associations. Other examples of quantitative forecasting models are optimisation models, generic mathematical models, stock-and-flow models, input-output models, social accounting matrices, and simulation models (Safarishahrbijari, 2018[8]). Computable general equilibrium (CGE) models are used to analyse the economy-wide effects of potential shocks and scenarios. For example, the Finnish National Agency for Education applies a CGE model that accounts for 100 industries (including health) and is able to assess the welfare impact of various policies.

Most countries included in this study use quantitative forecasting methods for at least one of their health workforce planning exercises. One of the main advantages of quantitative forecasting methods is that if the methodology is transparent, then the exercise is replicable, including in other countries or settings. Moreover, the method is consistent across a wide range of occupations (across or within sectors), which

allows for comparisons between occupations. However, quantitative methods are also data demanding, requiring up to date and accurate labour market information, and people with sufficiently advanced skills in statistical and econometric analyses to develop and interpret them. Data and expertise were identified as barriers in several LMICs, leading to the external commissioning of work or to a greater reliance on qualitative data to inform skills and training needs decisions. Furthermore, it is important to take care when interpreting and presenting the results of quantitative forecast studies as they may give a false impression of precision and certainty.

A good practice in conducting quantitative forecasts is to make use of a variety of data sources, including qualitative data, because this improves the quality and precision of the output (OECD, 2016[3]). This section provides examples of potential indicators of labour demand and supply and of shortage and surplus indicators which are often included in quantitative forecasts. Some countries, particularly the LMICs included in this study, use these indicators independently of quantitative forecasts to assess current skill needs in the health workforce. When limited resources are available, the imperative is to focus on the immediate needs of the sector.

The examples in this section are mostly based on the in-depth interviews that were conducted for this study. For a more comprehensive overview of health workforce projection models, see Ono, Lafortune and Schoenstein (2013[9]).

Skill demand indicators

Projections of the future size and structure of the population (i.e. demographic projections) are a commonly used indicator of demand for health services and health workers in quantitative forecasts. The most basic approach is to identify the share of workers by occupation (as well as sex and age, for instance), and to identify future demand by linking these employment shares with estimated changes in population size or structure. Demographic projections also indicate the demand for health services directly, as healthcare utilisation varies by age and gender and other subgroups. For instance, women between 20 and 40 years old are most likely to seek out midwives, and the ageing of the population increases the demand for geriatric nurses. The Netherlands Institute for Health Services Research (NIVEL) takes into account current utilisation of health services in their occupational forecasts, which, combined with other factors such as an estimation of unmet healthcare demand, expected demographic changes, epidemiological changes, or socio-cultural developments, leads to an estimation of future demand for health services workers.

Other demand indicators that are specific to the health workforce are the expected change in the prevalence of specific diseases (i.e. morbidity) and expected health care expenditures. Since morbidity patterns tend to differ by gender and age, they are often used in combination with demographic projections. For instance, the quantitative forecasts for the health workforce carried out by the Korean Ministry of Health and Welfare use demand indicators such as demographics, utilisation of health services, and the incidence and prevalence of diseases. The World Health Organisation (WHO) models future market-based demand for health workers for 165 countries around the world by using World Bank data on per capita out-of-pocket health expenditures, population aged 65+ and per capita gross domestic product (GDP) (WHO, 2016[10]).

Besides the variety of indicators discussed above, most OECD countries included in this study also use macroeconomic projections as indicators of demand for health services in their quantitative forecasts. GDP growth will generally influence the amount of public and private resources available to pay for health care and therefore the demand for health services and workers (Ono, Lafortune and Schoenstein, 2013[9]). Macroeconomic projections are typically provided by national statistics offices, national planning bureaus or other specialised research centres. For instance, in Canada, macroeconomic projections are contracted out to an external contractor, and include indicators such as GDP, oil prices and interest rates. These variables provide an indication of the future state of the economy at a broad scale and can affect both the demand for and supply of labour. In most LMICs interviewed, it was less common for macroeconomic

projections to be factored into health workforce planning, potentially stemming from greater economic uncertainty.

Other factors may also influence the future demand for health workers, such as changes in health service delivery models (such as hospital-centred or primary care-centred systems); and changes in healthcare financing (such as the breadth and depth of health insurance coverage) (Ono, Lafortune and Schoenstein, 2013[9]).

Skill needs are not usually a direct input of quantitative forecasts, though some countries have developed methodologies to convert occupation needs to skill needs. When the skills dimension is taken into account, it is done so by linking occupational forecasts to the demand or importance of skills in occupations, using occupational skills frameworks. For instance, Employment and Social Development Canada is starting to map occupational projections to skill needs using O*NET, and the Dutch Research Centre for Education and the Labour Market (ROA) is similarly planning a research project to translate their occupational forecasts to skills forecasts using ESCO or O*NET. In Australia, the National Skills Commission uses the Australian Skills Classification to transform their occupational forecasts into skills forecasts. However, one limitation with using these types of occupational skills frameworks is that they assume that skill needs required for a given occupation are static over time and across countries. Occupational skills frameworks must be regularly updated so that the skill needs for a given occupation remain up to date, and even then they will often remain retrospective in terms of skill needs. Online job vacancy data can be useful in this regard, as they are available in real-time, and can take into account changing skill requirements within occupations. However, they may not be representative of all health occupations, since certain occupations may be less likely to use online vacancies to recruit new hires. For instance, Cammeraat and Squicciarini (2021[11]) show that online job vacancy data for the United States in 2019 represents about half of total employment of health professionals, and about a third of total employment of health associate professionals, as suggested by the United States Occupational Employment Statistics Survey.

Skill supply indicators

The future supply of the health workforce is a function of the behaviour of the current stock of health workers, as well as projected inflows and outflows. Sources of inflows include education and immigration, while outflows include retirements, attrition, and emigration.

One of the most common measures of the current stock of workers used in quantitative projections is the number of employed individuals by occupation, often taken from population census data or labour force surveys. However, in certain circumstances, the available labour supply may significantly exceed the number of workers employed. For instance, in Ghana, government ministries and unions reported that public resources were a major constraint on hiring health workers and many trained workers remained unemployed for lengthy periods after graduating.

Professional license registers are an additional common indicator of the current stock of health workers. In order to ensure that all health workers meet minimum requirements in terms of knowledge and skills, most countries put in place professional licenses (i.e. the legal requirement to have completed specific education or training to practice). Many countries have a national register to keep track of which health workers have a professional license, and this can be used as a data source for the (potential) supply of health workers in the labour market. For instance, the Advisory Committee on Medical Manpower Planning (ACMMP) in the Netherlands uses annual data on the number of registered medical specialists from the national registers of the Registration Committee Medical Specialists (RGS) as an indicator of supply by detailed occupation, as well as by other variables such as age and gender.

Other potential data sources on the stock of health workers are the number of hours worked or contractual working hours (often obtained through population censuses or labour force surveys) and employment data from health facilities, such as employee head counts, duty rosters, staffing records or payroll records (WHO, n.d.[12]).

Enrolments in and graduations from health education programmes represent a common source of data about inflows to the labour supply. Data on health education graduates provide an estimation of the inflow into the health workforce, depending on the amount of time health education graduates take to find employment and the share who find employment in the health workforce. Health education enrolments allow researchers to forecast the likely number of new entrants into the health workforce in 10 to 15 years, once they complete their programmes. Some countries also analyse job mobility and the number of graduates from non-health education programmes to estimate the potential inflow into the health workforce (Maier and Afentakis, 2013[13]). Typically, data on enrolment, attrition and graduation rates by study programme can be obtained through the Ministry of Education and sometimes the Ministry of Health, depending on which is in charge of health education programmes. Not all countries produce or make available this data, however. In Ghana, for instance, private hospitals did not have access to the number of graduates from public institutions, making it harder to forecast labour supply.

Another important inflow to the health workforce in high-income countries is immigration from other countries (Ono, Lafortune and Schoenstein, 2013[9]). For instance, Employment Social Development Canada (ESDC) includes immigration as an indicator of inflows to the labour supply in its labour market projections that include the health sector. However, since recruiting health workers from abroad may aggravate shortages of health workers in the countries of origin, the WHO encourages countries to refrain from recruiting health personnel from countries that are suffering from acute shortages, and improve the planning of their own health workforce requirements instead (World Health Assembly, 2010[14]) (Ono, Lafortune and Schoenstein, 2013[9]). This problem of 'brain drain' of healthcare workers to higher income countries, thus exacerbating shortages in the supply of skilled labour in LMICs, was identified by respondents in LMICs studied, with varying degrees of severity. Some respondents, including in Ghana and South Africa, noted that the current wave of outward emigration of healthcare workers pre-existed COVID-19 but had potentially been exacerbated by countries in Europe and the US relaxing immigration laws for healthcare workers during the crisis. This issue of brain drain, as well as difficulties recognising foreign qualifications and professional licenses, may be why most countries included in this study do not explicitly include immigration as a source of inflows in the quantitative forecasts for the health workforce.

Outflows from the health workforce may be due to retirement, job transitions, burnout, family reasons or emigration. In the LMICs studied, there were significant job exit rates due to emigration to higher income countries, usually for higher pay or lower unemployment. Some respondents also indicated that worker fatigue and burnout since the COVID-19 pandemic was contributing to job exit rates, in addition to the loss of life of workers during the crisis. Although it is hard to predict how many people may leave the health workforce for personal reasons, countries often predict exits due to retirement based on demographic projections of the number of people that will reach the legal retirement age at a given moment in the future. However, in many countries, doctors continue to practice beyond the legal retirement age (albeit often with reduced working hours), especially those in private practice. Taking doctors' actual retirement patterns into account may require modelling retirement as a gradual reduction in working time rather than an abrupt end of service (Ono, Lafortune and Schoenstein, 2013[9]). The Dutch Advisory Committee on Medical Manpower Planning (ACMMP) model takes into account physicians' actual retirement age by using national registration data, and estimates the size of outflows into retirement over the next 5, 10, 15 and 20 years. In South Africa, 70 per cent of the healthcare workforce are projected to retire within the next ten years, causing a potential labour supply shortage and a spike in the number of nurses to be trained. In Ethiopia, supply-side forecasting was carried out by forecasting inflows (training capacity and migration) and outflows (retirements, emigration, deaths, resignations and dismissals) and using a stock-and-flow approach to estimate the future supply of the health workforce to 2030.

Exit rates can also be measured irrespective of the reason for leaving the health workforce. The German QuBe-consortium and Employment Social Development Canada (ESDC) explicitly take job exits and job mobility into account in their quantitative projections. They use different mobility matrices, for instance by age or gender, to estimate future supply and demand by occupation. Data on job exit rates at the

occupational level are often obtained through population censuses or labour force surveys that include respondents' previous occupation, or through administrative records on retirees and their previous occupation (Maier et al., 2017[15]).

Most of the exercises identified in this study do not incorporate indicators of skills supply in their quantitative forecasts. Under the assumption that workers acquire certain skills and experience as they get older while other skills decline or become obsolete, demographic projections may provide an indication of the future supply of skills. Another way to estimate the skills supply directly is by using Big Data and Artificial Intelligence (AI). Using techniques such as Natural Language Processing, job and curricula descriptions can be analysed to extract the skills that people in certain occupations or with certain educational qualifications are likely to have. For instance, Headai, a Finnish company developing AI solutions to facilitate decision making, uses AI to categorise descriptions of education and training curricula into skill categories as a measure of skills supply (Verhagen, 2021[16]).

