

# 1 *Skill-mix for primary and chronic care: definitions, conceptual framework and relevance for policy and practice*

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## 1.1 Introduction: why skill-mix?

Access to and the quality of health services are closely linked to the density and skill-mix of a country's health workforce (OECD, 2016; World Health Organization, 2006, 2016). High rates of chronic conditions and multimorbidity, new treatment options, and technological advances and economic pressure have led to fundamental changes to health systems and have impacted on the daily work of health professionals. Many countries worldwide are experiencing a shortage of primary care providers, particularly in rural or socially deprived urban areas (OECD, 2016; World Health Organization, 2013). Primary care systems face the challenge of ensuring a sustainable workforce to allow timely access to services, high-quality care and person-centred services (Kringos et al., 2015a, 2015b). Against this backdrop, the skills and composition of the workforce have changed in many countries and settings to meet the increasing and diversifying demands of patients (Dubois & Singh, 2009; Freund et al., 2015). At the same time, health promotion and prevention are gaining increasing attention among primary care providers to ensure that all people can live in good health. Moreover, the global coronavirus disease 2019 (COVID-19) pandemic has brought to the forefront the necessity of having a well-qualified health workforce that has surge capacity, competencies and flexibility to react to short-term crises (WHO Regional Office for Europe, 2020). The pandemic has not only attracted more policy interest in strengthening the health workforce, it has also triggered a change in the public's view of the value and importance of health professionals and their contribution to the health of individuals and patients.

In a context where health care needs, demands and resources are rapidly changing, policy-makers aim to better understand which skill-mix reforms and strategies are effective. Global debates have in the past frequently focused on the required density and distribution of specific health professions to ensure universal access to and coverage of health services (for example, the number of physicians, nurses or other professions per population) (Campbell et al., 2013). There has been limited attention on identifying the right composition and skill-mix of the health workforce. This has changed over the past decade, with the World Health Organization (WHO), Organization for Economic Co-operation and Development (OECD) and European Commission moving skill-mix higher up the political agenda. The notion that the education, skills and competencies of health professions are essential for high-quality care and efficiency has been increasingly recognized. For instance, the OECD report “right skills, right jobs, right places” took an integrated approach covering the density, distribution and skill-mix of health professions (OECD, 2016). The WHO has published several reports on the health workforce including skill-mix or task shifting specifically (World Health Organization, 2007, 2008, 2016).

Yet, there has been a lack of common understanding of what skill-mix is, what professions are involved and what models exist in different care contexts. This knowledge is critical for identifying the effects of skill-mix on outcomes for patients, population groups and health systems. It is likewise important to identify lessons for implementation. Previous research has primarily focused on skill-mix among individual professions or between two professions, with less evidence available covering multiple professions. One skill-mix example that has been the subject of a considerable amount of research is the changing roles of nurses at the interface to the medical profession (Maier, 2015; Maier & Aiken, 2016; Maier, Aiken & Busse, 2017; Maier et al., 2016; Martínez-González et al., 2014a, 2014b, 2015a, 2015b; Morilla-Herrera et al., 2016; Swan et al., 2015). Fewer studies have analysed skill-mix changes covering multiple professions (Dubois & Singh, 2009; Freund et al., 2015; Sibbald, Shen & McBride, 2004; Tsiachristas et al., 2015). One cross-country analysis focused on a description of “typical” primary care teams in six countries (the United States of America, Canada, Australia, England, Germany and the Netherlands) (Freund et al., 2015). It found that general practitioners (GPs) and nurses were the main professions providing primary care in all countries, but they performed considerably different

tasks and roles. Moreover, the number and contributions of medical assistants and other support workers varied considerably within practices. According to an international study on primary care systems in Europe, the organizational structures of primary care providers also vary, ranging from primarily solo practices to health centres (Kringos et al., 2015a, 2015b). These cross-country variations in the composition and roles of the health workforce and health systems are critical to identify as important contextual factors, which will be described in Section 1.5. A systematic review (Tsiachristas et al., 2015) analysed the effects of new professional roles on a variety of outcome parameters, including all professions. It identified primarily studies on nurses and a few studies on new professional roles among other professions. The review included all care sectors, including hospital settings. It did not differentiate by care sectors, conditions or care contexts and concluded that more research on the optimal skill-mix is required (Tsiachristas et al., 2015).

## 1.2 Aims of this skill-mix volume

Given the general paucity of systematic reviews on skill-mix covering multiple professions and a break-down by patient groups, this volume seeks to provide a synthesis of skill-mix in primary care and ambulatory care and outcomes in individuals and health systems. The volume therefore addresses skill-mix changes aimed at different population or patient groups, ranging from prevention to long-term and palliative care. Moreover, this volume aims to identify country reforms, common developments and lessons for implementation.

This volume has two overarching aims:

- First, to identify skill-mix changes, and in particular skill-mix innovations and the evidence on outcomes in patients and health systems. Within health systems, the role of health care professionals is critical, so a particular emphasis was given on outcomes for health professionals.
- Second, to identify lessons for implementation in different contexts and countries. The volume will analyse what the common barriers and enablers are that have been shown to influence the uptake of new skill-mix reforms in practice. It will address if and how education, regulation, financing and payment policies impact on the timely implementation of skill-mix reforms. Based on the evidence from

country experiences, it will suggest lessons to overcome barriers in practice. Moreover, it will analyse what factors and strategies exist to implement skill-mix changes in health care organizations.

How are skill-mix innovations defined for the purpose of this study? Skill-mix innovations are examples of changes to the skills, roles or clinical activities involving at least two professions, and characterized by three parameters: first, (perceived as) new in a country-specific context (novelty); second, discontinuous with previous practice (disruptive); and third, aimed at improving at least one health outcome (aimed at value), for example, with positive effects on access, quality, patient experience, coordination of care and/or costs (Greenhalgh et al., 2004).

This volume was written before the COVID-19 pandemic; therefore the book does not cover the literature on skill-mix changes that originated during the pandemic. Moreover, as the pandemic is still ongoing, it is premature to analyse what effects changes to the roles, tasks and competencies of specific health professionals have had on patient or health system outcomes.

### **1.3 Policy relevance: why now?**

The notion that the health workforce is instrumental for improving access to health services as well as the quality of care has been recognized for decades, most notably with the publication of the *The World Health Report 2006: working together for health* (World Health Organization, 2006). Investing in the health workforce has received renewed policy attention recently during the COVID-19 pandemic (WHO Regional Office for Europe, 2020), in addition to previously ongoing WHO action on strengthening the health workforce (Campbell et al., 2013; Cometto et al., 2013). Achieving universal health coverage and other health-related sustainable development goals (SDGs) is dependent on a multitude of investments and reforms, including a sufficiently educated health workforce with the right skills and competencies (Cometto et al., 2013; World Health Organization, 2016). There is increasing evidence that strengthening the health workforce can not only have positive effects on health (for example, maternal and child health, among many others) (World Health Organization, 2006), but can also positively impact on other sectors beyond health. Effects beyond health include multiple potential spill-over effects on the economy, women's participation and

societal well-being (World Health Organization, 2018). Yet, globally, health worker shortages, skill-mix imbalances, maldistribution and barriers to interprofessional collaboration prevail and are among the main obstacles preventing countries from reaching universal health coverage (Cometto et al., 2013).

