Chapter 3
Education and training for doctors and nurses: What's happening with *numerus clausus* policies?

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One of the most powerful policy levers governments can use to adjust the supply of doctors and nurses to projected demand is the so-called numerus clausus*, that is, the regulation of the number of students entering medical and nursing education programmes. This chapter describes the evolution of* numerus clausus *policies in OECD countries over the past 15 years and key challenges in achieving an adequate number and mix of different categories of health workers. Since 2000, most OECD countries have increased substantially the number of students admitted to medical and nursing education, in response to concerns about current or future staff shortages. This has often been accompanied by deliberate policies to increase more rapidly post-graduate training places in general medicine vis-à-vis other specialties to strengthen the primary care workforce. A number of OECD countries have also introduced or expanded training programmes for advanced practice nurses such as nurse practitioners also to increase access to primary care by relying more on non-physicians. Following a strong and steady expansion in training capacity, some countries now worry about a possible over-supply of graduates entering the labour market. How might governments use more wisely these* numerus clausus *policies and the large amount of public resources spent in training future health workers? This chapter stresses that the health workforce planning models that are guiding these policy decisions need to better factor changes in population health needs and in the scope of practice of different health care providers that might impact on their future demand. These models also need to take into account the growing international mobility of students and health workers, which makes it more complicated to determine the "right number" to train at a national level.*

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3.1. Introduction

Ensuring an adequate balance in the number and mix of health workers is essential for the proper functioning of health systems. An undersupply of physicians, for instance, can hamper access to health services for certain parts of the population, whereas an oversupply can lead to a loss of human capital and increase government cost pressures through supply-induced demand.

One key policy lever governments use to influence the supply of health workers is the regulation of admissions into education and training programmes, so-called *numerus clausus* (i.e. closed number) policies. Most OECD countries have used such policies for a few decades now, to regulate entry into health professionals' education programmes and post-graduate training in different specialties for doctors. This policy is usually implemented either by explicitly regulating the number of students admitted each year (i.e. quotas) and/or by limiting the public budget subsidising education and training places. Although this is clearly a powerful tool to adjust the supply of health workers, the effect of these policies are not felt immediately, as it takes a number of years to train new doctors, nurses and other health workers.

Ever since *numerus clausus* policies were introduced, both their legitimacy and management have been questioned. In several countries, *numerus clausus* policies have often been characterised by upward and downward phases, as a response to changing concerns about future shortages or surpluses of health care providers. This has sometime been called the "yo-yo" approach to fixing the *numerus clausus*. Determining the right number of student admissions has proven to be a challenge, given the wide range and uncertainty of factors affecting both the future demand and supply of health workers. In some countries, the discussions have focussed on improving the decision-making process by strengthening the information base and projection models supporting decisions around *numerus clausus* policies (Ono et al., 2013). One country at least, Australia, has recently taken the bold initiative of abandoning *numerus clausus* policies for most health-related university studies, with the exception of medical education, in an effort to open up entry into university education (see Box 3.2).

This chapter first describes the initial aim, rationale and historical evolution of *numerus clausus* policies in OECD countries, focussing on medical and nursing education given the preeminent role that doctors and nurses have traditionally played in OECD countries. Second, it reviews changes in *numerus clausus* policies in medical and nursing education since 2000 across a large number of OECD countries, considering whether there have been any changes in directions following the economic crisis in 2008. Third, it analyses trends in *numerus clausus* policies for medical post-graduate training programmes, contrasting admissions in general medicine with other medical specialties. Finally, it reviews the development of education and training programmes for nurses in advanced roles such as nurse practitioners (NPs), as an example of a "mid-level" professional role that might help reduce the need to train a greater number of doctors.

This chapter concludes that there is a need for a regular re-assessment of *numerus clausus* policies, taking into account changing economic circumstances and new innovations that may affect the future demand and supply of health workers. These regular re-assessments need to be based on robust health workforce planning models and data, which are broader in scope than the silo approach used so far. Greater considerations need to be given to the interactions among different health care providers and changing scopes of practice, as well as the growing internationalisation in health labour markets.

3.2. The evolution of *numerus clausus* policies in OECD countries, new challenges and need for regular adjustments

Since the 1970s, most OECD countries have regulated the number of students admitted in medical schools through *numerus clausus* policies. A number of reasons have steered most OECD countries to adopt these policies including: 1) recognition of the limited capacity in hospitals and other health care settings to provide practical training to new doctors, combined with an interest in selecting students deemed to be the most able to pursue long and complex medical studies; 2) interest in limiting the amount of public spending in medical education (given that these studies are costly and heavily subsidised in all countries); and 3) need to control the number of doctors entering the profession to avoid an oversupply of doctors and an increase in supply-induced demand. In addition, the length of medical studies itself (which can last around ten years to complete specialty training), justified planning and control over student intakes to avoid shortages or surpluses in the medium to longer term. While *numerus clausus* policies generally started in medical education, several countries extended their use to other education fields, including dentistry, pharmacy, midwifery and nursing.

Numerus clausus are usually implemented by fixing explicit quotas on admissions to medical and nursing education and post-graduate training programmes. Some countries such as Chile, Italy and the United States do not explicitly impose such quotas, but budgetary constraints at the national or sub-national level limit *de facto* the number of students admitted. Two countries – the Czech Republic and the Slovak Republic – report that they do not have a *numerus clausus* for medical education. However, the available data on admission or graduation rates suggest that the limited capacity in universities in these countries also impose constraints on the number of students admitted each year.

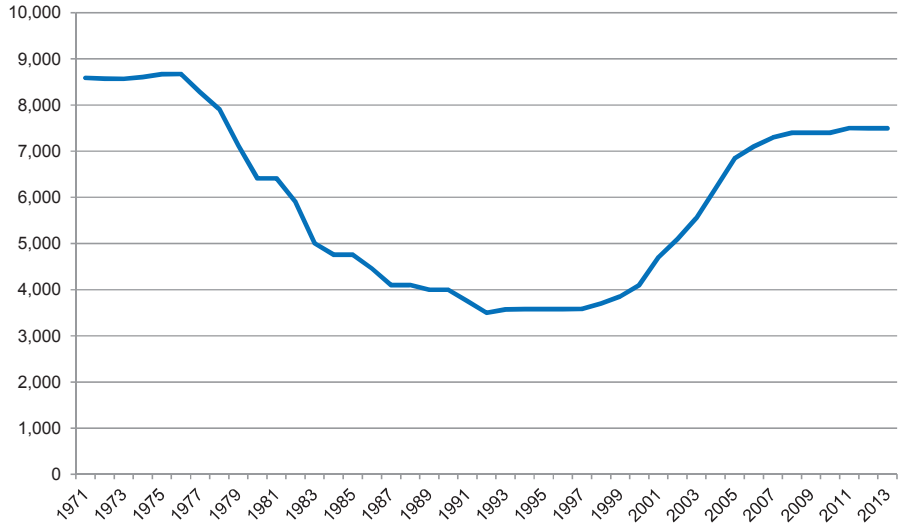
In France, *numerus clausus* policies for medical education were established in 1971, with explicit quotas taking effect in 1972. The explicit purpose of this measure was to match the number of medical students to hospitals' limited capacity to offer training places. Another less explicit reason was to curb the existing number of doctors and avoid adding undue pressures on expenditures in a system based on fee-for-services. Since 2009, *numerus clausus* policies in France also aim at addressing imbalances in the geographic distribution of doctors by using regional quotas, with limited success (ONDPS, 2015). As in several other countries, the setting of the *numerus clausus* in France has been characterised by large upward or downward fluctuation in admissions over time, reflecting changing concerns about either shortages or surpluses of doctors (see Box 3.1).[2]

In the Netherlands, *numerus clausus* in medical studies were initially introduced in 1976 to select only top students in a context where the number of applicants started to greatly exceed training capacities. Today, these quotas further aim at containing public costs related to the education and training programmes and restricting potential supply-induced demand (Ketel et al., 2012). The Ministry of Education, Culture and Science decides annually how many students will access medical education and various medical specialisations. Since 2000, this decision is based on recommendations from the Advisory Committee on Medical Manpower Planning (ACMMP), which has been tasked to regularly re-assess the projected demand and supply of doctors and other health professions (ACMMP, 2013).

Box 3.1. Changes in the *numerus clausus* for medical education in France

Following the decision to introduce a *numerus clausus* in France in 1971, the number of students admitted in medical education programmes started to decrease sharply a few years afterwards. It came down from nearly 9 000 students admitted per year in the mid-1970s to 3 500 in the 1990s, in response to concerns about a possible oversupply of doctors and the pressures that would put on health expenditures. From the end of the 1990s up to 2011, the numbers went back up to 8 000 students given growing concerns about foreseen shortages of doctors. Since then, between 2012 and 2014, the number of new students has been stable. Further decisions on *numerus clausus* are pending on new projections over future demand and supply of doctors. These new projections are expected to take into account several recent developments that will affect the future supply of doctors, including changing retirement patterns and growing numbers of foreign-trained physicians migrating to France.

Evolution of the *numerus clausus* for medical education in France, 1971-2013



Source: ONDPS (2015), *Rapport 2013-2014: La régulation démographique des professionnels de santé par les flux d'étudiants, la situation démographique des chirurgiens-dentistes, bilan de la filiarisation*, Paris.

In Germany, the total number of places in medical education programmes available each year is decided at the state (*Länder*) level. From the total number of places available, 20% are allocated to high-school top performers, 20% for qualified applicants who have been on a waiting list for a certain period of time, and the remaining 60% are subject to admission criteria as defined by the universities (Miani et al., 2015). On average, the number of applicants tends to exceed by four times the number of places available (Chenot, 2009).

The majority of OECD countries also regulate student admissions in nursing education. However, its rationale is not as strong as for medical education, given that the duration and cost of training is lower for nursing, and there is less concern related to supply-induced demand.

Following a reform designed to open up entry into higher education, Australia recently abandoned its *numerus clausus* policies for most university education programmes, except for medical education. In 2008, the *Bradley Review of Higher Education* called for a shift from a supply-driven university admission system to a demand-driven one, allowing a greater number of young Australians to obtain a

university degree (Bradley et al., 2008). Following the recommendations from this review, universities were given the freedom to determine how many students could be admitted in various fields. The Commonwealth Government assured funding would be available for every domestic student admitted to a public university. The only notable exception to this was the field of medicine, which continued to be regulated. A number of reasons led to the exclusion of medical education from this new demand-driven system in Australia, including the high cost of medical education and specialisation, and concerns that an oversupply of doctors would generate higher demand for health services and increase unnecessarily public costs for health care and prescription drugs. The recommendations from the Bradley review were also made following a rapid growth in the number of medical students, raising concerns over shortages of training places against the rising number of medical graduates (Kemp and Norton, 2014; see Box 3.2).

