

9 *Education and planning: anticipating and responding to skill gaps, changing skill needs and competencies*

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9.1 Introduction

Most European countries are faced with a chain of challenges in health care. Due to the ageing of the population and a growing number of chronically ill patients with multimorbidity, the demand for health care is higher than ever. At the same time, countries are confronted with current and forecasted health workforce shortages and maldistribution. Many countries have turned to interprofessional work and task substitution in response to these challenges (De Bont et al., 2016). Both concepts are interconnected and imply changes in the skills of health care professionals (OECD Health Division Team, 2018) as well as in the skill-mix of health care organizations (Dussault & Buchan, 2018). A key requirement for these changes to successfully take place, is that education and planning systems effectively and rapidly respond to the changing skill requirements at the workplace (Frenk et al., 2010).

Education and health workforce planning

When defining education, this chapter refers to the range of learning opportunities provided throughout a health professional career; from basic professional education to advanced education and lifelong learning opportunities within the workplace, including in-service training and continuous professional development. Health workforce planning is defined as the process concerned with ensuring that the right number of people, with the right skills, are at the right place at the right time to deliver the right services to those in need of them (Maxtrix Insight Centre for Workforce Intelligence, 2012; OECD, 2016). The main aim of planning is to achieve an optimal balance of demand and supply of health workers in both the short and long term (Kroezen, Van

Hoegaerden & Batenburg, 2018; Ono, Lafortune & Schoenstein, 2013; Scheffler et al., 2018).

The linkages between education, health workforce planning and skill-mix

As the main source of health workforce development, education can contribute to meeting demographic challenges by preparing the appropriate number of professionals to enter the health workforce. Apart from influencing the quantity of health workers, education can also address issues of quality and relevance in order to address population health needs (World Health Organization, 2013). For example, where new skills are required in practice, such as for nurses in advanced roles, educational systems are (partly) responsible for equipping health professionals with these skills.

Currently, the link between training and practice requirements is suboptimal. A recent OECD study showed that doctors and nurses report high rates of skills mismatch (Schoenstein, Ono & Lafortune, 2016). Defined as the inadequacy or over-adequacy of a worker's skills relative to the requirements of the job they are currently doing, more than three-quarters of all doctors and nurses reported over-skilling in their current job, and nearly half reported under-skilling. Especially advanced nurses (Master's degree or above) appear to face a high level of over-skilling whereby their skills exceed those required by the job. Although partly related to organizational, institutional and regulatory barriers, which prevent them from using their skills to the maximum (Schoenstein, Ono & Lafortune, 2016). This also demonstrates that the responsiveness of education systems to the changing skill requirements in health care can be improved. Various examples of this can be found across Europe. In some cases, educational systems appear to be too slow in responding to changing skill demands. For example in the Netherlands and Spain, nurses have learned the skills to prescribe medicines in practice, but actually performed this task illegally (or in legally grey areas) for a long time. This was related to the fact that the required educational basis was missing (Kroezen et al., 2013). In other cases, educational reforms were only implemented after the required legislative changes for the new role or task substitution were made, again creating a mismatch between practice and

education (Delamaire & Lafortune, 2010). Often, these challenges are complicated by the fact that some professions, particularly medical doctors, have a monopoly over some skills through regulations and legislation (Andrew, 1988).

The challenges faced by health workforce planning systems in response to skill-mix innovations are naturally linked to the challenges that confront the educational system. Just as the responsiveness of education systems to the changing skill requirements in health care can be improved, so can the responsiveness of planning systems to bottom-up developments concerning skill-mix be improved (Fraher & Brandt, 2019). This includes not only the response to new skill-mix developments from practice, but also educational reforms implemented by universities or other training institutions. One of the reasons that proactively planning skill-mix changes is challenging for many planning systems, is that workforce planning often misses essential and structural connections to other policy areas, such as general health policy and education (Kuhlmann & Larsen, 2015). If these linkages were in place, it would allow a more efficient response to future health needs of the population. Currently, however, many European countries are faced with health workforce shortages (Kroezen et al., 2015). These shortages and maldistributions only seem to grow, even if a great variety of planning models are used in European countries (Batenburg, 2015; Ono, Lafortune & Schoenstein, 2013). This urges the question of what type of education and health workforce planning is best suited to support the challenges in the health services and its change in demand.

In this chapter, we describe how and what types of education and health workforce planning models can anticipate and respond to observed skill gaps, changing skill needs and competencies, and thereby support the design and implementation of effective skill-mix interventions. We first present evidence from a systematic review that was identified through the overview of systematic reviews (see section 9.2). Next we discuss strategies, frameworks and tools in the field of (i) basic professional education of health professionals, (ii) postgraduate training and continuing professional development, and (iii) health workforce planning systems. In our concluding section (9.4), we synthesize these three fields, and propose further steps that can be taken to improve the role of education and health workforce planning in skill-mix innovation in health care.