The Global Burden of Disease study suggested that the health worker density would need to increase from a global average of 5.9 physicians, nurses and midwives per 1000 population in 2015 to 10.9 in 2030 (Global Burden of Disease 2017 SDG Collaborators, 2018). The study recognized the limitation of not covering other health professions, nor taking account of team composition and skill-mix requirements in reaching the SDGs. From an international perspective, there is little research evidence available that goes beyond density levels per profession and covers teams, the composition and the specific division of roles and tasks in practice. This is of relevance for all health systems and all care sectors, including primary care. Primary care is the care sector that has been estimated to determine to a large extent whether the goals of achieving universal health coverage and the SDGs can be met (Campbell et al., 2013; Cometto et al., 2013), yet, it is often less financed and not as attractive to health professionals compared with the secondary and tertiary care sectors.

The year 2016 was a landmark year with the creation of the United Nation's High Level Commission of Health Employment and Economic Growth (United Nations, 2016). The commission increased policy attention and commitment internationally on the necessity of strengthening the health workforce towards achieving the SDGs. The commission brought together heads of state and government, health and finance ministers and a wide research and practice community to demonstrate the evidence and create awareness of the link between strengthening the health workforce, economic growth and gender equality, which mutually reinforce each other on the quest towards the SDGs. There is increased recognition now that investment in a strong health workforce is required to reach the SDGs. The Commission developed a *Five year action plan for health employment and inclusive economic growth* led by the WHO, OECD and the International Labour Organization (ILO) in 2018 (World Health Organization, 2018). The action plan aims to strengthen the health and social care workforce globally as an important means to achieve the SDGs. The plan lists ten recommendations and five immediate actions, including actions to improve the education,

skills and jobs of all health professionals, but with a particular focus on those countries with the largest shortage of health professionals in low- and middle-income countries. The action plan recommends the assessment of skill-mix shortages and suggests strategies to overcome these shortages. At the same time, the action plan is directed at all countries, including high-income countries. The reason is that many countries worldwide are facing challenges in ensuring a sustainable health workforce, particularly in primary care, long-term and palliative care and in underserved regions. The plan identifies interprofessional education and multiprofessional service provision, including the identification of skills and competencies as critical to achieve integrated people-centred care (World Health Organization, 2018, p. 15).

Moreover, in 2016, the WHO published the *Global strategy on human resources for health: Workforce 2030* (World Health Organization, 2016). Its main aim is to reach universal health coverage via a new global strategy for human resources for health. The strategy paper recommends the implementation of “health-care delivery models with an appropriate and sustainable skills mix in order to meet population health needs equitably” (World Health Organization, 2016). According to the WHO, the skill-mix should be community-based and include a variety of different health professions from different educational levels and backgrounds, including mid-level health workers in interprofessional primary care teams. There is limited additional guidance and evidence for what an appropriate and sustainable skill-mix entails, particularly for high-income countries and different care sectors.

For strengthening primary health care, the 2018 Astana declaration was critical to reach a renewed commitment among policy-makers, 30 years after the 1978 Alma Ata declaration (World Health Organization/UNICEF, 2018). The declaration highlighted the importance of knowledge and capacity-building and strengthened capacity in human resources for health in primary health care, alongside the use of new technologies and financing. Through governmental, intersectoral action and a coordinated governance strategy, the aim is to build capacity for a high-quality, well-performing health workforce with an effective skill-set to provide high-quality, safe, comprehensive, integrated, accessible, available and affordable care (World Health Organization/UNICEF, 2018).

At the European Union (EU) level, several initiatives have been introduced, including the *Support for the health workforce planning*

*and forecasting expert network* (SEPEN) (SEPEN, 2019). SEPEN was a follow-up network emanating from the Joint Action on Health Workforce Planning and Forecasting to foster exchange of knowledge, capacity and good practice in the field of European health workforce planning. The aims of the network are to encourage and sustain cross-country collaboration, to provide support to Member States and improve countries' health workforce planning processes and policy (SEPEN, 2019). The network has suggested capacity building so that the workforce can effectively work in multiprofessional teams, has access to high-quality knowledge and evidence about policies, regulations and planning. One major focus is on the mobility and migration of health professionals in the EU's single market and how countries can react and plan for inflows and outflows. Moreover, in 2019 the European Commission's Expert Panel on effective ways of investing in Health published an expert opinion on task shifting and health system design (European Commission, 2019). The publication of an opinion on this topic demonstrated the timeliness of skill-mix and health workforce themes at EU level. The opinion focused on one element of skill-mix (see definitions below, Table 1.1), namely task shifting; from one health professional to another, to patients or caregivers or to machines, hence including digital transformation. It did not, however, analyse other skill-mix changes, for instance the add-on of new roles and tasks (supplementation) or changes to multiprofessional teamwork.

The section below provides an overview of the definitions on skill-mix as an umbrella term and different typologies that fall within the definition.

#### **1.4 Skill-mix and the health workforce: definitions**

Before addressing what is meant by skill-mix, it is necessary to provide clarity on what is meant by the health workforce. The WHO defines the health workforce as "all people engaged in actions whose primary intent is to enhance health" (World Health Organization, 2006). This broad definition encompasses in its widest meaning also lay health workers, for example, community health workers, peers or family carers. To distinguish between the formally qualified and unqualified members of the health workforce, this volume will refer to health professionals as those with formal education (physicians, nurses, midwives, pharmacists, physiotherapists) and to health workers as those with no or

**Table 1.1** *Definitions: skill-mix and its typologies*

Term	Definitions and examples
Skill-mix	Changes to the skills, competencies, roles or tasks within and across health professionals and health workers (including community-based workers, peers, informal caregivers) and/or teams
<b>Skill-mix typologies</b>	
1. Re-allocating tasks	Task-shifting (other terms: delegation, substitution) between physicians, nurses, pharmacists and other providers. Examples include: nonmedical prescribing of medicines, diagnosis performed by advanced practice providers, screening performed by nurses or pharmacists
2. Adding new tasks/ roles	Supplementation of tasks or add-on of new roles that did not previously exist or were not routinely provided. Examples include care coordination role, patient navigator, eHealth monitoring, health promotion role
3. Introducing or changing teamwork	Changes to the (way) of collaboration between at least two professions or more. Examples include shared care provided jointly by physicians and nurses and multiprofessional collaboration

*Source:* Based on and modified from the following sources (Buchan & Dal Poz, 2002; Friedman et al., 2014; Laurant et al., 2005; Sibbald, Shen & McBride, 2004).

very limited health-related education (lay, informal, community-based or peer workers). A similar approach is taken by the International Standard Classification of Occupations (ISCO) (International Labour Organization (ILO), 2010a), which has classified the health workforce into three major functions: health professionals, health associate professionals and (personal care) workers. For example, GPs, nurses and physiotherapists are covered under health professionals; whereas nurse assistants and medical technicians are summarized under health associate professionals. Home-based personal care workers subsume a large number of diverse, primarily lay workers with considerable contribution to individual health, particularly in long-term care. This volume covers all health professions working in primary and ambulatory care settings or at the interface to hospital care, and also includes lay workers, such



as peers, community-based workers and family caregivers as long as they are covered by skill-mix changes and reforms.