Box 3.2. Australia abandons *numerus clausus* policies for most university education programmes, except medicine

The following are excerpts from a 2014 report by Kemp and Norton. It summarises the rationale for keeping the *numerus clausus* policy for medical education in Australia, while entry into other university programmes was liberalised:

"In recommending the demand driven system, the Bradley report stated that the government could exclude a course if it wanted to control student or graduate numbers. Medicine is the only course specifically mentioned into the higher education funding legislation as outside the demand driven system. However, the legislation gives the minister power to exclude other courses (…) but no field of education other than medicine has so far been excluded from the demand driven system.

(…) The decision to exclude medicine was taken in consultation with the Health portfolio. Through the old system of allocated places there had already been rapid growth in medical student numbers in the years leading up to the demand driven system being announced. Following the establishment of several new medical schools the number of commencing medical students doubled between 2002 and 2009 to around 3 000.

Several reasons were given for capping medical student places. As in other health courses, rapid increases in student numbers had created a shortage of clinical training places for medical students. Medical training is very expensive, with Commonwealth contributions alone for a six year medical degree exceeding AUD 120 000. A further factor was a long-standing concern that too many doctors would result in additional unnecessary costs through Medicare and the Pharmaceutical Benefits Scheme." (Kemp and Norton, 2014).

In countries where *numerus clausus* policies exist, decisions on the number of students admitted each year are usually guided by projections about the future demand and supply of different categories of health workers. One complicating factor in making decisions on *numerus clausus* is the growing internationalisation of both university education and health labour markets, which are difficult to measure properly and forecast in health workforce planning models. This issue is particularly relevant in the European Union, where medical and nursing graduates who have obtained their degree in one country can easily get their degree recognised in another country, thereby reducing barriers to the mobility of students and workers.[3]

The growing number of doctors and nurses willing and able to move to other countries to seize better job opportunities raises important challenges for health workforce planning. This is the case not only for sending countries losing a sizable number of skilled workers they have trained, but also for destination countries, which could have trained fewer health workers to address any given demand. If destination countries do not consider inflows of foreign-trained doctors and nurses in determining their *numerus clausus*, this may lead to an over-supply of medical graduates. However,

there is also a risk that countries which are net receivers of foreign-trained doctors or nurses may become complacent with this arrangement, and start free riding on the training efforts of other countries. Therefore, when deciding on *numerus clausus*, policy makers are confronted with a difficult balance between not overly relying on the training efforts of other countries to fulfil their own domestic needs, while recognising that both students and health workers will most likely be increasingly mobile in the future.

The Netherlands provides an interesting example of how the *numerus clausus* for medical education may need to be adjusted to reflect changes in the underlying data and assumptions around the mobility of doctors. In 2011, the quotas on admissions were increased following the expectation there would be fewer foreign-trained doctors coming into the Netherlands. Projections were suggesting that there would be substantial shortages of doctors across EU countries in the coming years. Three years later, the recommended quota was reduced as it was realised there had not been any reduction in the inflows of foreign-trained doctors. This example illustrates the growing complexity and uncertainty in setting a *numerus clausus* at a national level in a context where there are fewer barriers to the mobility of workers. It also highlights the need to regularly update these health workforce projections and to adapt *numerus clausus* decisions accordingly, as done in the Netherlands.

3.3. Trends in admissions in medical and nursing education

This section describes recent trends in admissions in medical and nursing education programmes in OECD countries. It starts by reviewing the general results from the *2012-13 OECD Health System Characteristics Survey*, which asked officials from Health Ministries to indicate whether there had been any changes in student intakes in medical and nursing education over the past five years (i.e., from 2007 to 2012). Table 3.1 summarises the responses to this question (further complemented by additional data sources, where needed).

Out of 31 OECD countries for which information is available, 21 increased the number of students admitted in medical education programmes between 2007 and 2012. For the remaining ten, the number remained relatively stable. With regards to nursing education, a vast majority of countries (21 out of 32) have also increased the number of students admitted between 2007 and 2012, while nine countries have maintained the number more or less constant during that same period. Only Portugal and the Slovak Republic have reduced the number of students admitted in nursing programmes. While the United Kingdom reported that the number of students admitted in nursing had been fairly constant in the United Kingdom as a whole, the number decreased in England.

Most countries reported to have increased student admissions for both medical and nursing programmes from 2007 and 2012, but there are some exceptions. In Italy and Poland, the intake of medical students increased, whereas the intake of nursing students remained constant. In Finland, Korea and Mexico, the opposite was reported, with an increase in nursing education intake, whereas admissions to medical education remained more or less stable.

The following sub-sections analyse in more detail trends in admissions in medical and nursing education over a longer time period for a subset of OECD countries. Annex 3.A2 provides additional data on the number of graduates from medical and nursing education programmes since 2005, for nearly all OECD countries, based on responses to the annual OECD/Eurostat/WHO-Europe Joint Questionnaire.

Table 3.1. Changes to medical and nursing education intake, OECD countries, 2007 to 2012

	Medical education intake	Nursing education intake
Australia	Increase	Increase
Austria	Constant	[No reply]
Belgium	Increase	Increase
Canada	Increase	Increase
Chile	Increase	Increase
Czech Republic	Constant	Constant
Denmark	Increase	Increase
Estonia	[No reply]	Increase
Finland	Constant	Increase
France	Constant	Constant
Germany	Increase	Increase
Greece	Constant	Constant
Hungary	Constant	Constant
Iceland	Constant	Constant
Ireland	Increase	Increase
Israel	Increase	Increase
Italy	Increase	Constant
Japan	Increase	Increase
Korea	Constant	Increase
Luxembourg	Non applicable (no medical schools)	Constant
Mexico	Constant	Increase
Netherlands	Increase*	Increase
New Zealand	Increase	Increase
Norway	Increase	Increase
Poland	Increase	Constant (with year-to-year fluctuations)
Portugal	Increase	Decrease
Slovak Republic	Increase	Decrease
Slovenia	Increase	Increase
Spain	Increase	Increase
Sweden	Increase	Increase
Switzerland	Increase	Increase
Turkey	[No reply]	[No reply]
United Kingdom	Constant	Constant (with variations in different parts)
United States	Increase	Increase

* In the Netherlands, student intakes in medical education increased in 2011 and 2012 following recommendations from the 2010 report from the ACMMP, based on the assumption that the number of foreign-trained doctors coming in the Netherlands would decrease. However, this reduction did not occur, so the follow-up report in 2013 recommended a reduction of the admission numbers back to its 2010 level.

Source: OECD Health System Characteristics Survey 2012, complemented with other national sources (see Annex 3.A3).

Trends in medical education admissions since 2000

Figure 3.1 shows trends in medical education admission numbers since 2000 in 18 OECD countries. In most of these countries, the number of students admitted in medical education has increased markedly since 2000 (though at different paces). In Finland, France, the Netherlands and the United Kingdom, most of the increase occurred in the early 2000s with the number stabilising afterwards, whereas in Australia, Canada, New Zealand, Portugal and Sweden the increase continued steadily throughout the period.

Figure 3.1. Student intake in medical education, selected OECD countries, 2000-13 (or nearest years)

Index (Baseline year = 100)

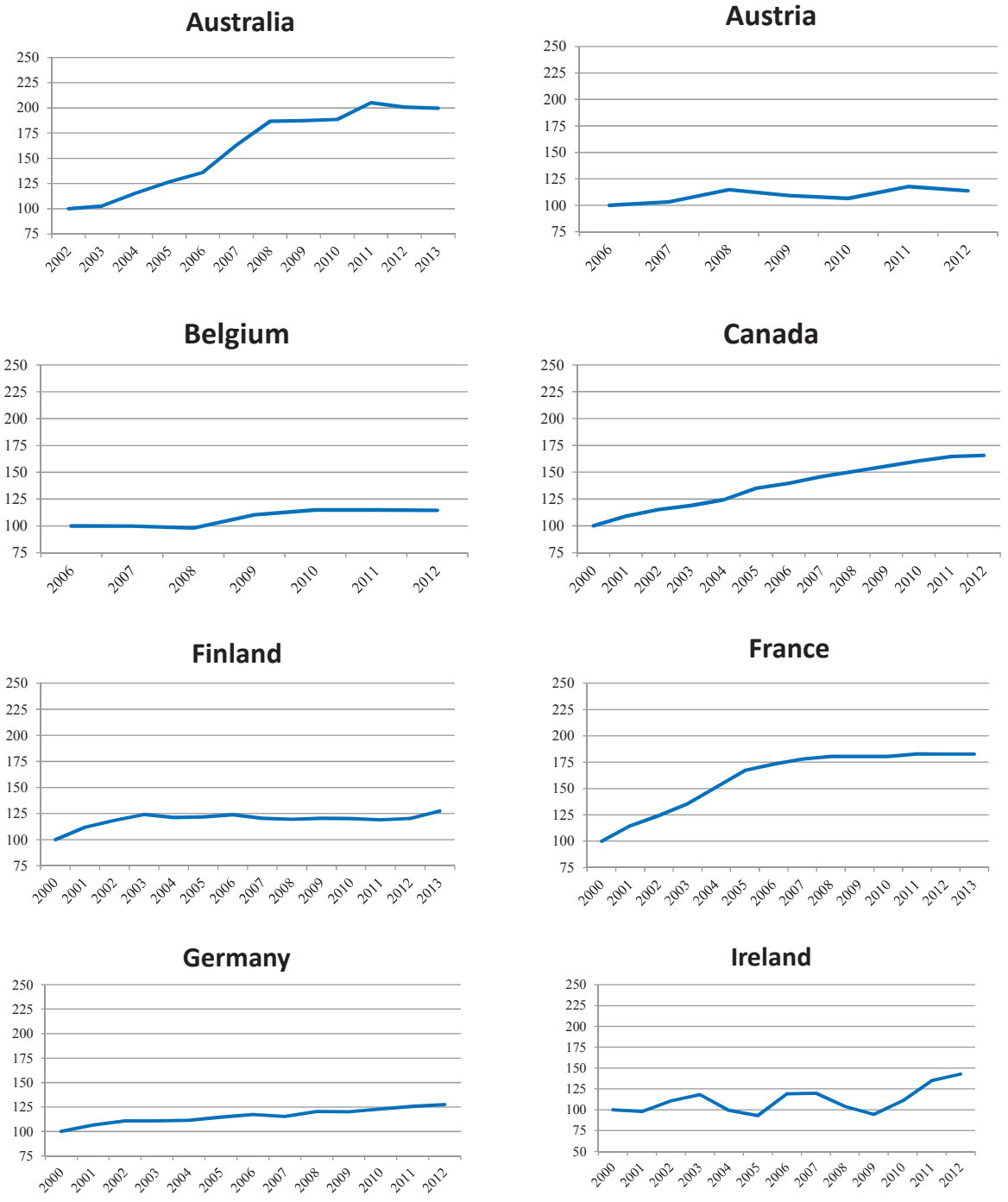


Figure 3.1. Student intake in medical education, selected OECD countries, 2000-13 (or nearest years) *(cont.)*