9.2 Overview of the evidence on education, planning and skill-mix

The overview of reviews identified one systematic review on education and none on workforce planning (Table 9.1). The identified review (Reeves et al., 2013) focused on the effectiveness of interprofessional education (IPE) interventions and included 15 studies. The groups targeted were health professionals, teams and patients who were involved in an IPE intervention. It was shown that IPE interventions vary in content and length. Examples of learning methods used in the IPE interventions included interprofessional learning sessions, role plays, discussions, practical exercises, videos, homework and phone calls by the instructors. The length and intensity of the IPE interventions also varied considerably, with some interventions comprising 1-day sessions only, while other interventions had sessions that ran over a period of 18 months. Seven of the 15 studies included in the review reported positive outcomes on clinical care and collaboration, such as improved teamwork, improved development of competencies, improved information sharing and adherence to guidelines. Improved patient or quality-related outcomes were reported in six studies. Four studies reported a mixed set of outcomes and another four reported that the IPE interventions had no impact on either processes or patient-specific and other related outcomes.

9.3 Role of education and health workforce planning in the implementation of skill-mix innovations

In this section, we discuss some of the main trends related to skill-mix innovation that are visible in education and health workforce planning. We do so by successively discussing strategies, frameworks and tools that are used in the field of basic professional education of health professionals, postgraduate training and continuing professional development, and health workforce planning systems.

Skill-mix implementation by basic professional education

A significant part of the health workforce of tomorrow is in school or at university today. In view of the current levels of skills mismatch, and of the trend towards multiprofessional work and skill-mix (OECD Health Division Team, 2018), basic professional education is being adapted, and needs to be further adapted to respond to these changing skill needs

Table 9.1 *Overview of evidence on interprofessional education from included systematic review*

Intervention			Outcomes				
Description of intervention	Content of interventions and skill-mix changes	Profession(s) in intervention & comparator group	Population	Countries	Patient-related outcomes	Health-system-related outcomes	Profession-specific outcomes
Interprofessional education, including all types of educational, training, learning or teaching initiatives, involving more than one profession in joint, interactive learning	Various forms of IPE, including workshops, role plays, discussions, practical exercises, videos	Intervention: Health and social care professionals Comparator: Teams without IPE or same team as before intervention	Professionals or patients that are involved in IPE intervention	USA, UK	<ul style="list-style-type: none"> Improved patient outcomes (6/15 studies) Improved patient satisfaction (2/15 studies) 	<ul style="list-style-type: none"> IPE leads to changes in the use of guidelines or standards (3/15 studies) IPE might lead to changes in clinical process (1/15 studies) 	<ul style="list-style-type: none"> Improved teamwork, development of competencies, orientation to patient groups and information sharing (no adequate assessment possible)

Abbreviations: IPE: interprofessional education.

Country abbreviations: UK: the United Kingdom; USA: the United States of America.

Source: Reeves et al. (2013)

and competencies. Most notably, the following trends can be discerned in basic education in relation to skill-mix innovations:

- development of interprofessional education
- development of competency-based education
- academization of health professions.

Development of interprofessional education

In order to prepare future health professionals for multiprofessional and interprofessional work, to advance teamwork and to increase the understanding of roles across health care, it is important to instil students with a multiprofessional and interprofessional perspective from an early stage onwards (Rossler & Kimble, 2016). Therefore, a relatively small but steadily growing number of health care educational institutions are modernizing their curricula to include IPE collaborative experiences. This happens in university-based medicine, nursing and allied health curricula (Olson & Bialocerkowski, 2014). IPE, often used interchangeably with multiprofessional education, is defined as educational initiatives that incorporate interactive learning methods between different professionals to foster collaborative practice (Hale, 2003). It has been recognized by the World Health Organization as an innovative strategy that can play an important role in mitigating global health workforce challenges (World Health Organization, 2010). However, most of the evidence so far comes from Anglophone OECD countries.

A number of key factors have been identified as crucial for the development of interprofessional education, namely: having a shared culture, support and leadership, strategic facilitation and planning, and effective feedback and evaluation of curriculum intent (Gum et al., 2012). In terms of the design of IPE courses or modules, there seems to be a trend to extend the format of didactic lectures to include other forms of education (Rossler & Kimble, 2016). High-fidelity human patient simulations and practice-based learning experiences have been argued to be more meaningful to students, as the links between IPE and interprofessional work become more apparent (Joseph et al., 2012). Findings showed that students had more positive attitudes about interprofessional learning following simulation and practice-based learning (Joseph et al., 2012; Rossler & Kimble, 2016).