Directly testing the skills of health professionals is another way to obtain a measure of the skills supply. However, no examples of direct assessments of skills of health professionals were identified among the countries that participated in this study. Tools for direct assessment of skills take the form of examinations or tests performed by respondents in the presence of trained interviewers, and direct observations of actual performance by trained observers. The OECD Survey of Adult Skills (PIAAC) is an international direct assessment that evaluates skills in numeracy, literacy and problem solving for the general working adult population. These results can be disaggregated for specific health occupations, down to 3-digit ISCO for some countries. Health Education England piloted a digital literacy self-assessment tool in one hospital in 2021, with plans to roll out nationally (Health Education England, n.d.[17]). The tool was designed to provide senior managers and leaders in the health workforce with anonymised data to help them understand the digital literacy skills and training needs of their staff (https://www.hee.nhs.uk/our-work/digital-literacy/digital-literacy-self-assessment-diagnostic-tool). A direct examination type of assessment instrument was also under development by the National Council of State Boards of Nursing (United States) for rigorously evaluating clinical reasoning skills among nurses (Maeda and Socha-Dietrich, 2021[18])

Shortage and surplus indicators

In addition to measures of skills supply and demand, some countries track indicators of shortages or surpluses as inputs to quantitative forecasts. One way to collect such information is to conduct employer surveys, in which employers are asked whether they experience any hiring difficulties. These are often undertaken by employers' organisations, professional associations as well as by governments. While some data collected by employer surveys is purely qualitative (such as open-ended questions about skill needs), the responses to targeted questions can be used in quantitative forecasts. For instance, in Norway, municipalities and health facilities are asked how many people they need to hire for the health workforce in a given year. Although employer surveys are a good indicator of perceived shortages, these subjective assessments may, in some cases, reflect hiring difficulties for reasons other than shortages, such as poor working conditions, inadequate remuneration or poor human resources policies (OECD, 2017[19]). In South Africa, the HWSETA conducted employer surveys, but a lack of motivation among employers to participate in these surveys was considered a constraint on effectively collecting labour market information for skills analysis in the healthcare sector.

Hard-to-fill job vacancies (defined as job vacancies that remain open over a given reference period) are another indicator of shortages, because prolonged unfilled vacancies or high job vacancy rates can signal that employers are facing difficulties in finding enough people with the right skills to fill a position at a given wage (OECD, 2017[19]). For instance, in the Netherlands, the Advisory Committee on Medical Manpower Planning (ACMMP) uses vacancy rates by detailed occupation in their quantitative projections. In Germany, the QuBe-consortium uses occupation and skill specific search durations from an employer survey as an indicator of how hard it will be for employers to fill a vacancy. In Ghana, vacancies were

established to be the main mechanism for informing training policies, with only a nascent focus on the future skills needs that the industry may require. In most countries, national statistics offices or public employment services (PES) provide vacancy data by detailed occupation and/or by sector. Real-time online job vacancy data ('Big Data') can also be used, although these data may not be representative of the whole labour market (OECD, 2017[19]). Member countries of the European Union can also use the Job Vacancy Statistics (JVS), which are available by country, region, year, sector (including Health and social services), and 1-digit ISCO occupation. While widely used, the use of hard-to-fill job vacancies as an indicator of shortages is primarily reactive and focuses on the current demand of professionals as a proxy for existing skills needs. Furthermore, vacancies may be hard to fill due to a variety of reasons including poor working conditions or non-competitive wages.

Another indicator of shortages in the health workforce that is used in quantitative projections is patients' waiting time before seeing a doctor. For instance, the Advisory Committee on Medical Manpower Planning (ACMMP) in the Netherlands uses time series of waiting time (in weeks) for first outpatient clinic visits as an indicator of shortages of health services workers. They also use data on health education graduates' search time for finding a postgraduate training programme. The assumption is that shorter time intervals indicate higher demand or even shortages of health services workers. They obtain these data from surveying medical doctors about how long they searched for a training place and administrative data on the time interval between final degree examination in medicine and intake in a postgraduate programme (ACMMP, 2020[20]).

The WHO provides an example of how shortfalls from a minimum requirement of supply might serve as an indicator of shortages of health services workers. Based on several analyses they calculate an indicative threshold of 4.45 physicians, nurses and midwives per 1 000 people, and use that in their estimations of health workforce needs and needs-based shortages by 2030. In Ghana, for instance, the WHO tool was being used as the primary tool to determine the number of workers that needed to be trained for each specialisation. The WHO emphasises the limitations of this approach in that this number only reflects a selected number of health service occupations, and it does not reflect the heterogeneity of countries in terms of baseline conditions, health system needs, optimal workforce composition and skill mix (WHO, 2016[10]).

As markets should assign a higher price to scarce skills or occupations, wage growth by occupation is a commonly used signal of skill shortages in many skill assessment and anticipation exercises (OECD, 2017[19]), though rarely used for such assessments in the health workforce. Wage data can, for instance, be obtained through administrative data (such as from tax authorities) or labour force surveys. Among private sector employers in Ghana, wage inflation was listed as a major indicator of skills shortages, and wage data was used as a tool for human resources planning. In this case, the data was coupled with information on the length of time vacancies were taking to fill. However, wage data are not used in the majority of exercises included in this study, nor in a previous OECD review of quantitative projection models in the health workforce (Ono, Lafortune and Schoenstein, 2013[9]). Among the 26 projection models from 18 OECD countries included in the previous study, wages (or other modes of provider payment) were only included in one study as a variable affecting the future supply and demand for health workers. A potential reason for the limited use of wage data in skills anticipation exercises for the health workforce is that such studies are often conducted at too detailed an occupation level to have sufficient and reliable data on wages. Another reason may be that in many countries, health workers predominantly work in the public sector, and wages in the public sector are not sufficiently sensitive to shortages and surpluses to serve as a useful indicator.

Table 2.4. Methods of skill anticipation exercises covered in this study

	Quantitative methods	Qualitative methods
Argentina	X	X
Australia		X
Bangladesh		X
Canada	X	X
Colombia		X
Ethiopia	X	X
Finland	X	X
Germany	X	X
Ghana	X	X
Ireland	X	
Korea	X	X
Netherlands	X	X
Norway	X	X
Sweden	X	
South Africa	X	X

Source: Interviews with stakeholders. Data not available for the United States.

Qualitative methods

Qualitative skills anticipation exercises can consider a broader range of factors than those that can be easily quantified. This makes them helpful in skills anticipation, given that skills are difficult to quantify and skill needs are dynamic. Moreover, they can facilitate discussion about emerging skills needs associated with new technologies which may not yet show up in national qualification frameworks or occupational skills frameworks (such as O*NET, ESCO, or the UK Skills and Employment Survey). Qualitative methods are also generally easier to set up in contexts where financial resources or statistical expertise are more limited. This was reflected in LMICs being more likely to rely on qualitative methods. Disadvantages of qualitative methods are that they are subjective, non-systematic and potentially yield inconsistent responses.

Qualitative methods often involve gathering groups of experts and/or stakeholders to share their informed views on how the skill needs of the health workforce are likely to evolve. These include focus groups, stakeholder consultations, foresight methods, and Delphi methods. Other qualitative methods include surveys of managers, health workers, or graduates. While surveys are a qualitative method, their outputs can be both qualitative and quantitative.

Focus groups, foresight and related methods

Focus groups, stakeholder consultations, foresight methods and Delphi methods are similar in that they involve gathering stakeholders to share informed views on how skill needs in the health workforce will evolve. A focus group is a facilitated group discussion that is "focused" on a particular topic, such as which skills will be in higher demand in a given health occupation in the future (Brown, 2019[21]). The term ‘stakeholder consultation’ broadly refers to developing relationships with stakeholders with a range of aims: from a one-way relationship with the sole purpose of informing them, to a two-way relationship aimed at gathering feedback or even involving and empowering stakeholders in the decision-making process. The Delphi technique structures a group communication process by bringing together a panel of experts to formulate a prediction or set of priorities (Brown, 2019[21]). Foresight uses a range of methods, such as scanning the horizon for emerging changes, analysing megatrends and developing multiple scenarios to reveal and discuss ideas about the future (OECD, n.d.[22]).

In Australia, industry reference committees carry out Industry Skills Forecasts in non-academic health occupations using foresight methods. The purpose of the exercise is to update the competency framework ("training package") for particular non-academic occupations, such as enrolled nursing[1], ambulance and paramedics, and direct client care. Industry reference committees are comprised of key industry bodies related to the particular occupation. For instance, the Enrolled Nursing Industry Reference Committee includes representatives from Aged and Community Services Australia, the Australian College of Nursing, the Department of Health, and the Australian Private Hospitals Association, among others. As part of the exercise, the Department of Education and Training provides a list of 12 generic skills for industry representatives to rank in order of importance for the occupation. Each industry reference committee consists of about 20 members, and each state does their own exercise by sector. The industry reference committee approach depends on having well-established networks of industry experts who are actively engaged in improving the quality of skills and training in the sector, and willing to volunteer in lengthy consultations. The work of the industry reference committee is coordinated by support organisations (like SkillsIQ) that receive funding from government, and that are responsible for producing the final Industry Skills Forecast and submitting it to the Australian government for validation.

The qualitative component of Finland's Skills Anticipation Forum is based on a series of foresight workshops. There are nine anticipation groups in total, and social, health and welfare services is one of them. Each of the five phases of the process involve a foresight workshop. Phase one and two build an understanding of the major trends affecting the sector and develop scenarios. Phase three looks deeper at what is happening within firms and organisations and how they are likely to cope under the different scenarios. Phase four anticipates skill and education needs of the sector under the various scenarios, and phase five focuses on developing the proposal for the Ministry of Education with recommendations about how qualification requirements should change, determining student numbers in health programmes and building training programmes. Quantitative forecasts serve as an input for discussion in these workshops, and particularly in the first two phases. Each anticipation group has about 25 members made up of employers, employees, entrepreneurs, technical and vocational education and training (TVET) and higher education institutions, and educational administrators. A network of experts is involved in validating the proposal. Finland is exploring ways to combine its qualitative and quantitative approaches in a more systematic way to anticipate skills needs, and has started incorporating the use of the "E-Delphi method," an online discussion platform that allows participants to discuss different scenarios and megatrends.

The Irish Health Service also employed Delphi methods in its one-off 10-year projection of demand for workers in acute hospital services. They held workshops to develop scenarios based on grade mix and skill mix and consulted broadly with stakeholders in the acute hospital services. The findings from the exercise will be used to engage with the Department of Health to strategize about where to source the supply.

As part of their project "Accelerating adoption of AI in the health sector," Canada's Michener Institute of Education relies primarily upon stakeholder consultation to understand the readiness of health professionals to use new AI tools, and identify the skills that are needed to use these tools. The team built an extended network of partners from royal colleges and digital health groups who meet several times a year to share developments in their environments. A symposium also gathered 500 stakeholders to share experiences in the use of AI in the health sector.

Stakeholder consultations were also an important component of the approach taken by the WHO in developing the Global Competency Framework for Universal Health Coverage. The process involved iterative consultation and validation of the selected competencies and the underlying conceptual approach with a working group of education experts, as well as with a virtual community of practice that included academic institutions, individual experts, and agencies involved in health worker education. The approach was underpinned by a review of existing competency frameworks and competency-based curricula, as well as documentation about how the roles and responsibilities of health workers were likely to evolve.

In the United States, SEIU Pennsylvania (a sub-national trade union of healthcare workers) consults with health professionals and organises workshops and conferences, in order to assess future trends in the health sector and how this affects training needs of health workers. Part of this work is done in collaboration with the Consortium for Advancements in Health & Human Services, which offers an array of educational and consultancy-based services.

Surveys

Surveys are used to collect data from targeted individuals and organisations about skills gaps and skills demand within the health workforce. Their output can be either qualitative (such as responses to open-ended questions about skill needs) or quantitative (such as the share of hospitals that have difficulty finding workers with required skills). In comparison with focus groups and other qualitative methods mentioned above, surveys are relatively more demanding in terms of cost and statistical expertise.

The qualitative output generated by surveys can provide a rich picture of skill needs. Surveys about skill needs in the health workforce are generally directed at employers and managers, health workers themselves and sometimes at recent graduates. The Netherlands' Institute for Health Services Research (NIVEL) and the Advisory Committee on Manpower Planning (ACMMP) conduct surveys among both health workers and managers and ask them to evaluate how difficult it is to fill vacancies (quantitative output) and to indicate which tasks they expect will change (qualitative output). The Norwegian Committee on Skill Needs conducts an annual survey that polls county municipalities and employers in the health sector (as well as in other sectors) about how many people they need to hire. As part of Australia's Industry Skill Forecasts, industry representatives who are part of industry reference committees are asked to complete a questionnaire to rank how important a list of skills are for the health workforce, and whether they expect their importance to increase over time. Korea's Ministry of Health and Welfare conducts a workforce survey with health professionals themselves to identify health and medical personnel issues. Respondents can complete the survey in person, in writing, or over telephone. In Argentina, too, the trade union of health workers – *Federación de Asociaciones de Trabajadores de la Sanidad Argentina* (FATSA) – regularly conducts surveys among union members in hospitals, in order to assess current and future manpower needs and working conditions. The Netherlands' Research Centre for Education and the Labour Market uses surveys of recent health graduates as an input into its sectoral forecasts.