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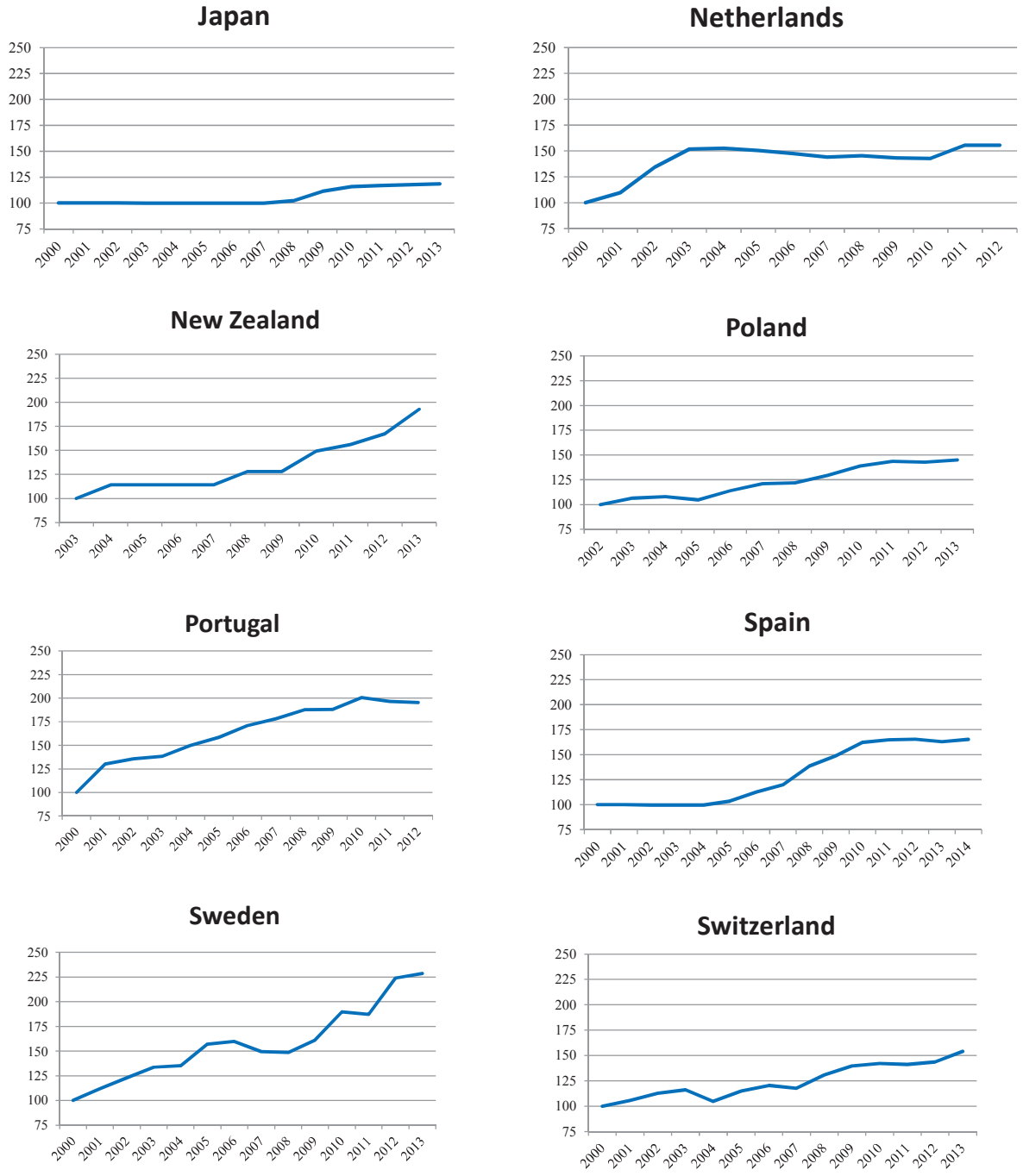

Figure 3.1. Student intake in medical education, selected OECD countries, 2000-13 (or nearest years) *(cont.)*

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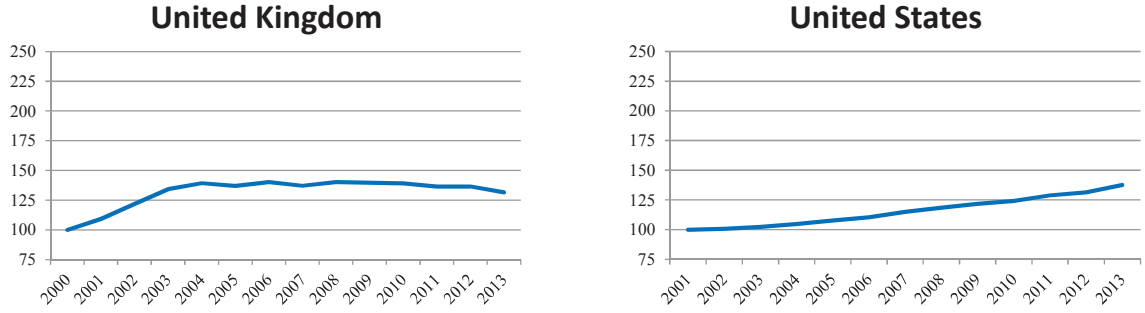

Note: For both Japan and France, the annual quotas (*numerus clausus*) set by governments are used as a proxy for actual student intakes. However, in France, there has been a gradual increase in the number of additional places for medical students beyond what is set in the main *numerus clausus*, with the number of such additional places rising from 42 places in 2001 (representing 0.9% of the main *numerus clausus*) to 536 in 2013 (representing 7.2% of the main *numerus clausus*) (ONDPS, 2015).

Source: Please refer to Annex 3.A3, Table 3.A3.1.

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In Australia, admissions to medical education doubled between 2002 and 2013, with most of the growth occurring between 2002 and 2008. This large expansion was made possible by an increase in the number of medical programmes offered (seven new medical programmes have received accreditation since 2000) and fuelled by a rise in the number of both domestic and international students (see Box 3.3). The increase in the number of international medical students was prompted by a government decision to support their stay in Australia upon graduation and allow their medical registration (Joyce et al., 2007; Health Workforce Australia, 2012). However, this strong rise in both domestic and international students has created pressures on the availability of post-graduate training places. Most, but not all, international and domestic graduates have been able to find post-graduate training places (Hawthorne, 2012).

Box 3.3. The growing internationalisation of medical and nursing education

The internationalisation of medical and nursing education is a growing phenomenon in OECD countries. Growing numbers of students are pursuing medical education in a foreign country, often because they were not admitted in their country of origin. This demand from students is supported by a growing number of medical schools which are interested in offering places to foreign students.

In Australia, for instance, the number of international students enrolled in medical and nursing schools has increased strongly since 2002 (see table below), with many universities viewing international students as a way to maintain or expand their capacity and bring in more revenues by paying full tuition fees (Hawthorne, 2012).

International Student Enrolments in Medicine and Nursing, Australia, 2002 to 2013

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Medicine	367	378	421	460	426	436	499	487	529	529	651	636
Nursing	397	604	902	1 285	1 708	2 346	2 487	2 710	2 799	2 558	2 384	2 579

Source: Medical Deans (2014) and Higher Education Statistics (2014).

In Canada, there has also been a strong growth in the number of students admitted in medical schools, with the number increasing by two-thirds between 2000 and 2012. Each province determines how many students will be admitted in their medical schools, based on their projections of physician requirements and their education and financial capacity.

The United States has also experienced a substantial increase in the number of students admitted in medical schools, albeit at a slower rate than in Australia and Canada. Between 2001 and 2013, student intakes grew by over 33% with most of the rise occurring after 2005. In 2006, following projections that there would be a growing shortage of doctors, the Association of American Medical Colleges (AAMC) proposed a 30% increase in student enrolment over the following decade (AAMC, 2006). Two main factors have supported the increase in student intakes in the United States: 1) after two decades of stagnation, the number of medical schools increased from 124 in 2005 to 145 in 2013;[4] and 2) existing medical schools have expanded the number of students by more than 10% on average from 2002 to 2012 (AAMC, 2012). The number of Americans studying medicine abroad has also increased, notably in Caribbean countries, but generally with the intention of coming back to the United States to complete their post-graduate training. However, the number of residency posts is not keeping pace with the growing number of domestic or foreign-trained graduates wishing to complete their medical training, which is leading to a bottleneck (Iglehart, 2013). Unless the number of residency posts increases substantially in the coming years, it will become increasingly difficult for medical graduates from a foreign university to find a residency and ultimately practice in the United States.

In the Netherlands, student intake in medical education increased by 50% between 2000 and 2003. From 2003 to 2010, the number remained relatively stable or even declined slightly, until it went up again in 2011 and 2012. This last rise has been driven by concerns over an expected decrease in the number of foreign-trained doctors coming into the Netherlands following expected shortages of doctors in Europe (ACMMP, 2010). However, as previously noted, these concerns did not materialise. Hence, the 2013 ACMMP report recommended reducing the admission numbers back to their 2010 level (ACMMP, 2013).