There are a number of factors that limit the potential effectiveness of IPE. One of the main barriers to IPE is the logistical difficulty of

coordinating academic calendars and student timetables (Hermann et al., 2016; O'Carroll, McSwiggan & Campbell, 2016). A possible solution for this, is to limit the contact teaching time and make more extensive use of other learning methods, such as self-directed learning and asynchronous e-learning (Holland et al., 2013). A related problem is the way in which schedules are devised. For example programmes operating under a credit hour ratio, may be limited in the number of hours that they can free up for IPE.

Also, deciding what to teach in the IPE module has proven to be a difficult task, especially as duplication of content must be avoided if students are to view the IPE experience as adding value to their education. In the development of an interdisciplinary curriculum for oncology palliative care education, for example, it was found that nursing, medicine, social work and chaplaincy had dramatically different views on the amount of content related to palliative care principles and teamwork (Hermann et al., 2016).

Finally, negative attitudes and uncertainty about the value of IPE, both among students and teaching staff, have repeatedly been reported (Hermann et al., 2016; O'Carroll, McSwiggan & Campbell, 2016). For staff, the problem is partly related to the fact that many health professionals had no exposure to IPE during their own training, and development of faculty members has been identified as a key factor supporting the success of IPE initiatives (Hall & Zierler, 2015).

A number of facilitating factors have also been identified that can positively influence views on IPE. Among others, it is advised to use vectors such as improving patient safety as the explicit IPE curriculum and teamwork as the implicit curriculum. In this way, students can be taught the importance of teamwork in ways that resonate with their professional goals. Also, it is important to develop information resource centres to support those teaching IPE (Hall & Zierler, 2015). The report by Frenk et al. (2010) also argued that adapted educational resources, such as syllabuses and didactic material, are needed to equip teachers to teach interprofessional care. Finally, it is clear that a substantial amount of resources should be devoted to facilitate coordination among the educators and curriculum developers, and that making attendance compulsory and developing flexible schedules can increase participation rates among students (World Health Organization, 2013). The main conclusion, however, is that evidence is poor overall, that the impact, if measured, is often small and that it is difficult to demonstrate the benefits of IPE, also for patients (Jackson et al., 2016).

Development of competency-based education

While a number of definitions of competency-based education exist, most explain it as an approach “in which the student demonstrates the attainment of certain learning outcomes prior to progressing in their course of study” (Gravina, 2017). The basic focus is on learning concrete skills rather than only abstract notions. Instead of courses or modules, individual skills and competencies are the single units of a training programme or education. The principles of competency-based education are that:

- students work on one competency at a time, which is a ‘component’ of a larger learning goal;
- students are evaluated on the individual competency and can only move on to other competencies after they have mastered the current skill being learned;
- students are able to skip learning modules on competencies if they demonstrate mastery by learning assessment or formative testing.

Competency-based education promotes flexibility in the time and sequence of what is to be learned, which is regulated by the needs of the learner. It is designed to allow an individualized learning process rather than the traditional one-size-fits-all curriculum (Murad et al., 2010). The uptake and diffusion of competency-based education are not only driven by the need to adapt to societal changes and changing health care needs, they also fit the existing need of health care professionals to extend their education and lifelong learning, in balance with their career and private life. For instance, competency-based education specifically enables nurses to attain their Bachelor’s degree in nursing science at their own pace. Most nurses begin their career after graduation working full-time and find returning to school difficult because of time and financial constraints (Gravina, 2017) (see also the section below on Advanced practice).

Competency-based education and skill-mix interventions

In theory, competency-based education is well-suited to contribute to skill-mix innovations. Frenk et al. (2010) have noted that the adoption of competency-based curricula and the promotion of interprofessional education can break down professional silos and enhance collaboration in the field. However, while (core) competency-based education has the potential to typically support skill-mix relevant behaviour and hence

skill-mix interventions, its implementation is confronted with obstacles. For example, in a review paper on orthopaedic trauma education in the USA, the United Kingdom and Canada, the authors illustrate this by noting that “moving towards competency-based frameworks will place emphasis on technical skills which are easy to assess and measure, while other essential abilities of a competent clinician, including professional judgement, compassion, communication and collaboration skills, may not be so easily defined and the tools to assess these skills are lacking” (Nousiainen et al., 2016). Another illustration is the example from the Netherlands, where curricula for medical specialists and nurses have become competency-based (Box 9.1).