### *What is skill-mix?*

Several definitions of the term skill-mix exist in the literature with different focus, levels of breadth and depth (Buchan & Dal Poz, 2002; Dubois & Singh, 2009). Terms used commonly are skill-mix as an overarching term, but also changing roles, task shifting, task sharing, task supplementation, delegation and substitution, among others. For the purpose of this study and informed by two definitions (Buchan & Dal Poz, 2002; Sibbald, Shen & McBride, 2004), the following working definition was developed: skill-mix is defined as “directly changing the skills, competencies, attitudes, roles or tasks within and across individuals and teams”. This definition was chosen deliberately with a broad remit to cover all changes that directly and purposefully change the roles of individual health professionals or teams in primary and ambulatory care settings. Differentiating between skill-mix change and a skill-mix innovation, the following additional three criteria were applied to qualify as an innovation: novelty of skill-mix changes (in its widest sense), being of disruptive nature (changing the status quo) and aimed at improving at least one health or health system outcome (Greenhalgh et al., 2004).

Further, to grasp the range and type of changes in the health workforce a modified typology of skill-mix innovations has been used for the study (Laurant et al., 2005; Friedman et al., 2014) (Table 1.1).

The first typology addresses re-allocating tasks between two professions. Commonly the term task shifting, or sometimes task sharing, has been used, although the latter term often lacks clarity over which tasks are shifted and which ones are being shared and by whom. Task shifting has also been referred to as substitution or delegation. While substitution refers to tasks being entirely shifted to a new profession, delegation is frequently referred to as the transfer of tasks to nonmedical professions such as nurses, but with physicians maintaining ultimate responsibility (Laurant et al., 2005; Sibbald, Shen & McBride, 2004). The two terms are sometimes also used simultaneously when it comes to questions of oversight and jurisdictional responsibility. This typology refers to a new division of work between at least two professions and the team in which they work.

The second typology concerns the addition of new tasks or roles, also referred to as task supplementation, such as care coordination, use of new technologies or eHealth monitoring. Adapted from Laurant et al. (2005), this typology refers to health professionals expanding their roles and performing new functions that were previously not or not routinely performed. Hence, this typology refers to expansions of the skills set and roles of an individual and the team.

The third typology covers the introduction of teamwork and collaboration for at least two professions, for instance shared care of physicians and nurses. The use of the term teamwork across this volume is based on changes to at least two professions directly affecting their method of collaboration. This also touches upon interventions to improve cooperation and collaboration such as teamwork effectiveness or interprofessional education (Friedman et al., 2014; Laurant et al., 2005).

In some cases, skill-mix changes result directly or indirectly in response to changes in service delivery models, which change the interface of care provision. A transfer of care from hospital to ambulatory or community care (such as community-based treatment and testing, for example, for HIV/AIDS, which would previously have been provided in hospitals or clinics) has major implications for the composition of teams providing this service and is also influenced by new technologies, treatment options and laboratory testing devices. Liaison functions are skill-mix changes aimed at improving the care across care settings to provide a smooth, continuous provision of services. This also applies to the relocation of care, which comprises a shift of entire service delivery models (for example, hospital-at-home). These models are more complex and although they may result in skill-mix changes, they are larger service delivery reforms of which skill-mix is only one important element among others. Hence, the evaluation of these models is more complex and attribution of causality is limited compared with the typologies 1–3 listed in Table 1.1.

### **1.5 The diversity and skill-mix of health professions in Europe: a snapshot**

Strengthening primary care to meet the health and social care needs of an ageing population is prompting many countries in Europe to make far-reaching changes to the primary care workforce. The traditional primary care model of small, solo general practices is becoming increasingly unsustainable and unable to manage growing workloads, work

intensity and work complexity, especially with many countries facing escalating GP shortages and economic constraints. As a result, these traditional ways of working are gradually being replaced by new models of primary care practice, centred on collaborative, multiprofessional teams (Groenewegen et al., 2015; Kuhlmann et al., 2018). To support these new ways of working and the delivery of more complex care and procedures, many countries have enhanced the scope of practice and skills of established health professionals such as nurses or pharmacists, reoriented professions such as paramedics or social workers that traditionally worked elsewhere in the health system into primary care settings or introduced new professions entirely such as physician assistants.

The scale and pace of these changes has, however, not been unified across Europe and considerable variation in the composition of the health workforce across the region exists (Groenewegen et al., 2015; Kringos et al., 2015a). Although some countries (for example, the United Kingdom, Iceland, Lithuania, Spain, Sweden) have introduced health centres or larger practices with multiprofessional teams incorporating a range of health professionals such as physicians, nurses, medical assistants, health care assistants, psychologists, physiotherapists and social workers, other countries (for example, Austria, Belgium, Czech Republic, Germany and Romania) still rely primarily on smaller primary care practices where GPs work alone or with one or two other professionals, usually a nurse or medical assistant (Groenewegen et al., 2015; Kringos et al., 2015a). In addition, the scope of practice and skill-profiles of an individual profession such as advanced practice nurses differs considerable from one country to the next (Maier & Aiken, 2016; Maier, Aiken & Busse, 2017; Maier, Koppen & Busse, 2018). Even within the same country, ways of working and responsibilities of different professions often vary between practices and settings, depending on patients' needs, individual competencies, professional boundaries and the division of work.

### *International definitions of health professionals*

In light of the variations of teams and skill-mix within and across countries, it is important to have an understanding of how a physician, a nurse or a pharmacist is defined in different country contexts and internationally. Although there are clear variations across countries, there are also attempts at the international level to define health professions, their core tasks and clinical roles. Core definitions are provided in the Appendix, for instance based on International Standard

Classification of Occupations (ISCO)-08 codes that have been developed by the International Labour Organization (ILO) (International Labour Organization (ILO), 2010a, 2010b) or by standard definitions from other sources.

Hence, ISCO classifications provide a common understanding of the definition of different health professions and their scope of practice. For example, among other tasks, generalist medical practitioners or GPs are defined as carrying out clinical examinations of patients to assess, diagnose and monitor a patient's condition and provide continuing medical care for patients including prescribing, administering, counselling on and monitoring of curative treatments and preventive measures (modified from: ILO: ISCO 2211). Nursing professionals, including specialist nurses, plan and provide personal care, treatments and therapies; develop and implement care plans for biological, social and psychological treatment and provide information about prevention of ill-health, treatment and care "for people who are in need of nursing care due to the effects of ageing, injury, illness or other physical or mental impairment, or potential risks to health" (ILO: ISCO 2221). Pharmacists meanwhile are professionals that "store, preserve, compound and dispense medicinal products and counsel on the proper use and adverse effects of drugs and medicines following prescriptions issued by medical doctors and other health professionals" (ILO: ISCO 2262). ISCO does not cover all health professions; new professions that have emerged more recently and have a comparatively younger tradition in many countries are often missing. Some examples are Nurse Practitioners/Advanced Practice Nurses and Physician Assistants, or dental hygienists. For these professions, standard definitions by other sources were used (see Appendix). Moreover, there are a multitude of other health professionals working in primary care, ambulatory care settings or at the interface between inpatient and outpatient care. Further details on these professions, their definitions and common tasks for other health professionals can be found in the Appendix.