The Norwegian Health Workforce Commission plans to use interviews to complement an analysis of hospital administrative data to meet its mandate to investigate the needs of personnel and skills in the health sector to 2040. To analyse if there are possibilities for different groups of health workers to start sharing tasks, or to change the way in which they are currently sharing tasks, the Commission is making use of administrative data from hospitals about which tasks are currently carried out by different occupations. They will likely complement this analysis with interviews with hospital managers and health workers, and may also physically observe how health workers carry out their tasks on the job.

Surveys can also be directed at employers and trainers to collect data on the training that workers are receiving. In South Africa, HWSETA conducted a survey among employers and skills development providers following interruption to training during COVID-19 to determine whether training had resumed. Seventy-five per cent of employers and 82 per cent of skills development providers indicated that training had resumed during lockdown periods, which was determined to be a positive development for the supply of skills.

Combining quantitative and qualitative methods

Ideally, skills anticipation exercises adopt a holistic approach and combine various qualitative and quantitative methods in order to achieve robust and reliable results (CEDEFOP, 2008[5]). Indeed, most countries included in this study combine quantitative and qualitative methods, as part of the same exercise or as a set of exercises (Table 2.4). For instance, some countries (Finland, Germany, Korea, the

Netherlands, Norway, and South Africa) employ qualitative stakeholder consultations to verify the validity of their quantitative forecasts. It is also common to include employer or graduate surveys as one of the inputs in quantitative forecasts, or alternatively, to use the results from quantitative forecasts as an input to stakeholder consultations. For instance, the Finnish National Agency for Education (OPH) and the Advisory Committee on Manpower Planning (ACCMP) in the Netherlands conduct quantitative forecasts that serve as an input for Delphi discussions. Colombia's Ministries of Health and Education noted that the approach towards skills anticipation in the health workforce had been too qualitative, citing a lack of reliability and accuracy of previous exercises as a limitation to their policy application. This further highlights the need for a combination of quantitative and qualitative methods to produce skills intelligence that is fit for policy use.

Dealing with uncertainty and validating findings

Uncertainty is a key challenge when anticipating future skill needs: it is impossible to precisely predict the future, and therefore the required size of the future health workforce or the skills they will need to have for future scenarios. The longer the time horizon, the greater the uncertainty. Exercises with a shorter time horizon (less than 10 years) that are intended to inform shorter-term policy responses (such as upskilling the existing health workforce in digital skills, or temporary migration flows) tend to involve less uncertainty than those that project 10 years or more into the future, and that are intended to inform the number of training spaces in health education programmes or the curriculum of such programmes. Economic uncertainty can greatly affect the supply and demand of healthcare workers in LMICs, which are sometimes unable to absorb the healthcare workers that they have trained into the public healthcare sector due to budgetary limitations. Meanwhile, external factors, such as unexpected spikes in demand for migrant health workers abroad, can increase the brain drain of skilled workers in ways that can be difficult to plan for.

The costs of under- or overestimating future skill needs in the health workforce could be larger than in other sectors. Underestimates could lead to future health workforce shortages, which could in turn contribute towards higher morbidity and mortality rates in the population. However, overestimating future skill needs of the health workforce is costly too, given the large private and public investments needed to train specialised medical doctors (both in terms of time and financial resources).

Among the exercises included in this study, four different strategies for dealing with uncertainty in the skills forecasts could be identified. The first is to repeat the exercise frequently (such as every two or three years), in order to incorporate emerging insights about changing future trends. Another strategy for dealing with uncertainty in quantitative exercises is to provide ranges instead of exact numbers. For instance, the Advisory Committee on Medical Manpower Planning (ACMMP) publishes estimates of the minimum and maximum number of health workers that will be needed in the future. Employment Social Development Canada (ESDC) and the Research Centre for Education and the Labour Market (ROA) in the Netherlands transform the projected numbers of workers needed into categories (such as small, medium or large shortages/surpluses) and only report the category that each occupation falls into. Analysis in South Africa forecasted ranges for future nursing shortages, highlighting that an existing gap of 26,000-61,000 nurses was likely to increase to 131,000-166,000 by 2030. Representatives from South Africa acknowledged that the wide ranges were indicative of uncertainty and issues with data reliability. A third strategy is to communicate to the final user how reliable the projections are. The Netherland's ROA provides a measure of an occupation's historical business cycle sensitivity, where higher sensitivity to economic downturns or growth imply more uncertainty about that occupation's labour demand projections.

Finally, several exercises deal with uncertainty in their design by investigating scenarios. When this is a quantitative exercise, the forecasting model is run under different assumptions or hypothetical future events, to show how they affect the forecasted numbers. A qualitative approach to scenario development

involves asking field experts or policymakers about what potential future scenarios might look like, how likely these scenarios are to happen, and how they would affect the forecasts. One of the countries that incorporates scenario development into its qualitative exercises is Finland, where experts discuss how skill needs for the health sector (and other sectors) would change under different scenarios. While none of the scenarios analysed by the Finnish Skills Anticipation Forum has taken into account the possibility of a global health pandemic, efforts have been made to collect information ex-post about changing skill needs as a result of the COVID-19 pandemic. Members of the Skills Anticipation Forum participated in a survey to identify common skills and tasks between occupations, in order to understand which occupations could be an alternative in case of a shortage in another, as took place during the pandemic.

Validating findings is a necessary step in producing quality skills intelligence. Most countries validate findings from skills anticipation exercises with external experts before publishing them. This is an opportunity to discuss whether the results, and the assumptions they are based on, are considered plausible. Some countries (Australia and Canada) send the results to experts for feedback and conduct follow-up consultations in case there is any disagreement with the projected numbers. Other countries (the Netherlands, Finland, Norway) ask a mixed group of experts such as employers, education providers, researchers, health authorities, patient organisations and ministries to discuss the validity of the results together. In either case, the validation process leads to refining the forecasts. In Colombia, a variety of methods are used to validate findings from skills anticipation exercises in the health workforce, including expert focus groups, and cross-referencing/comparing data gathered from different sources in Colombia or from the same sector in other countries.

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Annex 2.A. Supplementary table

Annex Table 2.A.1. Types of skills anticipation exercises covered in this study

Country	Institution interviewed	Skill definition	Time horizon	Frequency	Scope		Methods
		Skill / **E**ducation / **O**ccupation	**… years** into the future	Every **… y**ears / **m**onths	**W**hole-of-labour-market / **H**ealth-workforce	**N**ational / **R**egional	**Quanti**tative / **Quali**tative
ARG	FATSA	O		1 y	H	N	Quant / Qual
	SSP	O	current needs	1 m	H	R	Quant / Qual
AUS	SkillsIQ	S	4	4 y	H	R	Qual
BGD		O	5				
CAN	ESDC	O	10	2 y	W	N	Quant
	MIE	S		One-off	H	N	Qual
COL		S/O	Mixed (0 - 5)	Recurring	W / H	N/R	Qual
DEU	BIBB (1) *	E / O	20	2 y	W	N / R	Quant
	BIBB (2)	E / O		One-off	H	N / R	Qual
ETH		O	Mixed (2 and 10)	One-off	H	N	Quant/Qual
FIN	OPH	S	5-9	1 y	W / H	N	Quant / Qual
GHA		O	>5 years		H	N	Qual
IRL					W / H	N / R	Quant
KOR	Min. HW	O	5 y	3 y	H	N	Quant / Qual
NLD	ACMMP	E / O	12-18	3 y	H	N / R	Quant / Qual
	NIVEL	E / O	12-18	3 y	H	N	Quant / Qual
	ROA	E / O	6	2 y	W	N / R	Quant
NOR	NHWC	O	20	One-off	H	N	Quant / Qual
	NCSN	E / O	4		W	N / R	Quant / Qual
SWE	LH	O			H	R	Quant
ZAF		O	Short and medium-term exercises	One-off/recurring (every 2 years)	H	N	Quant/Qaul

Notes: The table is based on the information collected during semi-structured interviews and may therefore not provide a comprehensive overview of the exercises conducted in all countries. FATSA = Federación de Asociaciones de Trabajadores de la Sanidad Argentina, SSP = Sindicato de Salud Pública de la Provincia de Buenos Aires, ESDC = Employment Social Development Canada, MIE = Michener Institute of Education, BIBB = Federal Institute for Vocational Education and Training, OPH = Finnish National Agency for Education, Min. HW = Ministry of Health and Welfare, ACMMP = Advisory Committee on Medical Manpower Planning, NIVEL = Netherlands Institute for Health Services Research, ROA = Research Centre for Education and the Labour Market, NCSN = Norwegian Committee on Skill Needs, NHWC = Norwegian Health Workforce Commission, LH = Leading Healthcare. Data not available for the United States. Blank spaces mean that the information was not collected during interviews.

* The BIBB conducts two different exercises: BIBB (1) refers to the qualification and occupation in the future (QuBe) exercise and BIBB (2) refers to a recent project on framework conditions for nursing education.

Note

[1] Enrolled nurses have completed their diploma qualification. They tend to work in a team and have less authority than registered nurses who have finished their degree.

3 Use of skills intelligence in health workforce policymaking

This chapter reviews the policy uses of the information produced by skills anticipation exercises relating to the health workforce. The information is used by governments, hospitals, and trade unions for education and training, employment and migration policy. A number of barriers hinder such information from being more fully and effectively used for policy purposes, including scope of practice regulation, lack of funding, lack of coordination, lack of stakeholder involvement and a poor alignment between skills intelligence and the desired policy purpose.

Introduction

This chapter explores how governments and social partners use the information gathered from skills anticipation exercises relating to the health workforce, including those identified in Chapter 2. Common policy uses are to inform education, employment and migration policy. Exercises are often designed with particular policy uses in mind. Quantitative outputs at occupation or qualification level are often used to determine student intake in health education programmes or migrant inflows. Qualitative findings that describe the types of skills that a given occupation will require can be used to define education and training course content and to inform changes to the way tasks are allocated across occupations.

For skills anticipation exercises to be effective in addressing skills gaps in the health workforce, they must successfully translate into policy. However, in many of the countries studied, challenges were identified in achieving the policy purpose of the findings. An important barrier preventing the information obtained from skills needs anticipation exercises to be used more extensively in policymaking in the health sector is that scope of practice regulation limits the tasks a person in a given occupation is legally allowed to perform. Other important barriers include lack of funding, coordination, stakeholder involvement, and poor alignment between the skills intelligence and the desired policy purpose. These barriers may be especially challenging to overcome in LMICs.

As with the previous chapter, this chapter draws primarily from semi-structured interviews with representatives from institutions that carry out or use anticipation exercises in Australia, Argentina, Bangladesh, Canada, Colombia, Ethiopia, Finland, Germany, Ghana, Ireland, Republic of Korea, the Netherlands, Norway, South Africa, Sweden and the United States. It also draws from participant contributions during a virtual peer-learning workshop attended by stakeholders from 20 countries who are involved in either producing skills information in the health workforce or using it for policymaking.

Main uses of skills intelligence in health workforce policymaking

Skills intelligence related to the health workforce is used to inform education and training policy, employment policy and migration policy. The social partners also make use of this information in the context of collective bargaining and informing training content.

Informing initial education and training policy

One of the primary objectives for gathering information about future skill needs in the health workforce is to provide guidance for education and training policy decisions. Specifically, this information is used to inform how many students should be admitted to health education programmes. The information is also used to design and update the health education curricula and to inform career guidance.

Determining intake in health education programmes

Several countries in this study (including Finland, the Netherlands, Norway, South Africa and Sweden) use quantitative forecasts to determine the maximum number of students that are allowed to enrol in health education programmes (“numerus clausus”). This type of workforce planning is particularly important in the health workforce, given the time and costs involved in training new health workers. Previous research shows that nearly all countries impose a numerus clausus on education programmes for doctors, nurses and other health professions (Ono, Lafortune and Schoenstein, 2013[1]).