Competency-based education and CanMEDS

Probably the best known example of competency-based learning in the medical domain is CanMEDS; a contraction of Canadian Medical Education Directives for Specialists. CanMEDS is an educational framework that “describes the abilities physicians require to effectively meet the health care needs of the people they serve” (Frank, Snell & Sherbino, 2015). The CanMEDS Framework defines professional values and competencies of medical experts in six intrinsic roles: communicator, collaborator, leader, health advocate, scholar and professional. Skill-mix-related competencies are specifically addressed in the collaborator role, such as:

- negotiate overlapping and shared responsibilities with physicians and other colleagues in the health care professions in episodic and ongoing care
- engage in respectful shared decision-making with physicians and other colleagues in the health care professions
- implement strategies to promote understanding, manage differences, and resolve conflicts in a manner that supports a collaborative culture
- determine when care should be transferred to another physician or health care professional.

While the CanMEDS approach and framework has been adopted in several high-income countries (in particular Anglophone countries and some European countries), studies of its effects on skill-mix innovation (teamwork, task-shifting and interprofessional collaboration) are

Box 9.1 Competency-based curricula in the Netherlands

Dutch health professional schools and specialist training institutes have thoroughly changed their curriculum and educational approach over the last years. The innovations in both medical specialist and nursing training clearly show that required skill-mix changes provide a more coordinating and **competency-based** role to the respective health professionals. Moreover, a number of competency areas defined in both curricula overlap.

A programme of modernization labelled *The medical specialist 2025* was initiated by the Dutch Federation of Medical Specialists (Federatie Medisch Specialisten, 2017). The programme implies individualization of training duration and a **competency-based** curriculum. This curriculum emphasizes interprofessional collaboration, patient safety, medical leadership, shared decision-making, substitution and efficiency. The programme clearly resonates with developments towards additional professional requirements such as flexibility of medical positions and roles, being open for substitution, changing hierarchies, patient orientation and team or group collaboration.

Likewise, the Dutch Nurses' Association developed its new strategic vision towards *Future-proof professions in nursing and caring* (Stuurgroep Verpleging & Verzorging 2020, 2015). Occupational profiles were redesigned and renamed. The general job title "nurse" was re-categorized into:

- Coordinating nurse (trained at higher vocational educational level)
- Basic nurse (trained at intermediate vocational educational level 4)
- Health care assistant (trained at intermediate vocational educational levels 1–3).

At the same time, a number of **competency** areas were defined for the coordinating nurse. These include support of self-management for patients/clients, their relatives and social network, initiating and developing quality systems, innovation, research and evidence-based professionalism, and coordinating the full-care processes for patients and clients into an interdisciplinary and integrated care provision. Because of the relative novelty of these curricular changes, no results can yet be reported on the implementation of the acquired competencies in practice, how they influence multiprofessional working and what wider health system outcomes have occurred.

scarce. In Canada, the effectiveness of a core-competency-based care of elderly diploma programme was evaluated by comparing it with a diploma programme based on learning objectives. The study showed that Family Medicine residents who followed the core-competency-based programme achieved significantly higher scores on the CanMEDS roles Communicator, Collaborator, Manager and Scholar (Charles et al., 2016). While other frameworks exist, such as the Accreditation Council for Graduate Medical Education framework (Educational Commission for Foreign Medical Graduates, 2019), there is great consistency between the frameworks, and their effects on skill-mix innovation are largely unknown.

Academization of health professions

A third trend that can be discerned, next to the development of interprofessional and competency-based education, is the upskilling and academization of health professions. Over recent decades, health professions in multiple countries have undergone a process of academization. For example, in Germany, a fast-paced development can be observed in terms of a growing number of graduate courses in the care sciences, with principal areas in nursing science and nursing education (Friedrichs & Schaub, 2011), although the share of nurses with a Bachelor degree is still low compared with most other countries in Europe. This evolution of advanced roles for nurses can be observed on a global scale. In many instances, the development of advanced roles occurred in parallel to other sociopolitical changes, such as the need for nursing unmet and more complex health issues, and as a response to the desire for a clinical career path for nurses, instead of only a managerial one (Lowe et al., 2012; O'Connor et al., 2018). Naturally, the academization of nurses and other health professionals has clear links to skill-mix innovations. It is a driver of new roles, leading to changes in the labour market. After all, professional groups are made up of a larger number of roles and job qualifications, which translate into different career paths (Friedrichs & Schaub, 2011). The other way around, (new) extended roles for nurses and other health professionals, such as pharmacists, are being used as a vehicle for academization (Giam, McLachlan & Krass, 2011). However, so far, it is not clear to what extent the academization of health professions contributes to the implementation of skill-mix innovations. This is partly due to

the fact that academization often occurs in conjunction with other developments, such as the introduction of new professional roles or changes in curricula, which makes it difficult to separate the effects of the academization process itself.