Although international definitions are helpful to have a common, minimum understanding of the role and tasks of certain health professions, the definitions need to be seen in the country-specific contexts, which include the minimum level education of these professions, their scopes-of-practice, which comprises the clinical activities and tasks that these professions are officially authorized to perform, and the clinical practice settings.

*The EU's free movement zone: minimum qualification of health professionals*

In 2005 the Council of the EU adopted Directive 2005/36/EC on the recognition of professional qualifications in practice, with the Directive modernized in 2013 (European Union, 2013). The legally binding Directive aims to support the policy of freedom of movement by granting automatic and mutual recognition of professional qualifications between Member States and other countries belonging to the EU's free movement zone (for example, Norway, Switzerland). The Directive covers five regulated health professions: physicians (including GPs and specialists), nurses, midwives, dental practitioners and pharmacists. The Directive provides a legal definition of minimum education qualifications and medical training that must be achieved in order to practice and has led to a process of minimum harmonization of education and training requirements across the EU, although variations remain across countries.

For physicians, basic medical education must consist of 5500 hours of practical and theoretical training over a minimum of 5 years. General practice is a distinct postgraduate qualification separate from other medical specialities, with mandatory postgraduate training defined as: (i) a full-time course of a minimum of 3 years; (ii) at least 6 months in an approved hospital or clinic and at least 6 months in an approved GP practice or centre where doctors provide primary care. Although specialist training is a mandatory prerequisite for becoming a GP in the EU/EEA, subjects studied and the duration of training vary markedly from 3 years (for example, Belgium, Bulgaria, Italy, Latvia, Malta, the Netherlands and the United Kingdom) to 6 years (Finland) (European Academy of Teachers in General Practice/Family Medicine (EURACT), 2020).

Following the Directive and reforms under the Bologna process, qualification as a registered nurse across the EU is now primarily achieved through obtaining a Bachelor-level degree (Lahtinen, Leino-Kilpi & Salminen, 2014). Few countries (for example, Austria and Germany) still have a co-existence of educational pathways, consisting of Bachelor programmes and vocational trainings at nursing schools. Advanced practice nurses (including nurse practitioners) are generally educated to at least Master's level (Maier, Aiken & Busse, 2017). According to the Directive, pharmacists must complete "training of at least five years' duration, including at least: (i) four years of full-time theoretical and practical training at a university or at a higher

institute of a level recognised as equivalent, or under the supervision of a university; (ii) six-month traineeship in a pharmacy”. In France, completion of a 5- or 6-year Doctor of Pharmacy degree is necessary to become a licensed pharmacist. In a small number of countries (for example, England), specific education and training programmes are also available to support pharmacists working in primary care (Middleton, Howard & Wright, 2019).

### *Role developments and scope-of-practice variations across Europe*

The roles and tasks undertaken by health professionals have expanded in scope and complexity in recent years in a number of countries (Dubois & Singh, 2009; Freund et al., 2015; Kringos et al., 2015a). In primary care, GPs are now increasingly expected to provide more complex, all-round care to patients, including those with multimorbidity or long-term chronic conditions and to work as part of multiprofessional teams. Kringos et al. (2015a, b) have grouped the range of services provided by GPs into five broad categories: first-contact care and triage; diagnostic services, treatment and follow-up care; medical technical procedures; prevention and health promotion; and mother, child and reproductive health care. However, an assessment of services provided by GPs in 13 case study countries found GP involvement in treatment and follow up was generally high but involvement in preventive care was limited. GP involvement in first-contact care was highest in countries with stronger and well-developed primary care services such as France, the Netherlands and the United Kingdom (Kringos et al., 2015b).

The move towards a broader skill-mix in primary care has allowed physicians to relinquish several clinical and non-clinical tasks to other professions such as to Advanced Practice Nurses/Nurse Practitioners with a Master’s degree or other postgraduate qualifications (for example, Finland, Ireland, the Netherlands, the United Kingdom) or nurses with additional education but not at the Master’s level (for example, Cyprus, Denmark, Estonia, Poland, Spain), to community pharmacists (for example, Switzerland, the United Kingdom), health care assistants (for example, in Spain and the United Kingdom), physician assistants (for example, in the Netherlands and the United Kingdom) or medical assistants (for example, in Austria, Germany and Switzerland) (Freund et al., 2015;

Maier, Aiken & Busse, 2017; Wismar, Glinos & Sagan, forthcoming). This task shifting, which has resulted in an expanded scopes-of-practice and a new division of work among teams, has been facilitated by reforms to the education and training of these professions in Europe.

Examples of the changing roles of health professionals are multifaceted and highly context-specific. An overview of in-depth country reforms and developments is provided in the European Observatory on Health Systems and Policies skill-mix case study companion volume (Wismar, Glinos & Sagan, forthcoming).

In this section, we provide a snapshot of trends with regard to two professions: nurses and pharmacists, for which a large number of reforms and developments have occurred in Europe. One notable example is the introduction of Advanced Practice Nurses/Nurse Practitioners roles, facilitated by reforms in line with the Bologna process and the move of nursing education to Bachelor's degree, followed by Master's programmes (Lahtinen, Leino-Kilpi & Salminen, 2014; Praxmarer-Fernandes et al., 2017). An analysis in 39 countries found that within Europe, Finland, Ireland, the Netherlands and the United Kingdom have expanded the scopes-of-practice of Advanced Practice Nurses/Nurse Practitioners considerably, authorizing them to perform a complex set of clinical activities. These include being responsible for a panel of patients, performing diagnoses/clinical assessments, ordering medical tests, deciding on certain treatments, prescribing certain medications, acting as first-point-of-contact and referring patients to other providers or settings (Maier & Aiken, 2016; Maier, Aiken & Busse, 2017). Another related trend across Europe is country reforms on nurse prescribing. As of 2019, 13 countries in Europe had adopted laws to grant nurses with additional qualifications certain prescribing rights, thereby expanding their official scopes-of-practice. These countries are Cyprus, Denmark, Estonia, Finland, France, Ireland, the Netherlands, Norway, Poland, Spain, Sweden, the United Kingdom and the canton of Vaud, in Switzerland. Of these, eight countries adopted new laws in the last decade, demonstrating the novelty of the skill-mix change (Maier, 2019).

In a similar way to changes in the role of nurses, several countries have expanded the role of pharmacists in primary care (for example, Belgium, Denmark, France, Italy, Portugal and the United Kingdom), leading to a substantial increase in the range of services provided by the profession (Pharmaceutical Group of the European Union, 2019).