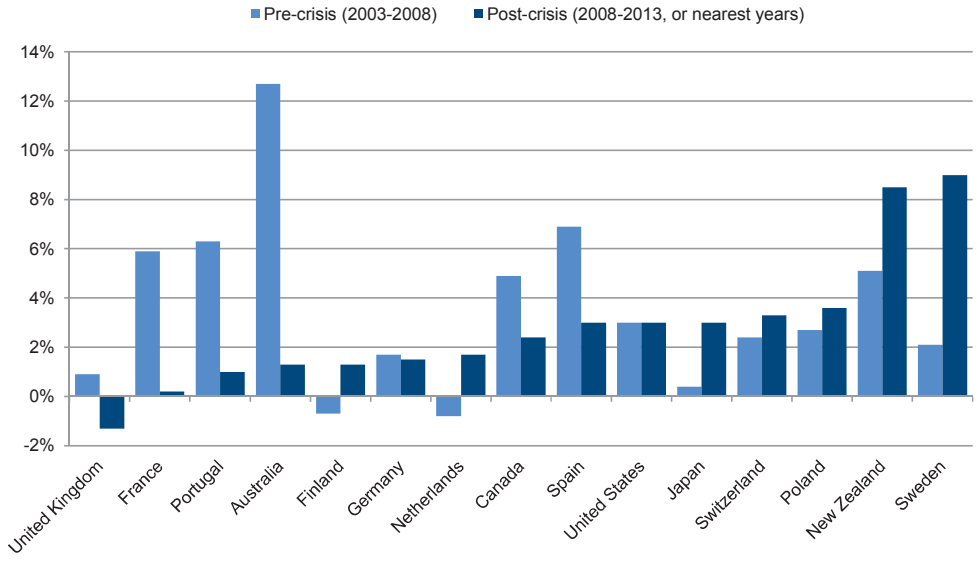
In the United Kingdom, admissions in medical education increased rapidly between 2000 and 2004, stabilising after that. In 2013, the number of students admitted in medical schools decreased slightly for the first time. This followed a recommendation from the Health and Education National Strategic Exchange to reduce by 2% medical school intakes in 2013 based on a projected oversupply of doctors (Department of Health, 2012).

In France, there has been a large increase in the *numerus clausus* since 2000, with most of the growth occurring between 2000 and 2006. The annual quotas for entry in medical education increased from 4 100 in 2000 to 7 100 in 2006. As noted in Box 3.1, this sharp increase started in the late 1990s following a period when *numerus clausus* was reduced (from over 8 000 students per year up to the mid-1970s to less than 4 000 per year throughout the 1990s). In recent years, the *numerus clausus* in France has remained unchanged, given the lack of robust and up-to-date projections regarding the future supply and demand for doctors. The most recent projections are based on 2007 data as the baseline year, and the hypotheses underlying the main scenario have proven to under-estimate the number of incoming foreign-trained doctors and the retention rate of doctors beyond the "standard" retirement age, leading to an underestimation of the supply of doctors in 2015 (ONDPS, 2015).

In Portugal, admissions to medical education doubled between 2000 and 2010 (rising from approximately 800 in 2000 to 1 600 in 2010). As in other countries, this followed concerns over future physician shortages. However, a recent projection exercise indicated that there may be an oversupply of around 4 000 to 9 000 medical specialists in Portugal by 2025 under some assumptions, including a retirement age of 70 (Santana et al., 2014).

Figure 3.2 examines the impact of the recent economic crisis on *numerus clausus* policies for medical education in OECD countries. Overall, the economic crisis does not seem to have had any major influence on *numerus clausus* policies, with countries continuing to focus on the medium- to longer-term outlook rather than reacting to the short-term cyclical downturn. In Portugal, Australia, Germany, Canada and Spain, after strong growth prior to 2008, admission growth rates slowed down. In Japan, Switzerland, Poland, New Zealand and Sweden, the intake of medical students grew more rapidly after 2008, reflecting policy decisions to increase the supply of domestically-trained doctors in addressing projected shortages. In the United Kingdom, as noted above, most of the growth in medical student admissions occurred between 2000 and 2004, and there was a small reduction in 2013.

Figure 3.2. Average annual growth rates in admissions to medical education, selected OECD countries, pre- and post-crisis



Note: Countries are ranked from the lowest to the highest average annual growth rate in admissions, post-crisis.

Source: Please refer to Annex 3.A3, Table 3.A3.1.

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Trends in nursing education admissions since 2000

In the ten OECD countries for which data have been collected, student admissions in nursing education have also expanded substantially since 2000, with the exception of Portugal and the United Kingdom (England) where the numbers have come down since the mid-2000s (Figure 3.3). In Australia and the United States, admissions growth has been fairly steady throughout the period, reflecting concerns about current or future shortages of nurses.

Figure 3.3. Student intake in nursing education, selected OECD countries, 2000-13 (or nearest years)

(Index: Baseline year = 100)

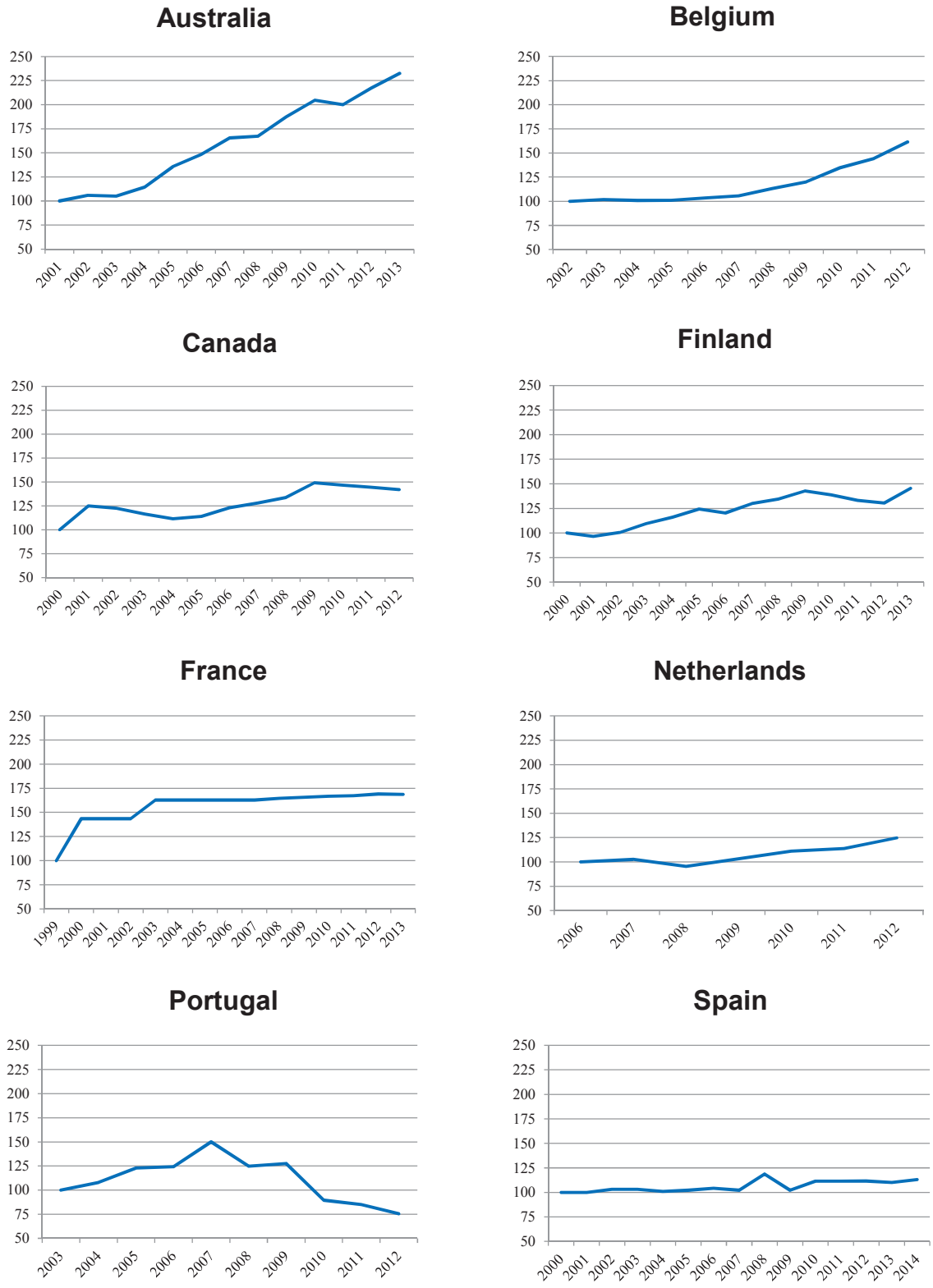
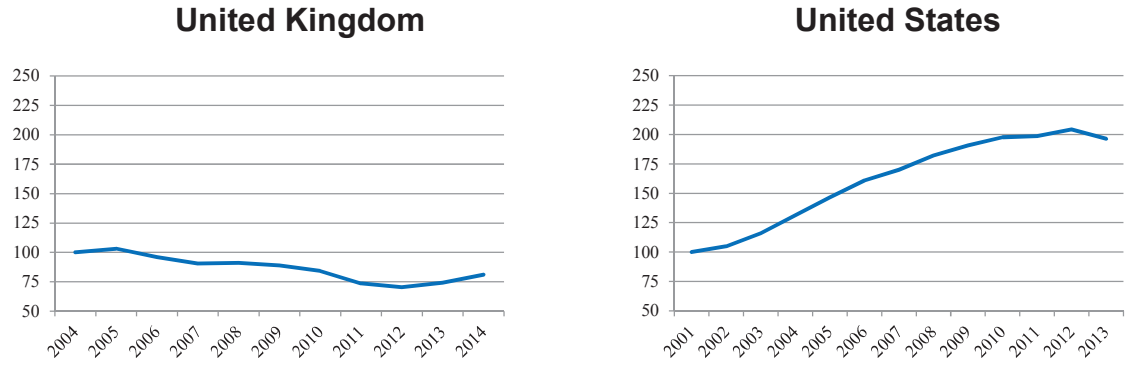


Figure 3.3. Student intake in nursing education, selected OECD countries, 2000-13 (or nearest years) *(cont.)*

(Index: Baseline year = 100)



Note: For the United States, the number of graduates is used as a proxy for the number of students admitted to nursing education. For France, the annual quotas (*numerus clausus*) established by the government are used as a proxy for the number of students admitted to nursing education. For Spain, the nursing education programme was changed from a medium level to a higher-level diploma in 2008: many nurses were admitted during that year to complete their diploma, explaining the peak. For the United Kingdom, the data relate to training places for adult nurses in England only.

Source: Please refer to Annex 3.A3, Table 3.A3.2.

StatLink http://dx.doi.org/10.1787/888933326131

In Australia, the number of students admitted to nursing schools more than doubled between 2001 and 2013, rising from 8 122 to 18 885. This expansion was supported by a freeze in tuition fees for students in nursing at their 2004 level, a reduction in debt repayments for graduates going on to work as nurses, and an increase in the number of foreign students (Health Workforce Australia, 2013). In addition, following the Bradley review of 2008, *numerus clausus* policies for entry in nursing education were abandoned (Box 3.2). Some universities lowered entrance requirements to attract more students, and the capacity of certain universities was stretched. Since the introduction of this liberal system, admissions in nursing programmes have increased by 25% between 2009 and 2013, with most of this growth driven by an increase in the number of Australian students (the number of foreign students remained relatively stable). However, the growth rate following this reform was not greater than the growth rate when the government was still exercising greater control on entry. In fact, during the four years that preceded the reform, the growth rate in the number of students admitted in nursing programmes in Australia was even greater, reaching almost 40%. This illustrates how a regulated system (based on a *numerus clausus* policy) can lead to a similar increase in the number of students as a liberal one, with the main difference being who is making the decision and on what basis. Following these steady increases in the number of students admitted in nursing programmes under both the regulated and unregulated systems, one emerging issue in Australia is that there may no longer be enough entry positions to absorb all the new graduates in the labour market. A significant proportion of new domestic nursing graduates in recent years have been unable to secure suitable employment in at least certain areas of the country (Health Workforce Australia, 2014).