The Advisory Committee on Medical Manpower Planning (ACMMP) in the Netherlands uses the different scenarios of their quantitative forecasts to determine the minimum and maximum recommended intake into health education programmes. In addition to providing a bandwidth recommendation, ACMMP also provides education institutions with a recommended intake size, such as at the bottom, middle or upper

bound of the recommended bandwidth. Some of the factors that feed into the decision for the recommended intake size are the size and duration of the shortage, and the speed at which the ACMMP recommends eliminating those shortages. For example, since specialists for intellectual disabilities and geriatric medicine experienced large and increasing shortages over several years, the 2020 ACMMP report included a recommendation for a relatively large intake into education programmes for these specialisations, so that shortages would be eliminated in 12 years, instead of the average 18 years for other specialisations (ACMMP, 2020[2]). The Allocation Decree of the Dutch Ministry of Health, Welfare and Sport decides on a numerus clausus for health education programmes each year based on the ACMMP's recommendations.

In South Africa, current to medium-term skills needs are determined by the Sector Education and Training Authority (HWSETA) through a sector skills plan. The Department of Higher Education and Training uses the sector skills plan to set student intake in order to improve the responsiveness of the post-school education and training (PSET) system. They do this in coordination with Department of Employment and Labour (DEL).

Although numeri clausi are a common use of skills intelligence in the health workforce, their effectiveness in mitigating shortages (or surpluses) depends on the quality of the skills intelligence, and on the uncertainty of the context in which they are implemented. For instance, in South Africa, the data for sector skills plans comes from employers, monitored through the Annual Training Report. However, many employers do not comply, compromising the data quality. There is also a risk of “yo-yo” effects when policymakers over-correct the numerus clausus in response to fluctuations in perceived or real shortages or surpluses (Ono, Lafortune and Schoenstein, 2013[1]). Large rises or falls in student numbers in health education programmes can create adjustment problems for education and training providers, by changing the required number of teachers, classrooms and training places required from one year to another. In LMICs, even when the need for more places in particular health education programmes has been identified, there may be issues in absorbing trained workers into the health care system. For instance, in Ghana, respondents reported that the government could not always afford to hire trained health professionals, even when shortages had been identified and workers trained.

Defining course content

While determining student numbers in health education and training programmes relies principally on quantitative data such as occupational forecasts, defining the content of programmes typically involves more qualitative data and approaches. The development of education and training programmes and relevant curricula can be informed by tools such as the WHO global competency framework for universal health coverage (Box 3.1), which provides guidance for creating competency-based education outcomes for health workers. Exercises that focus on skills needs, rather than workforce needs, are useful for helping to update curricula, since they allow for a focus on developing the composite skills required for a particular profession. For example, Germany’s Federal Institute for Vocational Education and Training (BIBB) is using qualitative methods to investigate how the continuing education and training (CET) curricula for nurses should be adapted following recent reforms and putting a particular emphasis on the skills needed to establish quality outcomes in the nursing profession. They set up an expert panel composed of field experts, education providers, employers, and researchers to develop the new curriculum. Similarly, the explicit purpose of Australia’s industry reference committees is to update competency frameworks (called “training packages”) for health occupations that require vocational education and training. Training packages are used to update course content for qualifications associated with those occupations.

Box 3.1. The WHO Global Competency Framework for Universal Health Coverage

The World Health Organization (WHO) carried out an assessment of which skillsets were common and required across health occupations and applied it to the development of their Global competency framework for universal health coverage. Making education programmes more general with a stronger focus on transversal skills supports mobility between occupations in the health workforce, which can help to mitigate skills shortages. This is one of the objectives of the framework, which sets competency standards for all health occupations that involve delivering primary care. The framework represents a guide that education practitioners can use to set the standards of both pre-service and in-service education for primary care health workers to align with efforts to achieve quality and universal health coverage. It focuses on six key competency areas: people-centeredness, decision-making, communication, collaboration, evidence-informed practice and personal conduct. In addition to informing the development of curricula, the framework can also inform related professional licensing and accreditation mechanisms and promote good practices by managers and health workers.

Source: WHO (2022[3]), Global competency framework for universal health coverage, https://apps.who.int/iris/handle/10665/352710.

Among the skills anticipation exercises identified in this study, there is a noticeable gap in terms of analysis that sheds light on the impact of digitalisation on the skills needed by health workers in order to inform curriculum content. The exception was a project carried out by the Michener Institute in Canada, a post-secondary institution embedded in a hospital. Funded by the Future Skills Centre and relying heavily on stakeholder consultation, the project sought to understand the readiness of health professionals to use new AI tools, and the skills that would be needed to use these tools. The objective of the project was to develop a new national certification programme in basic AI literacy for health workers, after testing the curriculum with 5 000 health workers. The project focused on various professions in the health care sector, recognising that different roles will be transformed by AI in different ways, depending on their reliance on personal interactions, data, repetitive tasks, and creativity.

Owing to factors such as limited resources and slower implementation of new technologies, forecasting of the impact of digitalisation on the health sector was limited in the LMICs studied. Nevertheless, several LMICs noted the importance of digital skills for the health sector. In Ghana, for instance, qualitative data gathered from hospitals indicated a need for improved information technology skills among workers and these findings fed into training programmes delivered at public institutions. However, the skills assessment approach was reactive, and did not attempt to forecast future skills needs. In Ethiopia, while some stakeholders recognised that digital skills were essential to accelerate digital transformation, they also noted that Ethiopia had a major challenge in finding highly skilled workers. They called for a greater focus on training a larger percentage of the general population in higher-level digital skills.

Informing career guidance

Several countries reported using skills intelligence to inform career guidance websites or other career guidance services. The forecasts conducted by the Netherlands' Research Centre for Education and the Labour Market (ROA) are used to inform various career guidance websites, including those aimed at secondary school students. A field experiment showed that informing pre-vocational secondary education students about the job opportunities in their occupations of interest – based on ROA's quantitative forecast results as well as expected hourly wages in those occupations – increases their probability of changing their preferences towards an occupation with better labour market perspectives (De Koning, Dur and Fouarge, 2022[4]). South Africa's Health and Welfare Sector Education and Training Authority (HWSETA), which conducts skills anticipation and assessment exercises in the country, launched a digital career

guidance portal in 2021, as face-to-face interaction was constrained by the COVID-19 pandemic. The objective of the portal is to address skills needs in the health care sector, combat youth unemployment and poverty, and inform people about the opportunities in the sector, including funding support for trainees, In Colombia, the Ministries of Health, Labour and Education all reported using the results of skills anticipation studies to inform prospective students about employment prospects in the health sector through career counselling and/or vocational guidance.

In order to inform career guidance, it is useful to conduct both national and sub-national demand-side labour forecasts for the health workforce. National level forecasts provide skills intelligence on the demand for specific skills and/or health professionals in a country, and can help address shortages at a national level. However, in many countries, skills shortages occur at a sub-national level, and many trained workers look for jobs within their region. Sub-national forecasts are useful in this context and could also help to address regional shortages, or urban/rural divides in health care provision as identified in some countries studied.

Informing employment policy

Skills intelligence in the health workforce can feed into the development of employment policies. It can inform how work is organised in the health sector, the updating of occupational standards, or the development or updating of on-the-job training, retraining and upskilling courses.

Work organisation changes

Skills intelligence can be used to improve work organisation in the health workforce, by optimising the allocation of tasks between occupations, or the mix of healthcare staff in an establishment at a given time. A focus on these two areas, often broadly referred to collectively as the “skill mix”, can help improve health system performance, address shortages and build more resilient healthcare systems (Buchan and Calman, 2004[5]). For the purpose of this report, a distinction is made between interventions to change the allocation of tasks between occupation (referred to here as “task allocation”) and those to adjust the mix of staff in the health workforce (referred to here as “skill mix”). An example of task allocation is reviewing scope of practice legislation to allow other workers in other health occupations to do some of the tasks that specialised medical doctors do. Respondents in several countries highlighted that specialised medical doctors are spending a significant amount of time doing administrative tasks, and some countries are therefore exploring how to shift these administrative tasks to other less in-demand health occupations to help mitigate shortages and make better use of doctors’ skills. An example of skill mix is forecasting future demand for health services in order to project how many doctors, nurses and other types of health workers will be needed to meet demand.

One of the mandated objectives of the Norwegian Health Workforce Commission is to investigate if there are possibilities for different groups of health workers to start sharing tasks, or to change the way in which they are currently sharing tasks. This exercise is based on an analysis of task and skill similarity across health professions, but also on an assessment of the potential impact of innovation and digitalisation on how certain tasks will be performed. They will use this information to estimate the number of different groups of health workers that are needed in the next 20 years.

Updating occupational standards

In some countries, skills intelligence in the health workforce is used to help determine the definitions of tasks and duties that health workers are expected to carry out, and the skills, knowledge and behaviours they must exhibit to work safely and effectively in their occupation. For instance, skills intelligence that highlights the increasing use of digital tools and AI in the workplace could be used to update the occupational standards for health workers to include digital skills. This can in turn feed into the development

and updating of curricula, qualifications and scopes of practice to help address both current and future skills needs.

In Australia, the primary use of Industry Skills Forecasts in the health sector is to update the training packages for vocational qualifications in health. Vocational education and training is based on occupational skills standards which are set out in units of competency within training packages and accredited courses. Training providers have to use this training package in the training they provide. For instance, the skills anticipation exercises showed an increasing demand in the aged care sector for dementia training and palliative care, which was then incorporated into the training package for this sector.

Informing migration policy

Countries with qualifications-driven migration policies, like Australia, Canada and South Africa, can use skills intelligence to select migrants with skills, qualifications and work experience that are in high demand, and that are difficult to source among the domestic workforce.

In Australia, the Commonwealth and state governments prepare annual skilled occupation lists that are informed by skills intelligence. Prospective migrants with qualifications or work experience related to one of the occupations on these lists will be prioritized for work visas (OECD, 2018[6]). One of these lists, the Medium and Long-Term Skilled Shortage List (MLTSSL), is forward-looking[1] and identifies occupations needed to meet medium-term projected skills shortages, as well as occupations required in the longer-term to build productive capacity in the economy. The MLTSSL is used to select migrants for all permanent skilled visas, as well as the medium-term Temporary Skill Shortage visa. Of the 212 occupations on the list, 60 are health-related occupations. As part of the annual review of the skilled occupation lists, the National Skills Commission considers various sources of data, including Industry Skills Forecasts, as well as occupation-level data on skilled migrant employment outcomes, reliance on temporary visa holders, rates of over- or under-qualification, low visa grants and projected employment growth. Using a points-system, they determine which occupations should be added to the skilled occupation lists and which should be removed or moved to a different list. Stakeholders are invited to provide feedback (OECD, 2018[6]).

In Canada, the provinces use the findings from ESDC's occupational projections to negotiate with the federal government about how many migrants with a given type of skill or qualification to admit. While the primary purpose of the Netherlands' ACMMP exercise (*Capaciteitsplan*) is to determine intake to health education programmes, the findings are also used to decide whether foreign health workers are needed if relying on domestic supply is unlikely to meet increasing demand.

In South Africa, skills intelligence that is developed through the Health and Welfare Sector Education and Training Authority is used by the Department of Higher Education and Training to develop critical skills lists on behalf of the Department of Home Affairs. The critical skills lists are developed every two years and are used to shape migration policies and facilitate the hiring of foreign nationals to fill short- to medium- term skills gaps. Nevertheless, respondents suggested that the effectiveness of critical skills lists were limited by unreliable data. Employers reported that skills that were in critical need at a hospital level were not reflected on these lists. This underscores the need for robust data and effective collaboration between stakeholders in translating skills intelligence into migration policy.

For other LMICs studied, concerns over migration in the health sector were primarily related to outward flows and issues of brain drain. Lower income countries face severe skills shortages in the healthcare sector and have limited resources and capacity to train new workers. When public healthcare systems invest in training new workers, only for them to move abroad, this represents a loss when finances are already severely limited. Some respondents reported that by lowering visa regulations in developed countries due to shortages in the healthcare sector, the COVID-19 crisis had contributed to an increase in outward migration of healthcare workers to these countries. In Ghana, respondents stated the need for international cooperation in order to stem the brain drain from the country. A bilateral agreement between

the Government of Germany and the Government of the Philippines, to facilitate the placement of Philippine nurses and other healthcare workers in the German healthcare sector while minimising the effects of brain drain – was highlighted as a potential model for finding sustainable solutions for migration in both LMICs and higher income countries. Similar bilateral agreements have been implemented in other countries[1].