Pharmacists now increasingly take on a more patient-focused role and work as part of a multidisciplinary team. Pharmacists are seen as key professionals to assess and treat patients and assist with medication management, in particular for older people and those with chronic conditions and complex polypharmacy. According to the European Pharmacists Forum, pharmacist services now include work in five key areas (European Pharmacists Forum, 2015): (i) medicine adherence, (ii) administering vaccines in pharmacies, (iii) pharmacist-provided screenings, (iv) supporting patients and the public in self-care, (v) disease prevention and support in individual behaviour change (European Pharmacists Forum, 2015).

In sum, the scope of practice, education and training of health professionals differs markedly across Europe. Many countries have implemented or started implementing reforms. This inevitably influences not only the roles and responsibilities that individual professions can undertake, but methods of working within the various ambulatory and primary care settings and the composition of multidisciplinary teams.

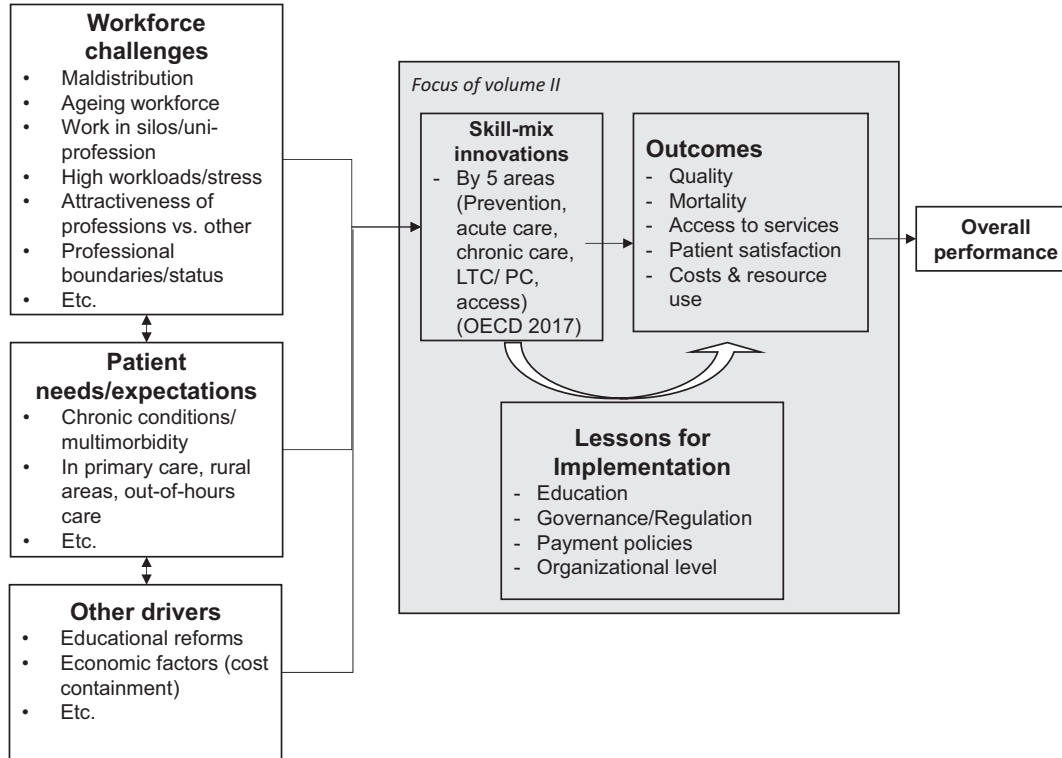
Yet, to date, there has been no systematic, cross-country synthesis of the evidence on the implications of skill-mix changes on individual and population health outcomes or health system outcomes, including on the professions themselves, which is the overarching aim of this study.

In the following section, the conceptual framework that guided the study is described.

## **1.6 Conceptual framework of the skill-mix study**

This volume is based on a conceptual health workforce framework that illustrates the interrelated factors that can lead to skill-mix changes (Fig. 1.1). The major two objectives are to analyse the evidence of skill-mix changes on (i) outcomes and (ii) factors that influence the implementation process. The changes to skill-mix are influenced by the status quo of a workforce often triggered by health worker shortages (for example, in rural areas), skill gaps (for example, in providing health promotion or prevention or social care), and other health workforce challenges. Health workforce challenges are often influenced by changing patient needs as well as drivers at the macro level – mutually influencing each other, for example, new financing mechanisms or cost containment strategies.





**Figure 1.1** Conceptual framework

*Abbreviations:* LTC: long-term care; PC: palliative care.

*Source:* Authors.

Specifically, this volume – which complements and builds upon its companion volume, consisting of in-depth country case studies (Wismar, Glinos & Sagan, forthcoming) – performs a systematic synthesis of the evidence on skill-mix changes with a focus on skill-mix innovations and outcomes. It focuses on five core care segments of relevance to any health system: health promotion and prevention, acute care, chronic care and multimorbidity, long-term and palliative care, and access to services in rural and socially deprived areas. Chapters 4 to 8 synthesize the current evidence on the effect of skill-mix innovations according to the five domains. Education, regulation, payment policies and organizational strategies present core elements of the implementation of skill-mix innovations and reforms. Hence, chapters 9 to 11 focus on lessons for implementation, including facilitators and barriers and possible outcomes.

## 1.7 Methods

The volume is based on a systematic review of the literature (“overview of reviews”), which analyses all relevant systematic reviews on skill-mix and outcomes in a systematic manner, and additional, complementary evidence on implementation and country-specific information on reforms and implementation.

### *Overview of reviews*

An overview of reviews (“umbrella review”) was conducted, summarizing all systematic reviews either on skill-mix and outcomes or on implementation. A protocol was developed a priori, which includes further information about the methodology (Maier et al., 2018b). All patients and population groups in primary care and all ambulatory care were covered. Excluded were inpatient settings and emergency care (for example, hospitals, long-term care institutions, hospice if inpatient), except for skill-mix interventions across several sectors including inpatient and ambulatory care (for example, coordination across sectors, liaison roles). The intervention was defined as changes to skill-mix (see definition in Table 1.1) over status quo/compared with standard-of-care. The comparator consisted of status quo (no changes

to skill-mix), and/or as standard-of-care (traditional service provision) at the time of the individual study. Systematic reviews covering only low- and middle-income countries were excluded.

### *Search strategy*

The search for eligible reviews was carried out in the following databases: Embase, MEDLINE in Ovid, Cochrane CENTRAL, Web of Science Core Collection, CINAHL, PsycINFO Ovid; in addition, a search in Google Scholar was conducted in January 2018. Search terms were developed together with the core team of researchers and a medical librarian. The full list of search terms is available in the addendum of the protocol (Maier et al., 2018a). For the search, no restrictions were applied regarding the year of publication, whereas in the screening process only articles with publication dates from January 2010 to January 2018 were taken into account. The reasons were twofold: first, for feasibility reasons as the screening showed a high number of relevant systematic reviews published in the time period, and second, the focus was on skill-mix innovations, hence the element of novelty also played a role in the decision to focus on more recent evidence instead of reviews published before 2010. Furthermore, snowballing was performed to identify additional relevant reviews.