In the United States, the number of graduates from registered nurses (RN) programmes nearly doubled between 2001 and 2013, rising from 102 009 to 200 341 (according to data from the National League for Nursing). Following a marked decrease

in student intakes during the 1990s, a 2004 report from the Department of Health and Human Services projected that there would be a significant shortage of RNs by 2020 if no change was made (Health and Human Services, 2004). The rapid expansion in admissions in nursing education programmes over the past decade was driven by successful campaigns to promote the profession and by a strong increase in the number of RN programmes. However, as in Australia, there are now concerns that graduates from nursing education programmes may soon exceed demand. The most recent projections estimate that, if student admission rates remain at their 2013 level, there will be an over-supply of more than 300 000 RNs by 2025. An over-supply is also expected for Licensed Practice Nurses (Health and Human Services, 2014).

In France, *numerus clausus* policies for entry in nursing education programmes have also increased substantially since 1999. The number of places grew by nearly 70% (rising from around 18 400 places in 1999 to over 31 000 in 2013). However, most of this growth occurred in the academic year of 2000/01 when the annual quota was increased by 43% (by 8 000 places). This sharp increase was driven by a projected reduction in the supply of nurses resulting from the reduction of working time to 35 hours per week, as well as the expectation that a large number of nurses would retire in the following years.

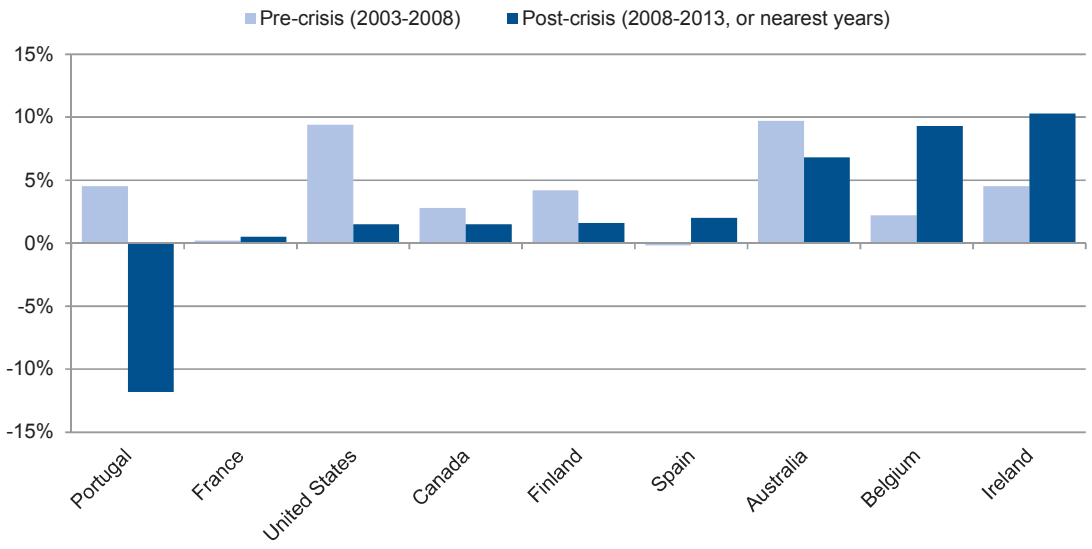
In Belgium, the number of students admitted in nursing has increased strongly since 2008. However, this growth has been driven to a large extent by foreign students who, in most cases, do not stay in Belgium once they have completed their studies.

By contrast, in the United Kingdom (England), the number of training places for adult nurses came down by about 25% between 2004 and 2012, before starting to rise again since 2013 in response to concerns about substantial shortages.

In Portugal, following an increase in intakes up to 2007, the number of students entering in nursing schools has been reduced by half between 2007 and 2012. Nurses were not spared from the austerity measures following the financial and economic crisis, which included cuts in nurses' salaries, a freeze of promotions and reductions in hiring. In 2012, graduates from nursing programmes were facing major difficulties in finding jobs, with many turning to temporary employment agencies (European Federation of Nurses Associations, 2012).

Figure 3.4 examines to what extent the recent economic crisis might have had an impact on admissions to nursing education in different countries. In Australia, Finland, Canada and the United States, admission rates continued to grow after the economic crisis but at a slower rate than during the pre-crisis years. In Ireland and Belgium, the number of students admitted has grown even faster since 2008, although as already noted the growth in Belgium was driven to a large extent by an increase in foreign students in Belgian nursing schools. By contrast, in Portugal admissions in nursing have significantly come down following the economic crisis.

Figure 3.4. Average annual growth rates in admissions to nursing education, selected OECD countries, pre- and post-crisis



Note: Countries are ranked from the lowest to the highest average annual growth rate in admissions, post-crisis. For Spain, the periods considered are 2003-09 (pre-crisis) and 2009-14 (post-crisis).

Source: Please refer to Annex 3.A3, Table 3.A3.2.

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3.4. Post-graduate training for doctors: The quest for a better balance between general practitioners and other medical specialists

As is the case for initial medical education, many OECD countries also regulate the number of places and/or financial resources allocated for post-graduate medical training. In recent years, beyond increasing the overall numbers of students in medical schools, several OECD countries have also taken steps to adjust the mix of specialty training places to modify the composition of the medical workforce. To increase the supply of general practitioners (GPs) and strengthen primary care, several countries opened up a greater number of places in general medicine.[5]

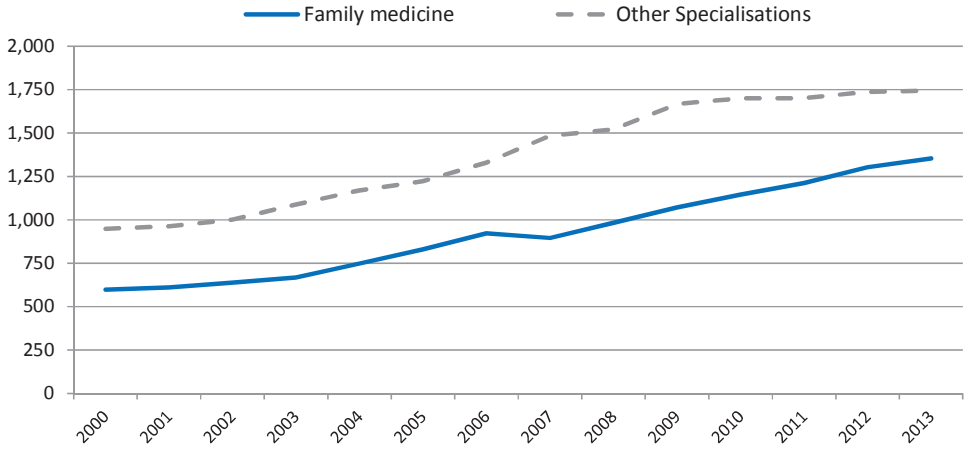
A number of factors influence the choice of specialty training of medical graduates beyond the number of places available. These include the length of the training period, the employment and remuneration prospects, and other aspects related to the working conditions (Creed et al., 2010; Mirvis, 2013). To be effective, a policy aiming to stir medical graduates towards general practice needs to address these factors in a coherent way.

In Canada, the number of first-year post-graduate training places in family medicine (i.e., general practice) more than doubled between 2000 and 2013, rising from around 600 to over 1 350, as part of a national effort to strengthen access to family doctors and primary care for the whole population (Figure 3.5). The number of training places in family medicine increased steadily during that period, at a rate of about 10% per year. Because this was accompanied by an almost equally strong rise in the number of places in other medical and surgical specialties, the share of all post-graduate training places in family medicine only increased moderately from 39% in 2000 to 44% in 2013.

Training in family medicine in Canada lasts a minimum of two years compared with three to five years for other medical or surgical specialties, though a growing number of trainees in general medicine are now doing an optional third year for sub-specialisation. In most cases, this additional year of training is taken in emergency family medicine, with very few trainees opting so far for sub-specialising in care for the elderly (Pong, 2012).[6]

As is the case in several other countries, in Canada, more women than men choose their post-graduate training in family medicine (CAPER, 2014). Given that women represent a growing share of students in initial medical education, this should help increase further the number of applicants to fill family medicine posts.

Figure 3.5. Places filled in medical post-graduate training, Canada, 2000-13



Source: Canadian Post-M.D Education Registry (2015), Data Tables (accessed 15 January 2015).

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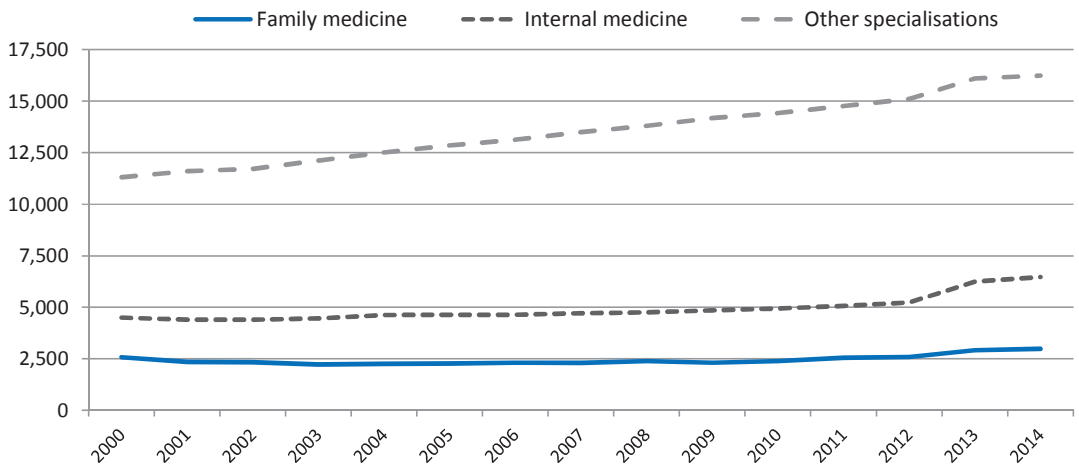
In the United States, the number of trainees in family medicine and internal medicine remained relatively stable between 2000 and 2012, but started to increase in 2013 and went up again in 2014. As a result, from 2012 to 2014, the number of training places in family medicine grew by 15% and in internal medicine by 23%.[7] The number of trainees also grew significantly in other medical or surgical specialisations, therefore the share of trainees in family medicine and internal medicine only increased slightly (Figure 3.6).