Use by the social partners

This study revealed that trade unions and representative organisations of employers use the information generated by skills anticipation exercises for a variety of purposes.

Trade unions representing health workers use the information gathered by skills anticipation exercises in collective bargaining, providing scholarships and informing in-house training. In Argentina, the trade union that represents health workers (*Federación de Asociaciones de Trabajadores de la Sanidad Argentina*, FATSA) advocates for better working conditions and benefits for health workers in light of high current and projected job vacancy rates in health occupations. FATSA also shares information with the Ministry of Education, to request scholarships to prospective students in high-demand occupations, including nursing. They also interact with the Ministry of Health and the Ministry of Labour to request training for unemployed people to work as nurse assistants for elderly care. FATSA also uses this information to inform their in-house training that is provided through their own educational institutes, university hospitals and agreements with tertiary education institutions. The information determines the courses they offer, and the scholarships they provide. SEIU Healthcare Pennsylvania, a regional trade union for health workers in the United States, also uses skills intelligence to develop and update their in-house training.

The European Union of Private Hospitals (UEHP) is an example of an employers' association which uses skills information in trying to address common challenges private hospitals face in recruiting and retaining healthcare professionals. Member hospitals face severe shortages of health workers, and UEHP makes regular requests to governments to increase intake in health education programmes, citing findings from skills anticipation exercises. They also use this information to motivate hospitals to improve the quality of work and to promote a good work-life balance in an attempt to retain staff.

Interviews with representative organisations of employers and workers in LMICs revealed a number of ways in which social partners were involved in both generating and using skills intelligence in the health sector. In South Africa, employers report to the Health and Welfare Sector Education and Training Authority, which develops sector skills plans to anticipate medium-term skills needs in the health sector. Furthermore, the Public-Private Growth Initiative and Hospital Association of South Africa worked in collaboration with the Department of Health to conduct gap analysis on the supply and demand of nurses up to 2030, to inform both national and private policy. Employers and workers also use the results of sectoral skills plans in collective bargaining. For instance, the National Council of Trade Unions in South Africa uses the information to negotiate on working conditions (including national health insurance and minimum wages) through the National Economic Development and Labour Council. Critical skills lists produced by the government based on industry surveys are essential for private employers to attract the skilled workers they need, though some employers report they do not accurately reflect needs at the sectoral level. In Ghana, the Health Services Workers' Union of the Trade Union Congress worked in cooperation with trade union partners in Norway to identify a gap of skilled labour in geriatric care and were engaged in training of trainer programmes to improve healthcare provision to the elderly.

[1] Bosnia and Herzegovina, India, Indonesia and Tunisia.

Barriers to using skills intelligence in health workforce policymaking

There are important barriers to making full and effective use of skills intelligence related to the health workforce for policy purposes. Scopes of practice may limit the use of skills intelligence for task reallocation and skill mix. Other barriers include lack of funding, a lack of political will to increase public spending on health and lack of coordination between the different ministries that are involved with developing a policy response.

Scopes of practice

One of the key barriers to achieving the full and effective use of skills intelligence for informing healthcare policy that was identified in this study are scopes of practice for health professions. Scopes of practice are the actions and processes that healthcare practitioners are permitted to undertake in keeping with the terms of their occupational license. Scope of practice laws apply to all healthcare practitioners that require a license to operate. By restricting which tasks people working in certain occupations are legally permitted to undertake, scopes of practice help to ensure quality care provision. At the same time, they can also limit the possibility for optimal task reallocation between occupations. Scopes of practice laws may be inflexible or not readily adaptable to the changing skills needs of the sector. As a result, they can pose a significant barrier to full and effective use of skills intelligence for task reallocation and for achieving the right skill mix in the healthcare sector.

Funding

In many LMICs, public funding is insufficient to train and/or hire the number of healthcare workers that are required in order to meet current and future skills needs. For instance, in Ghana, where the majority of healthcare provision is provided by the public sector, trained healthcare workers may have to wait years to be hired, due to insufficient funding. Some workers leave the sector through lack of opportunity. Meanwhile, the critical lack of funding means that the majority of resources go towards the hiring of workers, and there are fewer resources available for the development of training programmes.

Another key funding barrier that several stakeholders raised is low political will to increase public spending on health. Healthcare provision already represents a significant share of country's economies – 8.8% of GDP on average in the OECD and 9.1% of GDP in South Africa, compared to typically lower but still significant shares in lower income countries (such as 3.2% in Ethiopia and 2.5% in Bangladesh). There can be reluctance to increase funding in the sector, which limits governments' ability to address shortages by investing in attracting and training more skilled health workers. In some cases, countries or regions are reluctant to publicly report health workforce shortages because they lack the public funding to attract or train more health workers.

Governance and politics

Low political will to increase public spending on health may also be related to the fact that returns on investments to train additional healthcare workers can take 10 to 15 years to materialise, which often extends beyond political mandates. Furthermore, once skills anticipation exercises have been conducted, it can take several years before recommendations based on their results (such as increased intake into health education programmes) are implemented in practice. Such delays create a barrier to swift and effective policy responses and also mean that findings may be outdated or less relevant once policy responses are implemented.

Some countries mentioned a lack of coordination between the different ministries that are involved in the policy response as a barrier to translating skills intelligence to policy. In many countries, the responsibilities for labour market and education policies in the health sector are shared between the ministries of health,

education and employment. For instance, in the Netherlands, the Ministry of Health is in charge of university-level education for health workers, while the Ministry of Education is in charge of upper-secondary education for health workers as well as health education in universities of applied sciences. Skills anticipation exercises may be carried out by one of these ministries, but require coordination between all three for effective policy making. Problems can arise both in terms of coming to consensus about what the skill needs in the health workforce are and agreeing on an optimal policy response. In Ethiopia, for instance, some respondents highlighted a lack of collaboration between the Ministry of Health and Ministry of Education on updating the curriculum and applying consistent approaches to qualification and assessment. This led to poor outcomes in the delivery of health education.

Other barriers

Previous research has shown that a lack of consultation with stakeholders and experts in identifying skill needs is one of the key barriers to translating skills intelligence into policy (OECD, 2016[7]). While developing stakeholder relations may take time, excluding social partners from exercises to anticipate skill needs or discussing and validating the results before publication may slow policy implementation. In this study, countries that took time to build strong stakeholder involvement into the development or validation of their skills anticipation exercises (particularly Finland and the Netherlands) emphasised how this approach resulted in more effective and swifter policy responses.

Full and effective use of skills intelligence is sometimes limited because the findings of skills anticipation studies are not easy to understand, are not fit for the policy purpose or are not considered credible by policymakers. Previous research has shown that stakeholders often perceive the output of skills anticipation exercises as too technical or not sufficiently disaggregated and that the way skills are measured and defined do not map to useful variables in policymaking (ILO, 2017[8]) (OECD, 2016[7]). Strong stakeholder involvement in the development of skills intelligence may help prevent or overcome these potential barriers.

Poor reliability of data can also limit acceptance of the findings of skills anticipation studies, and willingness to translate them into policy. In all LMICs studied, the reliability and availability of accurate labour market data in the health workforce was cited as a major barrier to carrying out accurate skills anticipation and assessment exercises. For instance, a respondent from South Africa's Health and Welfare Sector Education and Training Authority cited data as the single biggest barrier to translating skill assessment and anticipation exercises into policy and practice. Reliability of data also goes hand in hand with funding. Many LMICs lack the resources to improve data collection systems and are therefore forced to rely on less reliable data. For this reason, many opt for qualitative methods rather than quantitative or mixed methods to assess skills needs in the sector.

The policy response may also be hindered by factors unrelated to the skills anticipation exercises themselves, such as student preferences. Effective education policy responses to skills intelligence in the health workforce rely on having a sufficient number of teachers, trainers and professional training placements for medical students, as well as a sufficient number of students who want to enrol in medical specialisations that are forecasted to be in shortage. The ACMMP in the Netherlands found that actual intake in health education programmes is often below their minimum recommendation, which is in part due to student preferences (ACMMP, 2020[2]). Although research shows that students can be nudged into different study programmes, for instance through career guidance informed by skills intelligence (De Koning, Dur and Fouarge, 2022[4]) or by financial incentives, the extent to which educational choices can be influenced remains limited. In Bangladesh, a respondent noted that the perceived attractiveness of different medical professions is a key reason why there is a surplus of specialists in certain areas, and shortages in others, including professionals involved in critical healthcare.

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Note

[1] Other skilled occupation lists have a shorter time horizon. The Priority Migration Skilled Occupation List identifies 44 occupations that fill critical skill needs to support Australia's economic recovery from the COVID-19 pandemic. Of the 44 occupations on the list, 15 are health-related occupations.

4 Framework conditions and policy recommendations

This final chapter summarises the framework conditions that are necessary to support countries in carrying out skills anticipation exercises for the health workforce. It also draws good practices for developing and using skills anticipation exercises for the health workforce, and provides concrete implementation guidelines for policymakers.

Introduction

Based on the insights presented in the previous chapters and a review of country practices, this chapter discusses the framework conditions required to conduct skills anticipation exercises for the health workforce, i.e. the minimum requirements that a country or region would need to carry out skills anticipation exercises in the health workforce. These include data requirements, social partner involvement, effective governance, funding and human resources. The chapter highlights good practices for developing and using skills anticipation exercises for the health workforce in order to support countries that want to develop these exercises or improve their use for policymaking. It concludes by providing a flowchart for policymakers to follow when implementing a skills anticipation exercise for the health workforce.

Framework conditions

The stakeholders interviewed in the context of this study were asked to identify the minimum requirements that a country or region would need to carry out skills anticipation exercises in the health workforce, based on their experiences. In countries where exercises were more limited, stakeholders were asked about the barriers they faced in developing more advanced skills anticipation exercises. Together, these insights suggest that a number of framework conditions must be in place to ensure that skills anticipation exercises for the health workforce are useful for policymaking.

Data requirements

A variety of data is needed to conduct quantitative forecasts or qualitative scenario analyses based on quantitative evidence. These may include data on demographic trends, job vacancies for health workers, or macro-economic outlooks. They may also include information on patient needs, changing disease patterns, epidemiological transitions and technological advances. Having a national statistical office to collect these data will be very helpful in this respect, so that the developers of the exercise can focus on developing the models and producing results, rather than on data collection per se.

Most of the stakeholders in LMICs who were interviewed are facing challenges with regards to the reliability and timeliness of labour market data, making it more difficult for them to conduct quantitative forecast exercises. Instead, these countries focused primarily on qualitative methods, such as focus groups, foresight methods, or employer surveys. Qualitative approaches may be easier than quantitative approaches to set up in contexts where data, budgets and statistical expertise are more limited. In countries such as Bangladesh and Ghana, qualitative surveys of skills needs at a hospital level were the primary anticipation exercise for the sector, in part reflecting the limitations of labour market data to conduct quantitative analysis. Even in upper-middle income countries such as Colombia, the absence of quantitative data was cited as a major methodological barrier to the development or updating of skills anticipation studies. A lack of data on rates of informality, distribution of employment by region, salary offers and training data at the post graduate level were identified as a major challenge to the implementation of sectoral studies in Colombia.

Effective governance

Effective governance of skills anticipation exercises implies involvement and collaboration of relevant actors to ensure that the exercise is designed to meet the needs of users, achieve consensus about skill needs, and agree on coherent and complementary policy responses. This is particularly important for health workforce planning, because it is a shared concern of ministries of health, employment, education, migration, as well as employers and workers and their representative organisations.