Skill-mix implementation by postgraduate training, continuing professional development and competency-based frameworks

Adaptations in basic education alone will not be sufficient to respond to current skill gaps, changing skill needs and competencies. After all, skills and competencies needed in a certain job tend to change during the course of careers and may be different for people in the same profession. This becomes especially important when external factors are changing – such as demographic changes and changing demands from patients, clients, organizations and systems – but also in view of internal factors – such as intrinsic motivation of health workers to foster their career and personal development. Important trends in this regard are:

- developments in postgraduate training for advanced practice
- developments in continuing professional development
- developments in competency-based frameworks.

Developments in postgraduate training for advanced practice

The concept of advanced practice is particularly applied to nursing, but it is also a feature of other health care professions (Barton & Allan, 2015). Where health professionals take up new roles and tasks and engage in advanced practice, additional (postgraduate) training is often required to ensure that they are equipped to do so. However, it has been noted for a long time that this is not always the case. For example, both new pharmacy graduates and experienced pharmacists were found not to be always adequately prepared to perform the new roles that were expected of them by new pharmaceutical care models. These required pharmacists to collaborate with other health professionals, engage in problem solving and communicate through both oral and written reports (Schommer & Cable, 1996). Providing health professionals with the necessary education and training can prevent this and ensure that they are adequately prepared to perform new tasks and assume new roles

and responsibilities. However, additional courses are not always taken by professionals. For example in the United Kingdom, 20% of nurses with an advanced respiratory care role had not undertaken accredited training, and in Australia, similar findings were reported for nurses involved in chronic disease care (Dennis et al., 2009). This occurs even if robust education programmes are in place, for example within courses such as nonmedical prescribing (Barton & Allan, 2015; Maier & Buchan, 2018).

A number of persistent barriers have been reported, not only for nurses, but also for other health professionals to engage in advanced practice education. Time constraints, scheduling difficulties, costs and geographic accessibility are among the most often mentioned (Kovner et al., 2012; Salyers, 2005). Suggested solutions to remove these barriers include web-enhanced courses (instead of classroom-based learning), as it is likely that those who return to school will (partially) need to continue to work (Kovner et al., 2012; Salyers, 2005). At the same time, employers should also be supportive in allowing health professionals to have days off and flexible scheduling in order to follow advanced practice education. A proper arrangement of postgraduate education for advanced practice has been identified as a key trigger for effective advanced practice (Maier & Buchan, 2018). However, the degree of effectiveness that can be achieved is strongly related to the regulatory arrangements that are in place in a country. As explained in more detail in Chapters 11 and 12 of this volume, there is a need to address regulation, education and legislation in a co-ordinated manner to enable the introduction of advanced practice roles (Maier & Buchan, 2018).

Developments in continuing professional development

It has been stated that lessons learned during initial basic education are often out of date within 10 years of practice. Moreover, knowledge, skills and competencies are not static. Hence, it is important that structured learning continues to take place after graduation from initial education. This learning should be based on up-to-date knowledge and developments in health service delivery, including new tasks, roles and skill-mix innovations. Hence, continuing professional development (CPD) forms one of the most important educational tools when discussing the implementation of skill-mix interventions in health care practice. CPD

refers to learning opportunities during the health professional's career (Langins & Borgermans, 2015) and includes:

- continuing medical education: generally used to designate continued professional education for physicians
- continued professional education: used to refer to continued professional education for other professionals
- setting-based in-service training: a brief learning opportunity that happens directly in the clinical setting during a health worker's work time.

In order to support skill-mix innovations, it has increasingly been argued that health professionals' education and training institutions should implement CPD and in-service training relevant to the evolving health care needs of their communities (World Health Organization, 2013). Health professionals should be provided with the necessary in-service training and development to support them in their constantly evolving roles. This positively influences the quality of care that is provided. For example, in Australia, it was found that specifically the exposure of nursing home staff to in-service training, one of the various measures of skill-mix, positively affected the quality of care (Pearson et al., 1992). In France, recent reforms have put CPD at the forefront of supporting interprofessional working and enabling skill-mix interventions (Box 9.2).

Box 9.2 Continuing professional development in health professions in France

For the past 20 years, France has followed a bumpy road of various arrangements for the CPD system intended for its 1.9 million health care professionals (Maisonneuve, 2014). In 2016, a new CPD system was put in place to respond to those challenges. Despite barriers and limits to the implementation of this new scheme and in the context of the launch of a health system reform, CPD has been identified as a potential driver for the development of new forms of collaboration and cooperation in primary care.

As in most countries, CPD in France is two-sided: it is grounded in the individual ethical duty of the health care professionals to maintain and develop their skills and competencies, but it is also thought of and used as a policy instrument to implement changes in health systems.