The recent increase in the number of training places in family medicine and internal medicine was driven by concerns about future shortages of generalists. Not only is a large number of generalists expected to retire over the next ten years, but there is also a projected growth in the demand for their services linked to an ageing population and expansion of insurance coverage (Petterson et al., 2012). A 2013 report from the Department of Health and Human Services projected that there may be a shortage of about 20 000 primary care doctors in 2020, based on the 2010 graduation rates (HHS, 2013). Some additional measures may be required to increase further the training of family doctors and other primary care doctors. One option includes increasing teaching hospitals resources so that more students are offered training in family medicine and other primary care specialisations. Another option is to increase the use of nurse practitioners (NPs) and physician assistants (PAs) to reduce the projected shortage of primary care doctors in the United States.

Figure 3.6. Places filled in medical post-graduate training, United States, 2000-14



Source: National Resident Matching Program, Results and Data Reports (2004, 2008, 2014).

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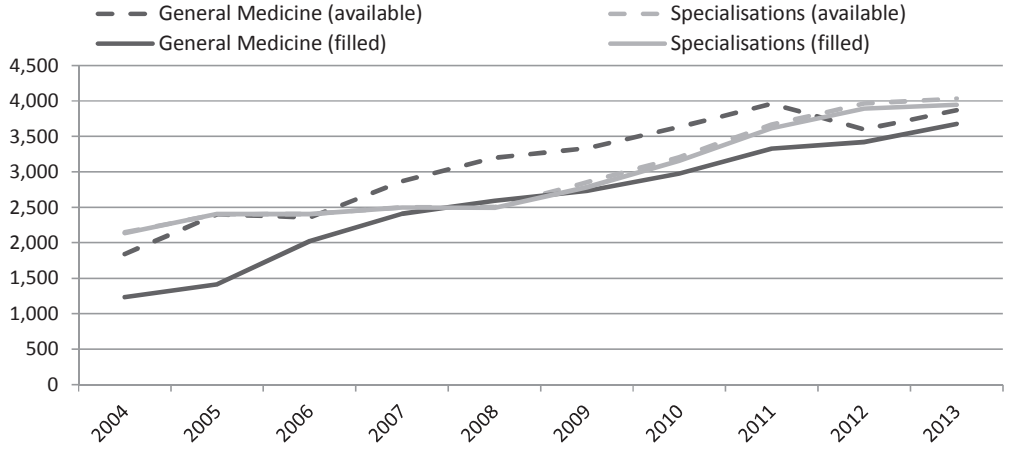
In France, over the past ten years important efforts have been made to increase the number of post-graduate training places in general medicine (Figure 3.7). Since 2004, the number of training places available in general medicine has increased more rapidly than in other specialisations. However, these places have not always been filled. In fact, until 2011, there was a fairly large gap between the positions available and those actually filled. This gap can be explained by a number of factors including the limited capacity of teaching hospitals and other trainers to provide internship positions in general medicine and the unwillingness of new medical graduates to choose general medicine. This gap was closed down in 2012 and 2013 as the number of places available was slightly reduced and the number of places filled increased.

Figure 3.7. Places filled in medical post-graduate training, France, 2004-13



Source: DREES (2011), "Les affectations des étudiants en médecine à l'issue des épreuves classantes nationales en 2010", Études et Résultats, No. 767 ; DREES (2014), "Les affectations des étudiants en médecine à l'issue des épreuves classantes nationales en 2013", *Études et Résultats*, No. 894, Paris.

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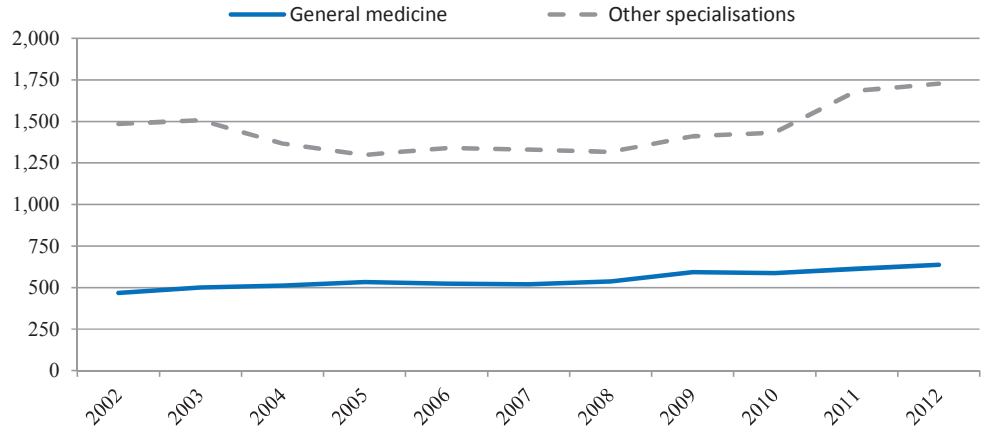
In the Netherlands, the number of post-graduate training places filled in general medicine was fairly stable up to 2008, when it started to rise slowly (Figure 3.8). Between 2008 and 2012, the number of these post-graduate training places filled increased from 537 to 638, an increase of almost 20%. Yet, this growth was more modest than the number of places filled in other medical and surgical specialties which grew by 30%. In 2013, the ACMMP recommended that the number of places in general medicine training remain the same as in 2012, while the number of places in other specialisations should reduce back to their level of 2009 and 2010, given concerns about a possible over-supply of doctors in certain specialties. As previously noted, these concerns were partly linked to previous projections of a possible reduction in inflow of foreign-trained medical specialists in the Netherlands (ACMMP, 2013). In assessing the future demand for GPs, the ACMMP also took into account the fact that a growing number of PAs and NPs could respond to the demand for primary care services. This more comprehensive approach of looking at the primary health care workforce as a whole is quite innovative as interactions and possible substitutions between different health care providers are often neglected in health workforce planning models and policy discussions in other countries.

Figure 3.8. Places filled in medical post-graduate training, the Netherlands, 2002-12

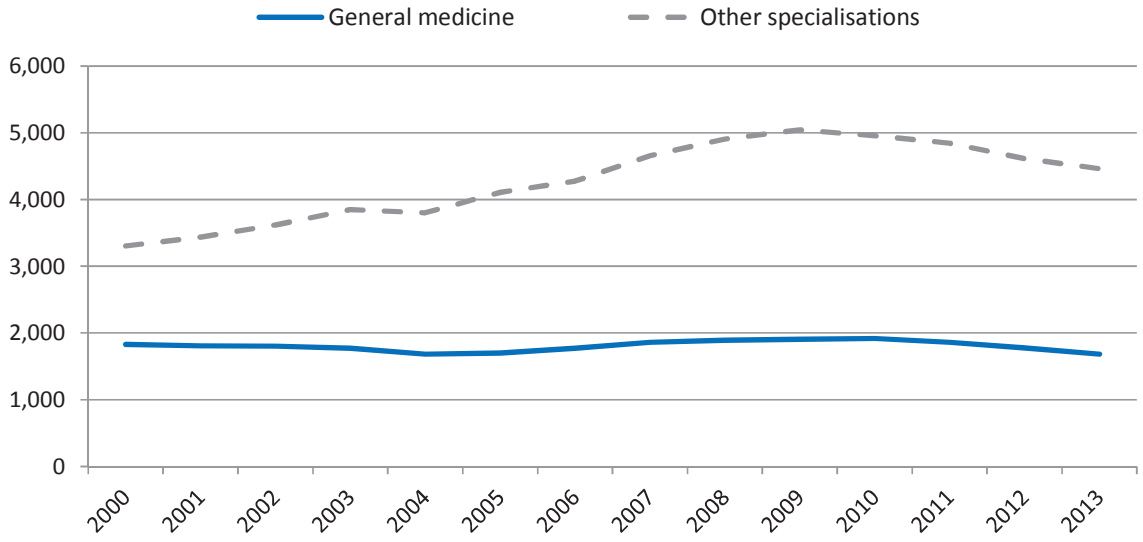


Source: ACMMP – Advisory Committee on Medical Manpower Planning (2013), *The 2013 Recommendations for Medical Specialist Training*, Capaciteitsorgaan, Utrecht.

StatLink http://dx.doi.org/10.1787/888933326185

In Spain, the number of post-graduate places filled in general medicine remained fairly stable between 2000 and 2010 while the number of places in other medical and surgical specialisations increased steadily (Figure 3.9). The number of places filled in other medical and surgical specialisations grew from around 3 300 in 2000 to 5 000 in 2010, a rise of approximately 50%. As a result, the proportion of trainees in general medicine fell from 36% in 2000 to 28% in 2010. Since 2010, the number of internship places in both general medicine and other specialties has started to decrease. In 2012, the Spanish Ministry of Health called for a reduction in the number of places available in medical schools, following the results from new health workforce planning exercises projecting surpluses and the lack of capacity of the health system to absorb all new graduates.

Figure 3.9. Places filled in medical post-graduate training, Spain, 2000-13



Source: Ministerio de Sanidad, Servicios Sociales e Igualdad [Ministry of Health, Social Services and Equality], 2015.