Previous literature on skills assessment and anticipation exercises suggests a number of practices to promote dialogue and consensus about skill needs (OECD, 2016[1]). Having an independent institution carry out the exercise can facilitate open discussions about the findings and optimal policy responses. Examples from this study include the Netherland's Research Centre for Education and the Labour Market (ROA) and Statistics Norway. Another approach is to mandate stakeholder dialogue via legal norms governing consultations around skills issues, to require inclusion of stakeholders in advisory boards to different ministries, or to put a third party in charge of leading and co-ordinating the discussion around current or future skill needs. For instance, Finland's Skills Anticipation Forum is governed by legislation that mandates stakeholder involvement, and Korea's new "Act of Providing Assistance with Health Professionals" requires the involvement in skills anticipation of an Advisory Committee comprised of representatives from government, research institutes, labour unions, and the Association of Medical Institution Workers. South Africa's HWSETA, which conducts sector skills plans and anticipation studies, has a tripartite board which is tasked with the leadership and direction of the organization and with promoting employer, worker, and public interest in skills development within the health and social sectors.

More informal governance mechanisms include the establishment of working groups or roundtables with diverse stakeholders around a topic related to skills needs. For instance, Canada's Michener Institute set up a symposium to engage stakeholders across Canada about what skills were needed to accelerate the adoption of AI in healthcare. Respondents noted that engaging representatives from rural indigenous communities in Canada had been a challenge, in part because the pandemic had prevented in-person visits to these regions. Employment and Social Development Canada also sets up targeted consultations with stakeholders when they do not agree with their occupational projections, as has been the case previously with projections in the demand for pharmacists.

Social partner involvement

Representatives of employers and workers should be included in the governance of skills anticipation exercises in the health workforce, in order to promote social dialogue in the sector and to generate results that are reliable and effective. Including social partners in the design and validation of anticipation exercises draws upon their knowledge and expertise of sectoral issues and helps to ensure an accurate identification of the skills, qualifications and occupations that are likely to be in demand in the labour market in the future. Engaging social partners in the anticipation and assessment of skill needs also promotes a smoother adoption of new policies to address health workforce shortages, and facilitates the use of the results by employers and workers, including in training programmes, hiring policies and collective bargaining. In many of the countries reviewed in this study, social partners are invited to validate the findings generated from skills anticipation exercises. For example, Employment and Social Development Canada sends the results from its occupational projections both to the provinces and to sector councils for validation. In some countries, social partners are responsible for or directly involved in conducting the exercises themselves (such as in Australia, South Africa, Finland, and Ghana). Social partner involvement depends on a country having successful and constructive industrial relations and strong networks in the health sector. Where these are absent, a country should seek to strengthen industrial relations and related institutional development in order to facilitate social dialogue and the representation of employers and workers in the sector.

Political will and funding

The amount of funding required to conduct skills anticipation exercises depends on the type of exercises and how frequently they are carried out. In this study, the majority of exercises were publicly funded, either by a single ministry or by multiple ministries, but there were instances of privately funded or public-private funded exercises. Given that most funding for skills anticipation in the sector is public, ongoing political will is necessary to ensure that exercises have continuous funding. The absence of continuous funding and

political support was identified as a barrier to regular and systematic skill needs anticipation in several countries interviewed. Countries with more limited funding tended to opt for qualitative over quantitative approaches, with LMICs in particular citing limited resources as a major barrier.

Even the best skills anticipation exercise will not lead to effective policies to address health workforce shortages if there is a lack of political will or sufficient funding. Most policy recommendations to address health workforce shortages require additional funding, for instance to hire additional personnel, to train new workers, to upskill and/or reskill the existing workforce, or to invest in technologies that can relieve health workers of some tasks (for instance, the administrative burden) to focus their efforts on areas where critical skills shortages exist. The results of skills anticipation exercises may in themselves be used to help justify political action and additional funding for skills development in the health workforce. In several countries included in this study a lack of funding was reported to be one of the main barriers to translating skills intelligence into policies and programmes for the health workforce.

Human resources

Among the exercises covered by this study, quantitative forecasts are usually conducted by a relatively small team (five people or less) with specific technical skills in labour economics, econometrics and statistical programming, while foresights and Delphi studies are conducted by larger teams (10 or more) with less technical skill requirements, such as communication and interpersonal skills. The latter type of exercises also depend on the participation of groups of experts (often 10 or more). Whether the people who conduct the exercise work on it full-time depends on the scope of the exercise and the frequency with which it is repeated. For instance, Employment and Social Development Canada (ESDC) has five people working part-time on the bi-annual quantitative whole-of-labour market forecasts, while the Netherlands' Advisory Committee on Medical Manpower Planning (ACMMP) employs 12 full-time equivalent workers, as well as people from other research institutes such as NIVEL, to run its mixed-methods forecasts for detailed health occupations every 3 years. Many developers of skills anticipation exercises contract out part or all of the research work, because they struggle to find enough people with the required knowledge or skills to conduct the exercise in-house, or because it is more economical to outsource specific aspects of the exercise rather than hire full-time employees, particularly in case of one-off exercises. In some countries (particularly in LMICs), additional funding for training and upskilling may be needed in order to develop and interpret skills anticipation exercises for the health workforce. Effective implementation also depends on having skilled government workers who can interpret skills anticipation exercises.

Policy recommendations

Drawing on the best practices identified in stakeholder interviews and from the literature, a number of recommendations can be made to guide countries in anticipating the future skill needs of the health workforce.

Design exercises with a policy objective in mind

The optimal design of a skills anticipation exercise for the health workforce will depend on the intended policy use. Choices about method, scope, skills definition, frequency, and time horizon need to be made with the final policy objective in mind. For instance, exercises that are national in scope are best suited for informing policies relating to maximum student places in health education programmes, or policies to target migrant workers with relevant skills and qualifications. Meanwhile, exercises conducted at the sub-national level can generate information to inform career guidance, which should ideally be at the local or regional level to meet the needs of adults who are place-bound. Similarly, a whole-of-labour market approach is appropriate for evaluating the relative size of shortages of workers in the health sector relative to other sectors, and for optimising the skills mix across sectors; while a health workforce specific approach is most

appropriate to understand how skill needs are changing within particular health occupations in order to inform new training curricula and can normally be conducted more rapidly and with fewer resources. Table 4.1 summarizes some of the advantages and disadvantages of the different methodologies identified in this study for different policy uses.

Use a combination of methods

There is consensus in the general literature that combining a variety of approaches, including quantitative and qualitative, is the best approach for achieving robust and reliable results (CEDEFOP, 2008[2]). A mixed methods approach allows a country or region to leverage the advantages and mitigate the disadvantages of different types of exercises, as summarised in Table 4.1. This review highlighted several examples of mixed methods approaches for skills anticipation exercises for the health workforce. For instance, both the Finnish National Agency for Education (OPH) and the Dutch Advisory Committee on Manpower Planning (ACCMP) conduct quantitative forecasts that serve as inputs for qualitative Delphi discussions about skill needs in the health workforce. In South Africa, qualitative stakeholder consultations are used to verify the validity of the quantitative forecasts. While conducting exercises with mixed methods is likely to be the most costly approach and may be more challenging for countries with limited resources and particularly LMICs, it is worth further investment as it generates the most reliable and robust data on future skill needs.

Table 4.1. Advantages and disadvantages of methods

Approach	Advantages	Disadvantages	Types of model	Health policy use
		Method		
Quantitative	Transparent methodology. Good at measuring proxies of skills (occupations) and for a whole-of-labour market approach.	Data intensive and high start-up costs. Difficult to measure skills per se.	Time series; regression; optimisation; stock-and-flow; input-output; social accounting matrices; simulations.	Projecting # of health professionals needed in particular occupations under different scenarios. These can be used to inform education and training, employment and migration policy.
Qualitative	Useful for projecting future skill needs of health workers, which are hard to quantify. Easier to set up with limited resources.	Less systematic, less replicable. Subjective. Can yield inconsistent responses. Requires involvement of experts. Less effective in measuring shortages in numbers of health professionals.	Sector surveys (managers, health workers, academic institutions, graduates). Expert insight (focus groups, stakeholder consultations, foresight methods, and Delphi methods).	Facilitate discussion about emerging skills needs (e.g. associated with technologies) to inform education and training and employment policy.
Mixed methods	Combines advantages of quantitative and qualitative. Can be used to validate each other. Achieves the most robust and reliable skills needs data. Can focus both on the quantifiable (occupations) and qualitative (skills needs).	Expensive. Demanding in terms of data, expertise and time.	Sector surveys can be used to collect both quantitative and qualitative data. Qualitative assessments are often used to validate quantitative studies.	Best method for collecting multi-use robust data for education, labour market and migration policy.
		Definition of skill needs		
Skills	Enables a dynamic understanding of future skills needs to help prepare for changes within occupations due to technological advances, demographic changes, and climate change.	Skills are difficult to quantify. No standardised language for talking about skills.		Anticipating future skills needs to develop education and training, labour and migration policy that is responsive to changing labour market needs.
Occupations	Easily understandable. Useful for anticipating numbers of workers needed in different health occupations. More easily quantifiable than skills.	Not always clear which skills or qualifications are required to perform a given occupation. May overlook evolution of skills needs in an occupation over time.		Identifying shortages in health professions can inform the training and hiring of more specialists, or develop skilled migration lists.

Qualifications	Easily understandable. Data on number of new graduates and educational attainment of the labour force are often readily available.	Individuals with the same qualification may have different skills. Education and training programmes may not keep pace with changing skill needs. Mapping occupational projections to qualifications requires occupational frameworks.		Useful to make policy recommendations on student intake for education and training programmes in healthcare
		Time Horizon		
Short (less than 5 years)	Provide data to fill current/imminent shortages in the health sector. Less uncertainty than with longer time horizons.	Unable to project future skills needs. Data may become outdated quickly.		Short-term policy responses e.g. updating the content of upskilling and reskilling training programmes for the existing health workforce, regulating temporary migration flows, task reallocation between medical jobs.
Medium (5-10 years)	Forecast medium-term skill needs.	More uncertainty than with short time horizons. Requires more data and assumptions.		Medium-term policy responses e.g. planning or updating curricula or determining training places.
Long (10+ years)	Forecast long-term skills needs. Medical professionals can take 10 years to train so aids long term planning.	More uncertainty than with short and medium time horizons. Requires more data and assumptions.		Longer-term policy response, e.g. education and training and labour market policy and preparing for impacts of technological, demographic, and climate change.
		Frequency		
Recurring	Regularly updated results. Can build upon previous studies. Easier to update quantitative studies than to repeat qualitative studies.	Requires more funding than one-off exercises. Difficult to secure long term funding if stretches across political mandates.		Useful to provide skills intelligence for continuously updating labour market, education and training and migration policy
One off	Able to address immediate concerns. May be more feasible where funding is limited or adhoc.	May lose expertise and/or collaborative stakeholder partnerships developed during exercise.		Policy responses to immediate shortages, e.g. migration policy, crisis response etc. Can inform discussions on longer term planning on e.g. updating curricula

Focus on skills

Most of the exercises reviewed in this study project future demand for health workers by occupation or qualification. It is rare to find examples of exercises that focus explicitly on how the skills required for the health workforce are likely to change over time in response to trends like technological change, partly because individual skills are poorly understood and hard to quantify. However, those exercises that do focus on skills facilitate a more proactive and dynamic approach to health workforce planning that goes beyond anticipating manpower needs to consider which skills will be needed to allow health workers to adapt to new technologies.

Though relatively uncommon, several of the exercises identified in this review (Australia, Finland, Canada and Norway) did focus on skill needs explicitly. A focus on skills is particularly useful in informing curriculum development for health education and training, task reallocation between health occupations, and skills mix. The slower adoption of new technologies in low and medium-income countries may reduce incentives to carry out such skills-focused exercises.

Involve social partners

Tripartite social dialogue throughout the process is essential to skills needs anticipation. As already noted in the framework conditions above, social dialogue and cooperation among key stakeholders helps to ensure that skills intelligence is fit for policy use and promotes buy-in to the policy response among stakeholders. Social dialogue is key to making informed decisions in the processes of designing and implementing the exercises, to making practical sense of analytical results and to the effective application of the findings. Skills anticipation in the health sector should include appropriate institutional mechanisms for social dialogue, and capacity development for social partners in order to generate constructive input into and feedback on the information generated. By following this approach, more robust skills anticipation exercises that translate into effective skills development policies can be developed in the health sector.