### *Data collection and analysis*

The data management was executed with Rayyan QCRI, which is online software specifically designed for screening of articles for systematic reviews. The search in the databases produced a total of 8300 hits. The snowballing produced an additional 323 possibly eligible reviews. After several pilot phases to ensure consistency of the screening phase, the titles and abstracts of the first 100 hits were reviewed by three reviewers according to the inclusion and exclusion criteria. From these search results, interrater agreement for the first 100 hits scored  $>0.8$  using an extended version of Cohen's  $k$  coefficient, suitable for three reviewers (Zapf et al., 2016). As a high interrater agreement was reached, the remaining hits were divided among the three reviewers for both the screening of titles and abstracts, and then the screening of full-text versions. Authors were contacted if the full-text version was not available or if additional information was needed. Data analysis was based

on a narrative synthesis on the main outcome measures by each of the five care segments [see conceptual framework (OECD, 2017)]. The form used was informed by previous overviews of reviews (Thomson et al., 2010) and covered the following elements: country, study design, methods, participants, intervention, health profession, comparator, outcomes, care settings and context. Meta-analysis was not a priori excluded, but because of the type of review (overview of reviews) and the coverage of a broad topic (skill-mix), the outcome measures were too heterogeneous to perform meta-analyses.

### *Additional evidence on implementation and country reforms*

In addition to the overview of reviews, evidence from other sources was included in this volume, particularly with a focus on the implementation of skill-mix changes and the identification of country reforms. To this end, each author team from each of the chapters performed additional literature searches to identify relevant material: the material included additional studies, reports, policy documents as well as other grey literature (for example, from health-related international organizations such as WHO, OECD, European Commission). In addition, country experiences were summarized with a particular focus on the implementation of reforms and outcomes, as available. To this end, the author teams identified suitable countries to be covered as mini case studies in the chapters, based on the authors' collective expertise in their field. Information on suitable country case studies was also supplemented from the companion volume on skill-mix, which includes in-depth country case studies in 17 countries in Europe and other regions (Wismar, Glinos & Sagan, forthcoming). The material together was synthesized for each chapter focused on country-specific policy reforms and barriers/facilitators to implementation.

## **1.8 Overview of this volume**

The volume is divided into three parts (see Fig. 1.2). The volume begins with a general part arranged in three chapters (Part I) on the rationale, definitions and conceptual framework of the book and the skill-mix situation in Europe (Chapter 1), a synthesis of the evidence on skill-mix changes and relevant outcome measures on patients, health systems and professions (Chapter 2) and lessons for implementation (Chapter 3).

Part I: Summary on drivers, trends, main lessons	Part II: Skill-mix innovations & evidence on outcomes	Part III: Lessons for Implementation
<ul style="list-style-type: none"> <li>• Chapter 1: Rationale, conceptual framework</li> <li>• Chapter 2: Main findings of the evidence (summary of Part II)</li> <li>• Chapter 3: Main policy lessons (summary of Part III)</li> </ul>	<ul style="list-style-type: none"> <li>• Chapter 4: Keeping people healthy</li> <li>• Chapter 5: Acute care</li> <li>• Chapter 6: Chronic conditions and multimorbidity</li> <li>• Chapter 7: Long-term and palliative care</li> <li>• Chapter 8: Access to services</li> </ul>	<ul style="list-style-type: none"> <li>• Chapter 9: Education and workforce planning</li> <li>• Chapter 10: Policy instruments: role of regulation and payment policies</li> <li>• Chapter 11: Change management in healthcare settings</li> </ul>

**Figure 1.2** Structure of the skill-mix volume (Volume II)

*Source:* Authors.

The second part consists of five chapters that present the evidence on outcomes as well as major country developments and trends. These are categorized into five areas of relevance to health systems and primary care, identified by and modified from OECD classifications: Keeping people healthy, acute care, chronic conditions and multimorbidity, long-term and palliative care, and access to services (OECD, 2017). The last part (Part III) consists of three chapters covering the implementation and lessons for uptake in policy and practice, with a focus on education and workforce planning (Chapter 9), the policy level (Chapter 10) and organizational change (Chapter 11).

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## *Appendix Overview of international definitions of selected health professions working in primary and ambulatory care*

<b>Health professions</b>	<b>Definitions</b>	<b>Common roles and tasks</b>	<b>Included professions</b>
Physician	“(…) study, diagnose, treat and prevent illness, disease, injury and other physical and mental impairments in humans through the application of the principles and procedures of modern medicine.” (ILO: ISCO 221)	<ul style="list-style-type: none"><li>• Conduct physical examinations</li><li>• Determine patients’ health status</li><li>• Order and analyse diagnostic tests</li><li>• Prescribe and administer curative treatments and preventive measures</li><li>• Perform surgery and clinical procedures</li><li>• Plan and manage referral plans (modified from: ILO: ISCO 221))</li></ul>	Specialist and generalist physicians

(cont.)

Health professions	Definitions	Common roles and tasks	Included professions
Generalist medical practitioner	<p>“ (...) Generalist medical practitioners diagnose, treat and prevent illness, disease, injury, and other physical and mental impairments in humans through application of the principles and procedures of modern medicine. They do not limit their practice to certain disease categories or methods of treatment, and may assume responsibility for the provision of continuing and comprehensive medical care to, and the maintenance of general health of, individuals, families and communities...” (ILO: ISCO 2211)</p>	<ul style="list-style-type: none"> <li>• Conduct clinical examinations of patients to assess, diagnose and monitor a patient’s condition</li> <li>• Order, carry out and interpret tests within the surgery to assist with diagnosis</li> <li>• Provide continuing medical care for patients including prescribing, administering, counselling on and monitoring curative treatments and preventive measures</li> </ul> <p>(modified from: ILO: ISCO 221)</p>	<ul style="list-style-type: none"> <li>• District medical doctor</li> <li>• Family medical practitioner/ General practitioner</li> <li>• Medical doctor/ Officer (general)</li> </ul>
Dentist	<p>“(…) diagnose, treat and prevent diseases, injuries and abnormalities of the teeth, mouth, jaws and associated tissues by applying the principles and procedures of modern dentistry.” (ILO: ISCO 2261)</p>	<ul style="list-style-type: none"> <li>• Diagnose diseases, injuries, irregularities and malformations of teeth and associated structures in the mouth and jaw</li> <li>• Provide restorative oral care such as implants, crowns and orthodontics, and repair damaged teeth</li> <li>• Provide surgical treatments</li> <li>• Design, make, and fit prosthodontic appliances or write fabrication instructions or prescriptions for them</li> </ul>	<ul style="list-style-type: none"> <li>• Dental practitioner</li> <li>• Dental surgeon</li> <li>• Endodontist</li> <li>• Oral and maxillofacial surgeon</li> </ul>