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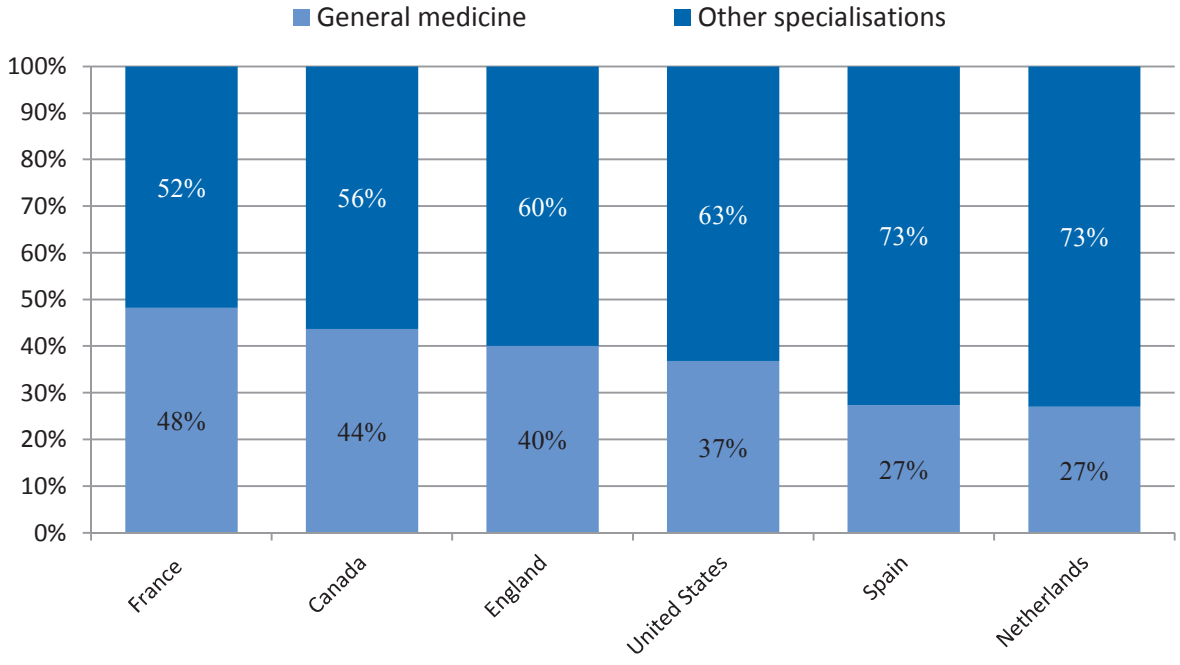
In a 2011 survey, Spanish medical graduates were invited to indicate which factors were most relevant for choosing their specialty area. Employment prospects came out as the most important reason. This probably explains the growing number and share of medical graduates applying for general medicine training in recent years, reflecting the perception that there may be greater employment opportunities in this field (Harris et al., 2013). However, since the offer of training places in general medicine has started to come down in recent years, one can infer that a lower percentage of applicants are actually getting a place.

Figure 3.10 shows the mix of students admitted in post-graduate training in general medicine vis-à-vis other medical specialties in six OECD countries in 2013 (or the nearest year). In France, the ratio of students in general medicine reaches nearly 50%, reflecting a deliberate effort to reach an almost equal balance. In Canada and the United Kingdom (England), the proportion of students pursuing general medicine training is also relatively high (over 40%). In England, the government mandated Health Education England in 2013 to reach 50% of medical graduates in GP training by 2015. This would mean that around 3 250 students would pursue this specialisation on an annual basis, up from the around 2 700 in recent years. A GP taskforce was created to come up with a set of recommendations on how to achieve this goal (NHS, 2014).

Figure 3.10. Share of students admitted in general medicine and other specialisations, selected OECD countries, 2013 (or nearest year)



Note: In the United States, general medicine includes students admitted to both family medicine and internal medicine.

Source: See sources in Figures 3.5 to 3.9.

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3.5. Advanced education for nurses: The development of programmes for nurse practitioners

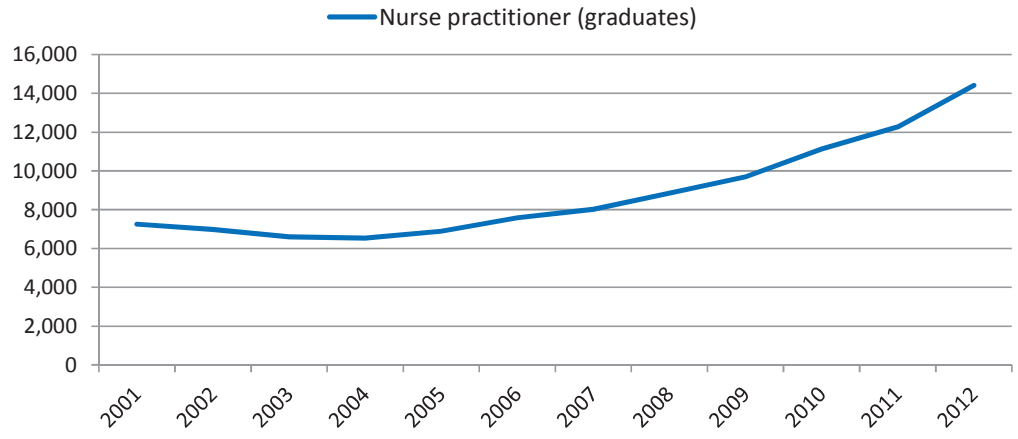
Many OECD countries are seeking to re-organise health service delivery to better respond to changing population health care needs by reviewing the roles of different health professionals, including those of nurses. Developing new and more advanced roles for nurses beyond the traditional scope of their practice is considered in many countries as a promising approach to improve access to care while helping to contain cost (Delamaire and Lafortune, 2010). This expansion is based on the prospect that advanced practice nurses (APNs) may play an increasing role in service delivery in primary care or in hospital. In primary care, advance practice nurses may take new tasks such as being the first point of contact for patients with minor problems, prescribing pharmaceuticals or tests, and routinely monitoring patients with chronic conditions.

The first education programmes in advanced nursing to train nurse practitioners (NPs) were created in the United States in the 1960s, when the University of Colorado pioneered a new NP certificate programme. Since then, these programmes have spread throughout the United States, as well as in Canada, the United Kingdom and several other countries. In most countries where positions for NPs now exist, the educational requirement to obtain these positions is generally a master's degree although there are some exceptions (for example, a university bachelor's degree is still sufficient in certain parts of Canada).[8]

In the United States more than 100 000 NPs were working in the health system in 2010, totalling about 5.5% of all RNs, with half of them working in primary care (HRSA, 2013). The number of NPs is expected to continue to grow in the coming years, given increases in admissions and graduation rates, and further growth in the demand for their services. Between 2001 and 2012, the number of graduates from NP programmes in the United States more than doubled, rising from around 7 000 in 2001 to over 14 000 in 2012 (Figure 3.11). This number increased further to 15 000 in 2013 (AANP, 2015).

For the past 20 years, a master's degree is required to become a NP (or any other recognised advanced practice nurse) in the United States. In 2013, 95% of NPs had at least a master's degree, up from 62% in 2000 (AANP, 2013). In 2004, the American Association of Colleges of Nurses and the National Council of State Boards of Nursing proposed that the minimum requirement for advanced nursing practice be raised further to a "doctor of nursing practice" (DNP) to be imposed from 2015 onwards. While this change would not have any consequence on current NPs and other APNs with a master's degree (who would still be able to continue to practice), it would add more years of education and training for the new generation of advanced practice nurses, therefore narrowing the gap with the education and training of medical doctors.

Figure 3.11. Graduates from nurse practitioner programmes, United States, 2001-12



Source: Health Resources and Services Administration, Bureau of Health (2013).

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An increased supply of NPs is seen as an important response to the growing demand for health services related to ageing population and the expansion in health insurance coverage under the Affordable Care Act. However, there are now some concerns that the growing number of NP graduates might lead to an over-supply in the coming years. Based on a 2013 health workforce projection carried out by the Department of Health and Human Services, the projected growth in the demand for NPs between 2010 and 2020 may fall short of the projected growth in their supply, leading to the potential unemployment or under-employment of new graduates from these programmes. Such an over-supply might be even greater for PAs working in primary care (Table 3.2). However, under a scenario whereby NPs would provide a greater share of services in primary care, the demand for their services would be higher and the potential over-supply smaller (Health Resources and Services Administration, 2013).

Table 3.2. Projected supply and demand for primary care nurse practitioners and physician assistants, United States, 2010 and 2020

Provider type/specialty	2010	2020
Supply		
Nurse practitioners	55 400	72 100
Physician assistants	27 700	43 900
Demand		
Nurse practitioners	55 400	64 700
Physician assistants	27 700	32 700
Supply and demand		
Nurse practitioners	*	7 400
Physician assistants	*	11 200

Note: No data was available for estimating if there were shortages of NPs and PAs in the baseline year (2010).

Source: Health Resources and Services Administration (2013).

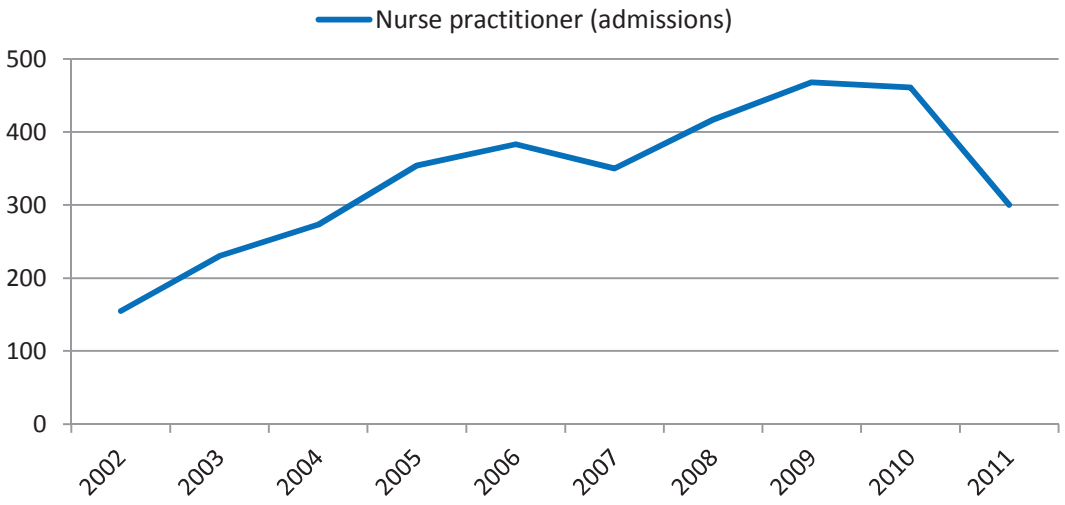
In Canada, the first NPs appeared more or less at the same time as in the United States in the mid-1960s, mainly to respond to shortages of doctors in rural and remote regions. Since then, they have spread out to urban areas. Between 2005 and 2013, the number of NPs in Canada quadrupled rising from 825 to 3 477, with most working either in primary care or in hospital (Canadian Institute for Health Information, 2014). Although all provinces and territories now have legislation in place authorising their practice, most NPs (about 60%) work in one province only (the province of Ontario, which is the most populated province).

The number of students admitted in NP programmes increased rapidly between 2002 and 2009, from about 150 in 2002 up to 450 in 2009 and 2010, fuelling the recent growth in the number of NPs in Canada (Figure 3.12). The number subsequently dropped in 2011, possibly linked to a re-organisation of education programmes at that time. While NP programmes used to be offered at three different levels (post-RN diploma, master's degree and post-master's degree), there was a move in 2011 to harmonise the educational requirement, with a master's degree becoming the norm. This may have prompted some students to delay their applications to see what would be the final arrangement regarding the educational requirement (Canadian Nurses Association and Canadian Association of Schools of Nursing, 2013).