International cooperation to solve a global issue

The data sources analysed for this report corroborate existing evidence (such as (WHO, 2016[3]) suggesting that health workforce shortages are widespread, and therefore represent a global issue. Health workforce shortages exist across low, medium and high-income countries, but are felt more severely in LMICs. Migration flows of health service workers tend to consist of movements from lower-income to higher-income countries, and while these flows can improve flexibility and the transfer of skills, they can also have negative impacts for origin countries that lose skilled and trained health workers to destination countries. This can have particularly damaging effects where countries have dedicated scarce resources to training workers who are then absorbed into healthcare systems abroad.

Bilateral agreements between origin and destination countries may help to mitigate the negative consequences of migration. For instance, the Model Agreement developed by the ILO and used by the Philippines and various destination countries involves measures to compensate the origin country for its loss, including planning for the return and reintegration of health workers, the exchange of students and expert visits, scholarship programmes, joint venture and investments in origin country health facilities, twinning of health facilities, and support to improve education and training facilities and technology transfers (Makulec, 2014[4]). The ILO Guidance on Bilateral Labour Migration Agreements ((ILO, 2022[5]) can provide guidance to ensure safe, orderly and regular labour migration based on international labour standards.

Given that health shortages are a global issue, international cooperation is needed not only in the policy response but also in planning and conducting skills anticipation exercises. The exercises identified by this study solely focused on national and sub-national efforts to anticipate skill needs in the health workforce.

However, internationally-coordinated efforts may be appropriate for addressing global skills shortage issues, and particularly to inform migration flows. For instance, the OECD and ILO Skills for Jobs database is an attempt to develop a harmonised cross-country measure of shortage and surplus intensity. Knowledge sharing between countries is also needed to support low and medium-income countries to face barriers in conducting skill anticipation exercises. Cooperation and knowledge sharing between higher income countries and LMICs on skills anticipation could also help to promote development in the health workforce in these countries, and create mutually beneficial solutions to skills shortages in the sector.

Implementation Guidelines for Policymakers

The review of exercises to anticipate skill needs in the health workforce conducted in this study suggests that there is no “one size fits all” approach. Rather, different approaches may work better depending on a country’s policy objectives, resource constraints, data availability and governance arrangements. The following flowchart provides an overview of some of the key decisions that need to be considered when establishing a skills anticipation exercise for the health workforce (Infographic 4.1).

First, public authorities need to agree on the policy objective of the exercise (Decision #1). The most common policy objectives related to the health workforce among the exercises included in this study are education policy (such as student intake, course content, or career guidance), employment policy (such as skills mix, task reallocation and occupational standards), migration policy (such as skilled migration lists and international cooperation) and collective bargaining processes.

Having a clear idea of the policy objective will facilitate setting the key design parameters, including how skills are defined, frequency, time horizon, and scope (Decision #2). For instance, if the intended policy objective is to set student intake in medical programmes, a longer time horizon may be needed, given long lead times in health education programmes. If the policy objective is to review the way tasks are allocated across health professions or to inform upskilling of health professionals in the face of technological change, an exercise at the skill or task level may be best suited. Exercises at the skill level may make use of a pre-existing skills framework (such as O*NET or DigComp 2.0), or a national qualification framework. Since longer time horizons imply more uncertainty, the frequency at which such exercises are repeated may need to be higher. If the objective is to identify future skill needs of specific health occupations, then the scope of the exercise will need to be more targeted than a whole-of-labour market approach.

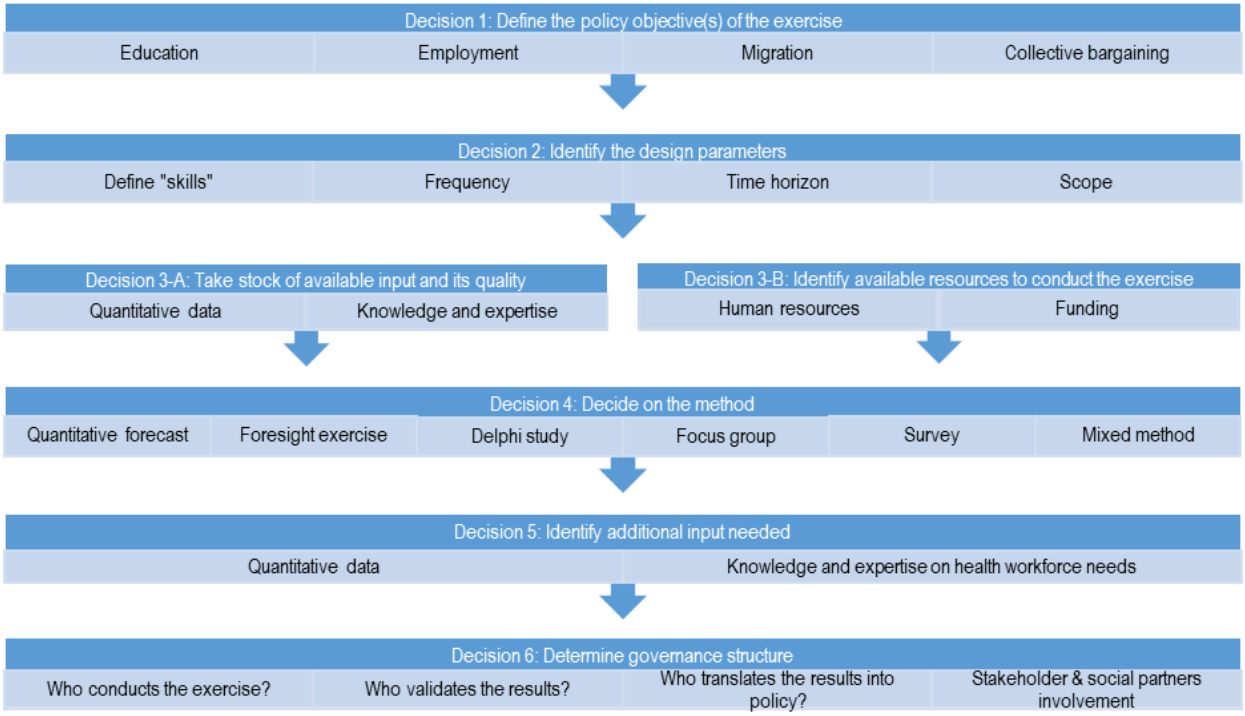
With the policy objective and design parameters in mind, the next consideration is to take stock of available input that could feed into the skills anticipation exercise (Decision #3a). What kind of data is available, and how regularly is it produced? Who produces it and is it of good quality? In addition to quantitative input, expertise that could help to inform a qualitative exercise should also be assessed, including among hospital managers, health professionals, and patients. In parallel, public authorities should consider the human resources (number of people available in-house and their skills, as well as outside consultants or think tanks) and financial resources that are available to develop and support the exercise, interpret the results and translate it into policy for the health workforce (Decision #3b).

Based on the above considerations, public authorities need to decide on the optimal skills anticipation method (Decision #4). The review conducted in this study suggested that a mix of quantitative and qualitative approaches was likely to produce the most robust and reliable results to anticipate skills needs in the health workforce. However, it also showed that countries with more limited resources and fewer high-quality data sources tend to opt for qualitative approaches such as focus groups or employer surveys rather than quantitative forecasts. Most countries that aimed to use the skills anticipation exercise for manpower planning in the health workforce or to determine student intake into health education programmes conducted quantitative forecasts or applied a mixed-methods approach.

After deciding on the method, public authorities will need to assess whether any additional input will need to be produced or sourced (Decision #5). With quantitative forecasts, data requirements are high and additional data may need to be sourced. With focus groups or foresight exercises, new partnerships may need to be established to engage social partners and other relevant stakeholders in the exercise.

The final consideration is to establish a governance structure for the exercise (Decision #6). This involves defining who will be responsible for conducting the exercise, which ministry or ministries or other stakeholders will be the end users, and mechanisms to involve social partners and other stakeholders in developing the exercises or and validating the results. In this review, ministries of health, education and/or labour were often involved in developing and/or validating the exercises. Formal or informal cooperation mechanisms (such as working groups or conferences) may need to be set up to engage buy-in from all the relevant stakeholders and social partners.

Infographic 4.1. Establishing a Skills Anticipation Exercise for the Health Workforce - Flowchart



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Annex A. Interview participants

Table A A.1. Interviewees who participated in interviews for this project, and their respective country and institution

Country	Institution	Interviewee(s)
Argentina	Federación de Asociaciones de Trabajadores de la Sanidad Argentina (FATSA) and Sindicato de Salud Pública (SSP) de la Provincia de Buenos Aires	Adriana Rosenzvaig, Miguel Zubieta
Australia	Skills IQ	Yasmin King
Bangladesh	Directorate General of Health Services (Planning and Development), Ministry of Labor and Employment, National Coordination Committee for Workers' Education (NCCWE)	Meerjady Sabrina Flora, Sharif Md Forhad Hossain, Chowdhury Ashiqul Alam
Canada	Michener Institute of Education	Dalia Al-Mouaswas, Nicole Chambers, Mohammad Salhia, David Wiljer
Canada	Employment and Social Development Canada (ESDC)	Martin Charron, Erwin Gomez Gomez
Colombia	Ministry of Education, Ministry of Health, Ministry of Work, Asociación Colombiana de Facultades de Medicina (ASCOFAME), Asociación Nacional Sindical de Trabajadores y Servidores Públicos de la Salud y Seguridad Social Integral y Servicios Complementarios de Colombia (ANTHOC), Asociacion Colombiana de Estudiantes de Enfermeria	Wilfer Jhon Pinzon, Germán Alirio Cordón Guayambuco, Luis Carlos Ortiz Monsalve, Paul Sayago, Mauricio Rubiano, Adriana Albarracin, Kattya Baquero, Javier Ricardo Bohorquez Gelvez, Oswaldo Barrera Guauque, Edgardo Hernando Ortega Ramirez
Ethiopia	Ministry of Health, Ministry of Education, Ethiopian Healthcare Federation (EHF), Confederation of Ethiopian Employers' Federation, Confederation of Ethiopia Trade Unions (CETU), Jhpiego	Ato Assegid Samuel, Abebe Tilahun, Mulatu Sisay, Dawit Moges, Measheo Berihu, Tegbar Yigzaw
Ghana	Ministry of Health, the Council for Technical and Vocational Education and Training (COTVET), Allied Health Professions Council, Central University, New Crystal Health Services, Health Services Workers' Union of TUC	Agyemang Karikari Marfo, Theophilus Zogblah, Samuel Yaw Opoku, Susan Ama Amuasi, Wisdom Amegbletor, Franklin Owusu Ansah
Finland	Finnish National Agency for Education (OPH)	Kari Nyyssölä, Ritta Radni
Germany	Federal Institute for Vocational Education and Training (BIBB)	Tobias Maier, Michael Meng, Miriam Peters
Ireland	Health Service Employment	Alice Healy, Breda Rafter, Liz Roche, Jennifer Greene, Claire Doyle, Margaret Campbell, Mahman Honari, Terence Hynes, Philippa Withero, Evelyn Hickey
Korea	Ministry of Health and Welfare	Kyungmin Noh

Netherlands	Advisory Committee on Medical Manpower Planning (ACMMP / *Capaciteitsorgaan*)	Victor Eiff, Tineke Zijlstra
Netherlands	Netherlands Institute for Health Services Research (Nivel)	Ronald Batenburg
Netherlands	Research Centre for Education and the Labour Market (ROA) at Maastricht University	Jessie Bakens
Norway	Norwegian Committee on Skill Needs	Kaja Reegård, Synnøve Roald
Norway	Health Workforce Commission	Lars Nerdrum
South Africa	Department of Higher Education and Training, Hospital Association of South Africa, Health and Welfare Sector Education and Training Authority (HWSETA), National Council of Trade Unions (NACTU), Public Private Growth Initiative (PPGI)	Khuluvhe. Mamphokhu, Dumisani Bomela, Nceba Ndzwayiba, Menzi Mthethwa, Pat Mphela, Tanya Cohen
Sweden	Leading Healthcare	Hans Winberg
United States	SEIU Healthcare Pennsylvania	Zach Zobrist
	Johns Hopkins Center for Communication Programs	Betemariam Alemu, Simon Heliso
	USAID	Ayalkebet Shiferaw
	World Health Organization	Siobhan Fitzpatrick, Mesfin Kifle, Paul Marsden, Peter Preziosi, Tana Wuliji

Annex B. Anticipating skill needs in the health workforce: Interview guide

Introduction

The COVID-19 pandemic has revealed a lack of preparedness in health workforces in all countries. Two years into the pandemic, health workforces are struggling with high rates of burnout, reflecting both manpower shortages (quantity) and skills shortages (quality). Even prior to the pandemic, health workforces in many OECD countries were under strain, with shortages reported both in terms of numbers of professionals and in terms of the skills needed to deliver quality healthcare. Population ageing in OECD countries will continue to increase the demand for healthcare-related services, putting additional pressure on health workforces.