Box 9.2 (cont.)

In 2009, a mandatory CPD system extended to all health professions was established. However, the model of governance and regulation of CPD were not clarified until 2016, when legislation was introduced and the National Agency for CPD (*Agence Nationale du DPC*) was established, a public body that oversees the CPD system for all health professions at national level.

The new CPD system has yet to be fully rolled out and the implementation is meeting barriers of several types:

- there is still a lack of engagement and awareness among the majority of health professionals;
- at this stage, no compliance enforcement is in place;
- the professional organizations have yet to define frameworks of CPD within the specific scope of each profession or specialty that would allow the development of high-quality CPD curricula;
- there are still unsolved and heated debates on questions such as the respective roles of professional and public bodies in the governance of CPD.

Despite these difficulties, the establishment of a national governance body acting as single platform for all health professions has been an opportunity to raise awareness of the need to leverage collaboration between professions through CPD. In 2017, the *Haut Conseil du DPC* – an advisory body to the Agency that involves high-level stakeholders from the health care field, including professional councils, unions and learned societies – identified the promotion of interprofessional learning to sustain coordination of care as a strategic priority.

In 2018, the same imperative stemmed from another source: one of the key measures of the health system reform *Ma santé 2022* is the development of innovative and collaborative organizations in primary care. A clear mandate is given to the National Agency for CPD and its professional stakeholders to support this objective. A national programme on continuing interprofessional practice and education is now being devised. It includes direct commission of CPD programmes supporting skill-mix innovation in primary care. The National Agency for CPD will select and fund CPD programmes targeted at multiprofessional primary care teams or networks using team-based and interprofessional learning methodologies in order to improve coordination of care. Whether this programme will fulfil its promises and effectively support the development of skill-mix innovations is unknown, as no other comparable programme has been deployed as of this date. The effectiveness of the programme will be assessed by research teams.

Developments in competency-based frameworks for health professionals

So far, the focus on competency consolidation has mainly been limited to looking at the professional education of health professionals, that is, college- and university-based education where initial exposure to competencies takes place (Langins & Borgermans, 2015). Recently, efforts have been made to develop health workforce competency compilations that are more closely related to developments in health care practice. This is also recommended by WHO, who urges health professionals' education and training institutions to consider adapting curricula to population needs through defining the competencies that are required to meet the evolving needs of populations (World Health Organization, 2013). For example, compilations have been identified for disease-specific programmes such as sexual health in primary care (World Health Organization, 2011) and competencies for integrated behavioural health and primary care (Hoge, Pomerantz & Farley, 2014). In 2015, five clusters of health workforce competencies were developed to provide integrated care to people with multiple or complex health problems (Langins & Borgermans, 2015), namely: patient advocacy, effective communication, teamwork, people-centred care and continuous learning. In addition to the health workforce competency cluster itself, a number of tools were identified that can be helpful in establishing competency-based continuing professional development:

- engaging staff to develop and select priorities for CPD
- staff information boards that include reminders and teaching aids
- engaging professional associations to develop CPD and in-service training opportunities
- engaging patients and patient associations in CPD activities to ensure patient needs and perspectives are included
- learning plans designed between managers/clinical leaders and staff
- online quizzes and certification courses
- continuous medical education
- regular staff-led in-service training on relevant topics provided during working hours.

Skill-mix implementation by health workforce planning

Apart from the skills and competencies that the various health professionals (should) possess, a structural concern at the policy level is the

matter of health workforce planning. Health workforce planning can (and should) take account of changes in the skills and competencies of health professionals, and assess in an integrated way the impact this has on health care delivery. In this way, health workforce planning can support policies for expanding or reducing student numbers and postgraduate training posts, to achieve an optimal balance between the required and available capacity of various health workers (Fraher & Brandt, 2019; Ono, Lafortune & Schoenstein, 2013).

Types of workforce projection models

Health workforce planning can be organized in many different ways and by many different models. As the main aim is to control so-called pork-cycles (that is unwarranted cyclical fluctuations of supply and demand), workforce projections play a central role in these models. Projection models can be supply-based, demand-based or needs-based (Batenburg, 2015; Kroezen, van Hoegaerden & Batenburg, 2018; Malgieri, Michelutti & Hoegaerden, 2015; Ono, Lafortune & Schoenstein, 2013; Roberfroid, Leonard & Stordeur, 2009).

Supply-based models are mainly designed to project the inflow and outflow of professionals, and optimize their replacement by increasing or decreasing training inflow to sustain the workforce at its current level. Supply-based models do not take changing health care demands into account. Hence, supply-based models have little relationship with skill-mix innovations. Demand-based models on the other hand do take into account changing health care demands. Demand-based models therefore seem to be preferred, but their application can also lead to overestimations of the required workforce capacity and hence an oversupply in training and employment (Birch et al., 2013).