Nurse practitioner/ advanced practice nurse	A Nurse practitioner/advanced practice nurse “is a registered nurse who has acquired the expert knowledge base, complex decision-making skills and clinical competencies for expanded practice, the characteristics of which are shaped by the context and/or country in which s/he is credentialed to practice.” (ICN, 2019)	<ul style="list-style-type: none"><li>• Diagnose general diseases having oral manifestations</li><li>• Provide preventive oral health care (adapted from: ILO: ISCO 2261)</li><li>• Integrate research, education, practice and management</li><li>• Case management and take on own cases</li><li>• Assess and diagnose health status</li><li>• Carry out advanced clinical competencies</li><li>• Consult other health providers</li><li>• Plan, implement and evaluate care programmes</li><li>• Act as the first point of contact for patients and families</li></ul> (modified from: Kringos et al., 2015a, b)	<ul style="list-style-type: none"><li>• Nurse anaesthetist</li><li>• Nurse practitioner</li><li>• Public health nurse</li><li>• Specialist nurse</li><li>• Clinical nurse</li></ul>
Nursing professionals	“(…) provide treatment, support and care services for people who are in need of nursing care due to the effects of ageing, injury, illness or other physical or mental impairment, or potential risks to health.” (ILO: ISCO 2221)	<ul style="list-style-type: none"><li>• Plan and provide personal care, treatments and therapies</li><li>• Develop and implement care plans for the biological, social and psychological treatment of patients</li><li>• Clean wounds, apply surgical dressings and bandages</li><li>• Monitor and alleviate pain and discomfort of patients</li><li>• Answer questions from patients or families and provide information about prevention of ill-health, treatment and care (modified from: ILO: ISCO 2221)</li></ul>	<ul style="list-style-type: none"><li>• Registered nurse</li><li>• Specialist nurse</li><li>• Clinical nurse consultant</li><li>• District nurse</li></ul>

(cont.)

Health professions	Definitions	Common roles and tasks	Included professions
Midwife	“(…) plan, manage, provide and evaluate midwifery care services before, during and after pregnancy and childbirth. They provide delivery care for reducing health risks to women and newborn children, working autonomously or in teams with other health care providers.” (ILO: ISCO 2222)	<ul style="list-style-type: none"> <li>• Plan, provide and evaluate care and support services for women and babies before, during and after pregnancy</li> <li>• Assess progress during pregnancy and monitor the health status of neonates, manage complications and recognize required referral to specialized doctors</li> <li>• Monitor and alleviate pain experienced by women</li> <li>• Provide advice and conduct community education (modified from: ILO: ISCO 2222)</li> </ul>	<ul style="list-style-type: none"> <li>• Professional midwife</li> </ul>
Nursing associate professional	“(…) provide nursing and personal care for people who are physically or mentally ill, disabled or infirm, in support of implementation of health care, treatment and referral plans usually established by medical, nursing and other health professionals They usually work under the direction of nursing or other health professionals and perform tasks of more limited range and complexity than nursing professionals.” (ILO: ISCO 3221)	<ul style="list-style-type: none"> <li>• Assess, plan and provide personal and nursing care, treatment and advice to the sick, injured, disabled within a defined scope-of-practice</li> <li>• Administer medications and other treatments and monitoring responses</li> <li>• Clean wounds and apply surgical dressings under the guidance of professional nurses or medical doctors</li> <li>• Monitor and observe patients’ condition and maintain a record of observations and treatment</li> <li>• Assist in planning and managing the care of individual patients</li> <li>• Assist in giving first-aid treatment in emergencies (modified from: ILO: ISCO 3221)</li> </ul>	<ul style="list-style-type: none"> <li>• Associate professional nurse</li> <li>• Assistant nurse</li> <li>• Enrolled nurse</li> <li>• Practical nurse</li> </ul>

Health care assistant

(...) provide direct personal care and assistance with activities of daily living to patients and residents in a variety of care settings such as hospitals, clinics and residential nursing care facilities. They generally work in implementation of established care plans and practices, and under the direct supervision of medical, nursing or other health professionals or associate professionals.” (ILO: ISCO 5321)

- Assisting patients with personal and therapeutic care needs such as personal hygiene, feeding, dressing, physical mobility and exercise, communication, taking oral medication and changing dressings
- Maintaining patient’s environmental hygiene standards
- Observing patients’ condition, responses and behaviour and reporting changes to a professional
- Health care assistant (clinic or hospital)
- Nursing aide (clinic or hospital)
- Psychiatric aide

Physician assistant

“(…) health care professionals trained within the medical model and licensed to practice medicine under the supervision of a licensed doctor” (Hooker, 2010)

- Conduct physical examination, diagnose and treat illnesses
  - Order and interpret medical tests
  - Write prescriptions
  - See patients with undifferentiated diagnoses or long-term chronic conditions
  - Provide preventive health care services
  - Formulate differential diagnoses and management plans
  - Physician assistant
  - Physician associate
  - Anaesthesia Associates
- (modified from (Hooker, Cawley & Asprey, 2010))

(cont.)

Health professions	Definitions	Common roles and tasks	Included professions
Medical assistant	“(…) Medical assistants perform basic clinical and administrative tasks to support patient care under the direct supervision of a medical practitioner or other health professional. They perform routine tasks and procedures such as measuring patients’ vital signs, administering medications and injections, recording information in medical records keeping systems, preparing and handling medical instruments and supplies, and collecting and preparing specimens of bodily fluids and tissues for laboratory testing.” (ILO: ISCO 3256)	<ul style="list-style-type: none"> <li>• Interview patients to obtain medical information and measure their vital signs, weight and height</li> <li>• Show patients to examination rooms and prepare them for examination</li> <li>• Collect blood, tissue or other laboratory specimens, logging the specimens, and prepare them for testing</li> <li>• Explain treatment procedures, medications, diets and physicians’ instructions to patients</li> <li>• Prepare treatment rooms for patient examinations, keep the rooms neat and clean, sterilize instruments and dispose of contaminated supplies</li> <li>• Arrange and schedule appointments and prepare documentation required for billing, reporting and insurance (adapted from: ILO: ISCO 3256)</li> </ul>	<ul style="list-style-type: none"> <li>• Clinical assistant</li> <li>• Medical assistant</li> <li>• Ophthalmic assistant</li> </ul>
Pharmacist	“(…) store, preserve, compound and dispense medicinal products and counsel on the proper use and adverse effects of drugs and medicines following prescriptions issued by medical doctors and other health professionals.” (ILO: ISCO 2262)	<ul style="list-style-type: none"> <li>• Receive prescriptions for medicinal products from health professionals, check patients’ medicine histories, and ensure proper dosage administration and drug compatibility before dispensing</li> <li>• Provide information and advice to prescribers and clients regarding drug interactions or incompatibility, side-effects, dosage and proper medication storage (adapted from: ILO: ISCO 2262)</li> </ul>	<ul style="list-style-type: none"> <li>• Dispensing chemist</li> <li>• Hospital pharmacist</li> <li>• Industrial pharmacist</li> <li>• Retail pharmacist</li> </ul>



Psychologist

“(…) research into and study the mental processes and behaviour of human beings as individuals or in groups, and apply this knowledge to promote personal, social, educational or occupational adjustment and development.” (ILO: ISCO 2634)

- Plan and carry out tests to measure mental, physical and other characteristics such as intelligence, abilities, aptitudes, potentialities, etc.
  - Analyse the effect of heredity, social, occupational and other factors on individual thought and behaviour
  - Conduct counselling or therapeutic interviews with individuals and groups, and provide follow-up services
  - Maintain required contacts, such as those with family members, educational authorities or employers, and recommend possible solutions to, and treatment of, problems
  - Study psychological factors in the diagnosis, treatment and prevention of mental illnesses and emotional or personality disorders, and conferring with related professionals (adapted from: ILO: ISCO 2634)
- Clinical psychologist
  - Educational psychologist
  - Organizational psychologist
  - Psychotherapist
  - Sports psychologist

(cont.)