Skills mismatches and shortages have adverse consequences in all sectors, but are particularly disastrous in the health workforce. Negative consequences can include loss of life and poor patient care, in addition to the negative economic consequences usually associated with skills mismatches and shortages in other sectors of the economy.

Improving the match between the supply and demand for skills in the health workforce can limit these negative effects. Effective assessments of skills shortages and mismatches, as well as the anticipation of future skills needs, can be important tools in this respect.

Therefore, the OECD, in collaboration with the International Labour Organization (ILO), is working to identify effective strategies among countries for assessing and anticipating the skill needs of the health workforce, and to understand how this qualitative and quantitative information is used to build more resilient health workforces. The interviews aim to gather information on:

- the types of skills assessment and anticipation exercises that the respondent's country implements to identify current and future skill needs in the health workforce;
- how this information is used to influence labour market, education and training and/or migration policy;
- the involvement of key stakeholders, including ministries of labour, education and health, local and regional authorities, employers and trade unions;
- any good practices and/or barriers which are encountered in developing such assessments or using them in policy development.

Scope

Please focus on skill assessment and anticipation exercise(s) that are carried out for the health workforce in the respondent's country.

Definitions of key terms used throughout the interview

A number of technical terms are used throughout the interview guideline. To minimise confusion, the following definitions are provided. When in doubt, please do not hesitate to contact a member of the OECD team.

Health workforce: This includes all people engaged in actions whose primary intent is to enhance health, or who help operate health care facilities. That means that the health workforce includes clinical staff (e.g. physicians, nurses, pharmacists, dentists) irrespective of the sector in which they work, as well as non-health care professionals working in the health sector, i.e. those who do not deliver health services directly but are essential to the performance of health systems (e.g. managers, ambulance drivers, or teachers of health education).

Skills will be interpreted broadly and can refer either to particular qualifications (e.g. technical/vocational, university), field of study (e.g. medicine, psychiatry, or nursing), or specific skills (e.g. numeracy, literacy, problem-solving, soft skills, or skills to work with new types of medical equipment).

Skill shortages arise when employers are unable to recruit staff with the required skills in the accessible labour market and at the going rate of pay and working conditions due to a lack of an adequately qualified workforce. They can be defined in terms of unfilled and/or hard-to-fill vacancies.

Skill mismatch either refers to the inadequacy of a worker's skills relative to the requirements of the job he/she is currently in (under-skilling, skill deficit or gap), or to the opposite phenomenon whereby a worker's skills exceed those required by the job (skills under-utilisation or over-skilling).

Matching can be seen as the deliberate attempt to bring the supply of, and demand for, skills better in line with each other to reduce skill shortages or skill mismatch.

Skill needs assessments evaluate the current supply and demand for skills, with a particular focus on mismatches or shortages.

Skills anticipation attempts to evaluate future skills needs as part of a strategy to improve matching.

Skill needs forecasts are qualitative or quantitative studies that use available information or gather specific information to anticipate future skills needs, mismatches or shortages. In some cases this may be part of a broader skill foresight exercise.

Skill foresight exercises. There is no single agreed definition of what constitutes a foresight exercise but for the purposes of this questionnaire it is taken to mean an exercise that is based on consultation, collaboration and networking across a range of stakeholders and experts that uses a variety of techniques (forecasts, scenarios, Delphi, expert panels, etc.) to reach a shared vision about the future and the strategic choices and decisions that are involved. Skill foresight exercises often involve reaching a shared cross-disciplinary view of future changes in the world of work and the implications for skill needs and skill development policies.

Resilience is here defined as the ability to adapt to unforeseen circumstances that may change the required quantity or quality (i.e. type of skills) of the health workforce.

Interview questions

Introduction

- The OECD, in collaboration with the International Labour Organization (ILO), is working to identify effective strategies among countries for assessing current and future skill needs of the health

workforce, and to understand how this qualitative and quantitative information is used to build more resilient health workforces.

- Note that when we talk about "skills", this should be interpreted broadly and can refer either to particular occupations (e.g. nurses, surgeons, dentists, psychiatrists), qualifications (e.g. technical/vocational, university), or specific skills (e.g. numeracy, literacy, problem-solving, soft skills, skills to work with new types of medical equipment).
- That means that, when we talk about "assessing skill needs", this could include evaluations of how many workers are needed, as well as what type of qualifications or skills these workers need to have.
- During this conversation with you today, we aim to gather information on how your organisation identifies current and future skill needs in the health workforce; and/or how this information is used to influence labour market, health, migration or education policy; and any good practice and/or barriers which are encountered in developing or using such assessments.

Can you please briefly introduce yourself, and explain your role in developing or using skills assessment and anticipation exercises for the health workforce in your country?

Please complete the following three sections for each assessment you are involved in developing.

Skill assessment and anticipation exercises

Name of the assessment	[Project name, etc., if any]
Is this assessment carried out on a regular basis?	☐ Yes ☐ No [If yes, please indicate here the frequency]
When was the [last] assessment undertaken?	[Start/end date]
Is the assessment publicly available?	☐ Yes ☐ No [If yes, please add here a link or attach the document to your reply] [If no, would you make the assessment available to the ILO/OECD?]
Bodies responsible for the assessment	How was the assessment conducted? ☐ In-house work ☐ Commissioned work Name of the body that conducted the assessment: [Please indicate ministry/ies, research institute, etc.] If commissioned work, name of the body that commissioned the assessment: [Please indicate ministry, etc.]

How was the assessment undertaken? Multiple responses are possible.

☐ Expert hearings, stakeholder consultations, foresight methods, Delphi methods [Who are generally the participants/respondents?]

☐ Collecting data, statistics

☐ Quantitative forecasts

☐ Direct assessments of skills (e.g. tests directed at health professionals)

☐ Conducting and analysing surveys (hospitals, health professionals, patients) [Who are generally the participants/respondents?]

☐ Other [Please specify]

Does the assessment focus on <u>healthcare professionals</u> *(e.g. physicians, nurses, pharmacists, dentists)*, or on all workers in the <u>health workforce</u> including workers in non-health care occupations such as managers, ambulance drivers or cleaning staff in hospitals?

Does the assessment focus on "skills" per se (e.g. numeracy, literacy, problem-solving, etc)? ☐ Yes ☐ No

[If no, which proxies of skills does the assessment focus on?]

☐ Occupation (e.g. nurses, surgeons, dentists, psychiatrists)

☐ Qualification level (e.g. lower/upper secondary, undergraduate, masters)

☐ Area of specialisation (e.g. general medicine, cardiology, psychiatry, dentistry)

☐ Other [Please specify]

IF the assessment does not focus on "skills" per se (i.e. defines skills as occupations, qualification levels or area of specialisation):

- **What is the main reason for not focusing on skills? Are there any barriers to doing so?**

Does the assessment try to describe current skill needs or anticipate future skill needs, or both?

☐ Current skill needs ☐ Future skill needs ☐ both

[IF future, what is the time horizon over which the assessment of future skill needs are made?]

Who funds the development of the assessment?

Approximately how much funding do you/those who are responsible for the assessment receive per year?

Approximately how many people work on this assessment in terms of FTE?

Which sources of information (if any) does this assessment rely upon as inputs, besides any that come from your own data collection?

- **Who/which organisation typically provides this additional information?**

At what level is the assessment carried out for the health sector?

☐ National

☐ Regional

☐ Sub-regional

☐ Sub-sectoral [Please specify, e.g. for a particular occupation within the health sector or for a particular hospital or medical institution]

How (if at all) do you validate your results?

If EXPERTS / FOCUS GROUPS:

- **Who typically takes part in this validation exercise?**
- **Are there any mechanisms/procedures in place to achieve consensus between these actors regarding the final output, i.e. to determine which skills are needed in the health workforce? Please provide examples.**

What do you consider the minimum requirements to be able to perform the assessment(s) we just discussed?

Are there any plans to build new skills needs assessments, forecasting or foresight exercises or to significantly change or discontinue existing ones?

If YES:

- **Could you please provide a brief description of the changes planned?**
- **What is the rationale behind the changes?**

Resilience

There is always a certain level of uncertainty around the assessment of future skill needs. For instance, it would probably have been very hard to predict the vast amount of healthcare workers that are needed right now during the COVID-19 pandemic.

How (if at all) does this assessment deal directly with the issue of uncertainty in its design?

Using skills intelligence for policymaking related to the health sector

The following questions aim to unveil how the skills assessment and anticipation exercises for the health workforce are being used for policymaking.

Is your organisation involved in translating the results of (your own) skills assessment and anticipation exercises into policy?

If needed, please put us in contact with someone who would be better placed to answer questions about how the skills intelligence is used in policy making.

How are the findings of this assessment being used for policymaking?

Which (if any) stakeholders use the final output of the assessment?

At which level do they use the output? *National / regional / sub-regional / sub-sectoral* **?**

What (If any) are the mechanisms/systems in place to enable collaboration across these different stakeholders?

What (if any) are the mechanisms/procedures in place to reach consensus about what the policy response should be? Please provide examples.

How (if at all) is the information on uncertainty used to develop policy responses?

Lessons learnt

One of the aims of this project is to provide a toolkit for countries that want to (re-)design skills assessment and anticipation exercises for the healthcare sector, so that they know what they could do and how. With your experience in conducting these exercises, you may have some tips and tricks regarding what works more or less well in certain situations.

Positive experiences

What do you consider to be the strengths of this particular assessment?

With respect to collaboration/coordination between actors, what (if anything) has worked well?

With respect to use of the assessment for policy making, what (if anything) has worked well to translate the information collected from skill assessment and anticipation exercises into policy and practice?

Negative experiences and obstacles

What do you consider to be weaknesses of this particular assessment? How might those weaknesses be addressed?

What would be a country/region/institution that you consider to be a best practice when it comes to health workforce planning, and why?

What obstacles, if any, lie in the way of (further) developing skills assessment and anticipation activities in your country?

What are the main challenges in enabling coordination/collaboration between stakeholders? Please provide examples.

What, in your view, are the main barriers *(e.g. methodological, dissemination-related, those relating to developing a policy response,)* **to translating the information collected from skill assessment and anticipation exercises into policy and practice**?

Closing

Are there other organisations in your country that assess current or future skill needs for the health workforce?

If YES:

- **To which extent do you reach the same conclusions regarding current or future skill needs in the health workforce?**
- **Could you put us in contact with someone in that organisation, so that we can interview them about their exercise too?**

Do you have any remaining questions or remarks?

Thank the respondent. Ask if we can contact them in case we have follow-up questions, or to review (parts of) the draft report.

Getting Skills Right

Equipping Health Workers with the Right Skills

SKILLS ANTICIPATION IN THE HEALTH WORKFORCE

The COVID-19 pandemic further exacerbated the long-standing skills shortages in the health workforce across countries. Equipping health workers with the right skills is essential to respond to future health crises, to prepare for increasing use of digital technologies, and to plan for demographic change. This joint report by the OECD and ILO aims to enable more resilient health workforces by helping countries to assess future demand in terms of both numbers of health workers and skills needs, and to prepare appropriate policy responses. The report provides a comparative overview of practices in 16 countries to anticipate future skill needs in the health workforce, and of how such information is used by policy makers and social partners to foster a better alignment with labour market needs. Analysis is based on interviews with institutions that are responsible for anticipating skill needs in the health workforce, a virtual peer-learning workshop and desk research.

This report was produced by OECD and ILO, through the joint ILO, OECD, and WHO Working for Health Programme.

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