The third type of projection models, needs-based models, aim to project supply and demand in parallel, taking as many trends at both sides of the labour market into account (Murphy, Birch & Mackenzie, 2007). These models require – next to demographic data about the patient and professional population – epidemiological data as well as data on sociocultural, sectoral, organizational and policy changes that influence the required and available supply of health workers in the near future. Currently, therefore, needs-based models seem most fit to take skill-mix innovations into account.

Obviously, needs-based models are more complex, require more data, higher data quality, as well as more assumptions to quantify the impact of sociocultural, sectoral, organizational and policy development (Ono, Lafortune & Schoenstein, 2013). One factor that draws a lot of attention in this regard is technology and its influence on the number of required health workers. Often, technological progress is included in projection models under the factor productivity growth (Ono, Lafortune & Schoenstein, 2013), assuming that technology will reduce the demand for health workers. However, it should be noted that the capacity effect of productivity growth (including technology) is actually an arbitrary assumption reflecting high uncertainty, as many other factors may be driving productivity growth in health care services as well (Cruz-Gomes et al., 2018).

The professional scope of health workforce policies and projection models

In relation to skills and competencies, health workforce policies and models differ in their professional scope. Traditionally, health workforce planning models are developed independently for each professional group, without taking into account possible (future) interactions between different health professionals (Fraher & Brandt, 2019; Kroezen, van Hoegaerden & Batenburg, 2018; Ono, Lafortune & Schoenstein, 2013). Moreover, most countries focus their planning models on doctors only and do not plan for other health professions (Maxtrix Insight Centre for Workforce Intelligence, 2012; Ono, Lafortune & Schoenstein, 2013). This focus can be understood from the so-called lead time to train health professionals, with doctors having the longest training time. Another important reason is that many countries are lacking the required information systems and data on the number of active health care workers, at least for those other than doctors, and their distribution in the health system (Kroezen, van Hoegaerden & Batenburg, 2018). Moreover, in some countries, not all health professionals are regulated. For example in England and Finland, advanced practice nurses are not specifically regulated – although nurse prescribers are – (Maier et al., 2018) and in Ireland, Malta and the United Kingdom, health care assistants are not regulated (Kroezen et al., 2018). Hence, where registration or regulation data are to be used as source of planning data, routine data are not available or not complete (Maier et al., 2018).

The advantage of planning professions in silo is that for each occupation, the training inflow is optimally forecasted and the profession-specific conditions are taken into account. The disadvantage, however, is that interprofessional collaboration, education and task shifting can only be partially captured in planning. Moreover, where only physicians are being planned, skill-mix innovations can hardly be taken sufficiently into account in health workforce policies and models. For example, if the skill-mix innovation is for nurse practitioners to take up additional medical tasks, planning should be aimed at having a sufficient capacity of nurse practitioners in the pipeline to perform the increasing number of tasks that is required of them (Maier et al., 2018). This requires data and a planning model on nurse practitioners. This also applies the other way around; planning systems should also ensure that fewer of the professionals who see their role decreasing as a result of skill-mix innovations are being trained, to prevent an oversupply. So far, this is not the case.

From silo to multiprofessional health workforce planning

In a context of changing patient needs and increased interprofessional work and task substitution, the current silo approach to health workforce planning hampers the possibility of analysing health workforce requirements in a more integrated way, taking into account possible new roles and responsibilities of different providers (Fraher & Brandt, 2019). In an overview of 26 health workforce planning models in 18 OECD countries, only five countries were found to have multiprofessional workforce projection models in place: the Netherlands, Norway, Switzerland, Japan and the USA (Maier et al., 2018; Ono, Lafortune & Schoenstein, 2013). The level of integration in these models varies. Models with an intermediate level of integration look at the demand for different providers by taking into account some possible task sharing and substitutions between different providers, such as the models in the Netherlands and Switzerland. Models with a higher level of integration require that the current and possible future demand and supply of different providers are taken more fully into account, based on alternative scenarios on the demand side and on the supply side. The overview by the OECD did not identify any model that already reached such a high level of integration, but mentioned that one of the models from the USA moved in that direction (Ono, Lafortune & Schoenstein, 2013).

There are hardly any studies that describe the integration of skill-mix changes into health workforce planning, or integrated health workforce planning. A recent study, one of the few on this topic, found that out of eight participating countries that have introduced the new professional roles of nurse practitioners and physician assistants, only three included these professions partially or fully in their health workforce projections. Canada, the Netherlands and the USA did so, with Canada testing new projection methods while the Netherlands and the USA fully integrated nurse practitioners and physician assistants in their planning system. Results from these two last countries showed that this can result in considerable differences in the projected numbers of GPs or medical specialists required in the future. Hence, this suggests that physician-only models are likely to overestimate the number of required physicians (Maier et al., 2018).