Health professions	Definitions	Common roles and tasks	Included professions
Social worker and counselling professional	“(…) provide advice and guidance to individuals, families, groups, communities and organizations in response to social and personal difficulties. They assist clients to develop skills and access resources and support services needed to respond to issues arising from unemployment, poverty, disability, addiction, criminal and delinquent behaviour, marital and other problems.” (ILO: ISCO 2635)	<ul style="list-style-type: none"> <li>• Interview clients individually, in families, or in groups, to assess their situation and problems and determine the types of services required</li> <li>• Maintain contact with other social service agencies, educational institutions and health care providers involved with clients</li> <li>• Compile case records or reports for courts and other legal proceedings</li> <li>• Provide counselling, therapy and mediation services and facilitate group sessions to assist clients to deal with and resolve their social and personal problems</li> <li>• Plan and implement programmes of assistance including crisis intervention and referral to agencies that provide financial assistance, legal aid, housing, medical treatment and other services</li> </ul>	<ul style="list-style-type: none"> <li>• Addictions counsellor</li> <li>• Bereavement counsellor</li> <li>• Child and youth counsellor</li> <li>• Family counsellor</li> <li>• Marriage counsellor</li> <li>• Parole officer</li> <li>• Probation officer</li> <li>• Social worker</li> <li>• Women’s welfare organizer</li> </ul>

Dental assistants and therapists

“(…) provide basic dental care services for the prevention and treatment of diseases and disorders of the teeth and mouth, as per care plans and procedures established by a dentist or other oral health professional. They examine patients’ mouths, teeth and related structures to assess oral health status; provide advice on dental hygiene; perform basic or routine clinical dental procedures; and assisting dentists during complex dental procedures.” (ILO: ISCO 3251)

- Provide dental health education about tooth care and diet
- Remove plaque and calculus by scaling and polishing teeth
- Take impressions and/or dental radiographs of teeth
- Apply prophylactic/antibacterial materials, fissure sealants and topical fluorides to help prevent tooth decay
- Carry out screening and monitoring procedures
- Treat and help to prevent gum disease

- Dental assistant,
- Dental hygienist
- Dental therapist

Paramedical practitioner

“(…) provide advisory, diagnostic, curative and preventive medical services more limited in scope and complexity than those carried out by medical doctors. They work autonomously or with limited supervision of medical doctors, and perform clinical, therapeutic and surgical procedures for treating and preventing diseases, injuries, and other physical or mental impairments common to specific communities.” Source: (ILO: ISCO 2240)

- Conduct medical examinations and question patients to determine the nature of disorders or illnesses
- Prescribe and administer treatments, medications and other remedial measures of a more restricted scope and complexity than medical doctors
- Perform therapeutic procedures, such as injections, immunizations, suturing and wound care, and infection management
- Refer complex or unusual cases to medical doctors, hospitals or other health workers if necessary. (adapted from: ILO: ISCO 2240)

- Clinical officer
- Primary care paramedic
- Advanced care paramedic
- Surgical technician
- Feldsher

(cont.)

Health professions	Definitions	Common roles and tasks	Included professions
Physiotherapist	“(…) assess, plan and implement rehabilitative programmes that improve or restore human motor functions, maximize movement ability, relieve pain syndromes, and treat or prevent physical challenges associated with injuries, diseases and other impairments.” (ILO: ISCO 2264)	<ul style="list-style-type: none"><li>• Administer muscle, nerve, joint functional ability and other tests to identify physical problems of patients</li><li>• Develop, implement and monitor programmes or treatments using the therapeutic properties of exercise, heat, cold, massage, manipulation, hydrotherapy, electrotherapy, ultraviolet or infrared light and ultrasound</li><li>• Instruct patients or families in procedures to continue outside clinical setting (adapted from: ILO: ISCO 2264)</li></ul>	<ul style="list-style-type: none"><li>• Geriatric physical therapist</li><li>• Manipulative therapist</li><li>• Orthopaedic physical therapist</li><li>• Paediatric physical therapist</li><li>• Physical therapist</li><li>• Physiotherapist</li></ul>

Dietician and nutritionist

“(…) dieticians and nutritionists assess, plan and implement programmes to enhance the impact of food and nutrition on human health. They may conduct research, assessments and education to improve nutritional levels among individuals and communities.” (ILO: ISCO 2265)

- Instruct individuals, families and communities on nutrition, the planning of diets and preparation of food
- Plan diets and menus, supervise the preparation and serving of meals, and monitor food intake and quality to provide nutritional care in settings
- Compile and assess data relating to health and nutritional status of individuals, groups and communities
- Develop and evaluate food and nutrition products to meet nutritional requirements
- Conduct research on nutrition and disseminate findings (adapted from: ILO: ISCO 2265)

- Clinical dietician
- Food service dietician
- Public health nutritionist
- Sports nutritionist

Audiologist and speech therapist

“(…) evaluate, manage and treat physical disorders affecting human hearing, speech communication and swallowing. They prescribe corrective devices or rehabilitative therapies for hearing loss, speech disorders, and related sensory and neural problems. They plan hearing screening programs and provide counselling on hearing safety and communication performance.” (ILO: ISCO 2266)

- Evaluate hearing and speech/language disorders to determine diagnoses and courses of treatment, required assistive devices and referrals
- Administer hearing or speech/language evaluations, tests or examinations using specialized instruments and electronic equipment
- Interpret audiometric test results alongside other medical, social and behavioural diagnostic data
- Counsel and guide hearing and/or language-handicapped individuals, their families, teachers and employers (adapted from: ILO: ISCO 2266)

- Audiologist
- Language therapist
- Speech therapist,
- Speech pathologist

(cont.)

Health professions	Definitions	Common roles and tasks	Included professions
Occupational therapist	“(…) client-centred health profession concerned with promoting health and well-being through occupation. The primary goal of occupational therapy is to enable people to participate in the activities of everyday life. Occupational therapists achieve this outcome by working with people and communities to enhance their ability to engage in the occupations they want to, need to, or are expected to do, or by modifying the occupation or the environment to better support their occupational engagement (World Federation of Occupational Therapists, 2012).	<ul style="list-style-type: none"><li>• Assess patients or clients to determine the nature of the disorder, illness or problem</li><li>• Develop and implement treatment plans and evaluate and document patients’ progress</li><li>• Assess functional limitations of people resulting from illnesses and disabilities</li><li>• Assess clients’ functional potential in their home, leisure, work and school environments, and recommend environmental adaptations to maximize their performance</li></ul>	<ul style="list-style-type: none"><li>• Occupational therapists</li></ul>

Sources: Provided in the table.