9.4 Conclusions

In this chapter, we described how education and health workforce planning models are responding to meet the changing skill demands, competencies and identified skill gaps in the health workforce, and thereby support the design and implementation of effective skill-mix interventions. We did so by discussing strategies, frameworks and tools that can be found in the fields of (i) basic professional education of health professionals, (ii) postgraduate training and continuing professional development, and (iii) health workforce planning systems. Naturally, all of these fields are strongly interconnected.

Basic professional education

Interprofessional education and competency-based education are being introduced in a relatively small but steadily growing number of health care educational institutions, mostly in Anglophone countries and some European countries. The aim of these forms of education is to train new generations that are oriented towards multiprofessional education in open, adaptive and collaborative cultures. However, studies on the effect of these new types of education on skill-mix innovations are scarce, as was also shown by the results from the overview of reviews. Another trend visible in basic education is the academization process taking place in several professions, most notably nursing. As of now, however,

empirical studies are still lacking to show how and to what extent the academization of health professions contributes to the implementation of skill-mix innovations.

Postgraduate training, continuing professional development and competency-based frameworks

Additional (postgraduate) training is often required for health professionals to take up new roles and tasks. However, this training is not always followed or completed. Identified barriers include time constraints, scheduling difficulties, costs and geographic accessibility. The introduction of web-enhanced courses (instead of classroom-based learning) may be a solution to overcome some of these barriers, as are supportive attitudes by employers, by allowing health professionals days off and flexible scheduling. As knowledge, skills and competencies are not static, CPD and in-service training (with relevance to the evolving health care needs of communities) were identified as other educational tools with high relevance to skill-mix innovations. An example of this can be found in France, where CPD has been at the forefront of supporting interprofessional working and enabling skill-mix interventions. A final trend that could be discerned is the introduction of competency frameworks for the HWF, which can be more closely related to developments in health care practice and hence can bridge the skills gap between education and practice.

Health workforce planning

The way in which health workforce policies and planning systems are organized, reflects the way in which (and extent to which) changes in the skills and competencies of health professionals (as well as their impact on health care delivery) can be taken into account. Differences can be found in the type of projection model in place and in the professional scope of these models. Supply-based projection models do not take changing health care demands into account and have the least connection to skill-mix innovations. Needs-based models on the other hand include both supply and demand trends, and are therefore most fit to take skill-mix innovations into account. In the majority of countries, health workforce planning models are developed independently for each professional group, without taking into account possible (future)

interactions between different health professionals. Most countries focus their planning models on doctors only and do not plan for other health professions, which are often important actors in skill-mix innovations. An important barrier in this regard is the lack of available data, complicated by the fact that not all professions are regulated in all countries. As a result, in most planning models, interprofessional collaboration, education and task shifting can only be partially captured. Multiprofessional health workforce planning is attempted in a small number of countries, but so far the level of integration is limited and there are hardly any studies on the effectiveness in terms of skill-mix innovation.

Identified trends, effects and the future

This chapter shows that to effectively implement skill-mix interventions in health care practice, basic and postgraduate education and health workforce planning systems are essential and closely interlinked vehicles. A number of trends were identified in these areas. Some of the trends take place on a larger scale, such as the academization of nursing, whereas most others are relatively smaller and younger, such as the introduction of interprofessional learning. For all trends, it can be concluded that evidence about the effectiveness from the point of view of skill-mix innovations is still lacking. This is partly due to a lack of studies on this subject (see also the limited results that came out of the overview of reviews on education and health workforce planning), but also to the difficulty in demonstrating a causal effect. After all, there are many confounding factors that influence the relationship between educational systems, health workforce planning systems and skill-mix innovations.

As many countries are re-organizing the way health services are provided by new professional roles, task substitution and increased interprofessional working, it is safe to say that educational institutions in many countries will have to strengthen health professionals' competencies. This can be done by revising and updating curricula on a regular basis, and increasing the competencies of existing staff (World Health Organization, 2013). Moreover, in view of the skill-mix changes taking place in health care practice, health workforce planning systems should incorporate these changes and adapt their projections based on current and future skill-mix changes in the health workforce. To achieve the full

potential of skill-mix interventions as well as education innovations, planning systems should therefore include more professions in their models and broaden the silo planning approach. However, changes in educational and planning systems will not deliver quick wins. There can be a significant time lag before the innovations in basic professional education show effect, which also applies for health workforce planning, in particular when it is institutionalized in health systems.

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