In the Netherlands, more than 1 300 NPs were employed in 2012 up from less than 200 in 2005. A two-year master's degree is required to become a NP in the Netherlands. Between 2005 and 2012, the number of students admitted in the nine universities offering these programmes increased from 220 to 350, with a large increase in 2012 (Figure 3.13).

The Dutch Ministry of Health, Welfare and Sports indicated in 2013 that it will continue to encourage the intake of students in NP programmes (as well as in programmes to train PAs), as a strategy to ensure a sufficient number of primary care providers. This pro-active training policy is complemented by a plan to strengthen the roles and responsibilities of NPs in the primary care sector (De Bruijn-Geraets, 2014). Contrary to the experience in the United States and Canada, only about 10% of NPs in the Netherlands worked in primary care in 2012. To strengthen their role in primary care, the education and training curricula of NPs will be reinforced in primary care delivery. In addition, in 2012, the scope of practice of NPs in primary care was expanded to include the prescription of certain drugs and the possibility to conduct diagnosis and prescribe treatments for some patients. GPs who wish to contribute to NPs training and recruitment can also receive financial support to do so (Freund et al., 2015).

Figure 3.12. Admissions to nurse practitioner programmes, Canada, 2002-11



Source: CNA – Canadian Nurses Association and CASN – Canadian Association of Schools of Nursing (2013), *Registered Nurses Education in Canada Statistics 2011-12*, Ottawa.

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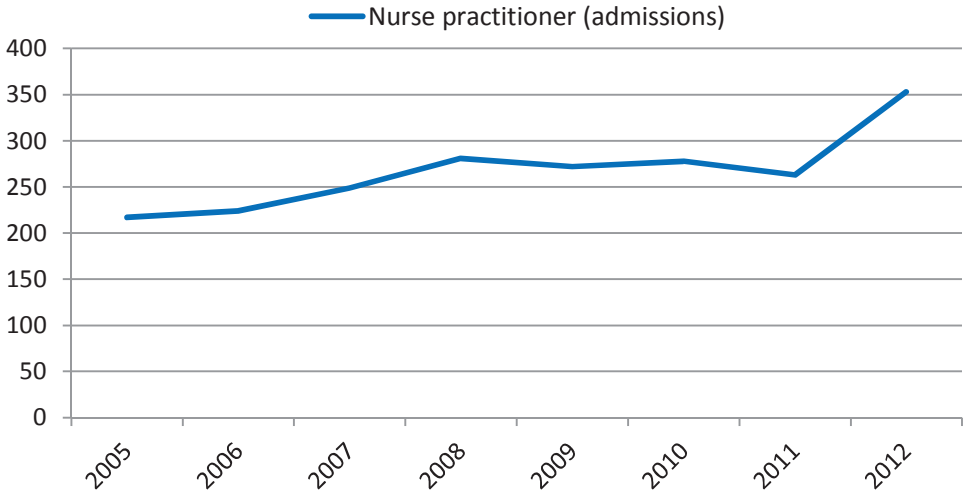
Figure 3.13. Admissions to nurse practitioner programmes, the Netherlands, 2005-12



Source: ACMMP – Advisory Committee on Medical Manpower Planning (2013), *The 2013 Recommendations for Medical Specialist Training*, Capaciteitsorgaan, Utrecht.

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The growing role and deployment of NPs in various countries will ultimately depend on the share of health services they are able to provide in primary care or in hospital. Past experience shows that NPs' roles and responsibilities tend to expand more easily in times and places that are underserved by doctors.

3.6. Conclusions

Changes to domestic admissions in medical and nursing education and training programmes is a key policy lever governments can use to adjust the supply of doctors and nurses to projected demand. Since the 1970s, most OECD countries have implemented some form of *numerus clausus* policies to regulate entry in medical education, and many countries have also extended the use of this policy to control entry in nursing education and other health-related programmes. The main rationale for setting a *numerus clausus* was and remains to control public spending for these education and training programmes, to limit entry to the most able applicants and to avoid any over-supply which may generate additional spending pressures through supply-induced demand. The rationale for a *numerus clausus* is generally stronger for medical education than for nursing education, given the longer duration and higher public cost of training new doctors and the greater risks of supply-induced demand. Such a rationale justified, for example, the government decision in Australia a few years ago to abandon a *numerus clausus* in nursing education and many other university programmes, but to keep such control on entry into medical education.

Although *numerus clausus* policies have been in place for several decades now, their legitimacy and management have regularly been criticised. *Numerus clausus* limit students' freedom to pursue higher education and the freedom of universities to offer more training places. It is also difficult for governments to set the "right quotas", which are inevitably based on future projections of supply and demand of different occupational groups that are fraught with uncertainty. In many countries, *numerus clausus* policies have often been characterised by "bust and boom" cycles, with periods of tight controls of student intakes to avoid any over-supply followed by periods of large increases to respond to real or perceived shortages of doctors or nurses.

This chapter reviewed changes in *numerus clausus* policies in a number of OECD countries since 2000. Across a majority of OECD countries, the number of students admitted in medical and nursing education programmes has increased substantially in response to concerns of shortages and a recognition in some countries of the need to become more "self-sufficient" and rely less on foreign-trained doctors and nurses. But there have been variations in the timing and size of this expansion. Following a period of strong growth in the early 2000s, some countries have stabilised around the mid-2000s entry in medical education programmes at the new higher level (e.g., Finland, France, the Netherlands and the United Kingdom), whereas in other countries the number of students continued to grow throughout the period (e.g., Australia, Canada and New Zealand). There were also variations in the timing and rate of growth in nursing education. In some countries, nursing education admissions increased mostly in the early 2000s (e.g. France), whereas there was a steady increase in other countries (e.g., Australia, Finland and the United States).

How to determine what may be the right level of student intakes that may be sufficient to meet projected future demand while avoiding any excessive production of new doctors and nurses which would result in a waste of money and human capital and make it more difficult to achieve any desirable change in the scope of practice of different providers? This is a question that many governments have struggled with and will continue to struggle with in the coming years, given the wide range of factors that are affecting the future demand and supply of various categories of health workers and the uncertainties regarding how these factors will evolve. These uncertainties call for a regular re-assessment of current and future health labour market conditions to adjust

numerus clausus policies accordingly, but without overreacting to cyclical factors that may only have passing effects.

There is evidence in some OECD countries that the steady growth in student intakes and graduation rates over the past decade may be exceeding current and projected demand. Some recent medical and nursing graduates are facing difficulties finding jobs, indicating a current over-supply. The change in the future outlook of the nurse workforce in the United States provides a striking example of how a large increase in student intakes, sustained over many years, can address any projected shortages and possibly lead to an over-supply. Whereas the US Department of Health and Human Services had projected in 2004 that there might be a shortage of about 1 million registered nurses (RNs) by 2020 if training rates were to continue at their level of 2001, the number of students admitted in RN education programmes doubled between 2001 and 2013, rising from about 100 000 to 200 000 per year. Training 100 000 more RNs per year over ten years results in 1 million additional RNs. The most recent projections from the US Department of Health and Human Services is that if student admission rates remain at their 2013 level, there might be an over-supply of more than 300 000 RNs by 2025. There might still be shortages in some States or local regions, but the overall supply would be more than sufficient to meet the demand if it is well distributed (HHS, 2014).

In countries where admissions in medical education have increased quite rapidly over the past decade, there is a need to ensure proper co-ordination between the number of new medical graduates and the number of post-graduate training places available, or else some medical graduates will simply not have the opportunity to complete their specialty training, leading to a waste of public and private resources. This "bottleneck" issue has come up in Australia and the United States, where there are strong pressures to open up a greater number of post-graduate training places to allow more medical graduates to complete their training, but at the risk of possibly ending up training too many new doctors which might have serious cost implications.

Some countries, like Canada, France and the United States, have recently opted to increase the number of post-graduate training places in general medicine to try to achieve a better balance between generalists and specialists. In France, the number of post-graduate training places in general medicine has increased more rapidly than places in other medical or surgical specialties over the past decade, reaching a ratio of almost 1:1. However, for these policies to be fully effective and have long lasting effects in the composition of the medical workforce, they need to be complemented by other measures to make general medicine more attractive financially and in other aspects of working conditions.

Some countries, such as Canada, the Netherlands and the United States, have also taken steps to increase training programmes for advanced practice nurses such as nurse practitioners (NPs). One of the goals is to respond to growing needs for primary care workers and possible shortages of GPs through increasing the supply of other "mid-level" providers. The United States and Canada have led the way in creating the first training programmes for advanced practice nurses back in the 1960s, with some other countries following through since then. The United States is the country where the number and share of NPs among all nurses is the highest, with NPs now representing more than 5% of all RNs. This growing number has been fuelled by steady increases in admissions and graduations from NP programmes, with the number of NP graduates more than doubling over the past decade. The US experience provides an example of the potential scope for development of NPs in other countries.

Proper management of *numerus clausus* policies for medical and nursing education needs to be based on more robust health workforce data and health workforce planning models that take into account the interactions between different health care providers and are regularly updated. Box 3.4 summarises some of the main recommendations from a 2013 OECD review of health workforce planning models.

Box 3.4. Recommendations to improve health workforce planning in OECD countries

- **Health workforce planning is not an exact science and needs regular updating:** Assessing the future supply and demand for doctors, nurses or other health professionals 10 or 15 years down the road is a complex task, fraught with uncertainties on the supply side and even more so on the demand side. Projections are inevitably based on a set of assumptions about the future; these assumptions need to be regularly re-assessed in light of changing circumstances, new data, and the effect of new policies and programmes.

- **Need to know first where we are before we can know where we're heading:** The first step of any good health workforce projection is good data about the current situation. One of the main benefits of strengthening health workforce planning efforts is that it often triggers improvements in this crucial first step.

- **Health workforce projections should help avoid a "yo-yo" approach to student intakes and entry into medical and nursing occupations:** Available evidence shows that employment in the health sector tends to be less sensitive to economic cycles than employment in other sectors, and there is also a long time lag between decisions about medical student intakes and when these students will actually enter the labour market. Hence, health workforce planning should keep an eye on long-term structural factors and avoid being overly sensitive to cyclical fluctuations.

- **Supply-side improvements need to focus more on retirement patterns:** Most health workforce projection models have focused their attention on new entry into different professions, but have paid less attention to exit through retirement. There is a need to consider more closely the complex issue of work-to-retirement patterns, particularly for doctors but also for other professions, as a large number of health care providers are approaching the "standard" retirement age and their retirement decisions will have a major impact on supply in the coming years.

- **Need to move from uni-professional to multi-professional health workforce planning:** Health workforce projection models need to be able to assess in a more integrated way the impact of different health care delivery models, as many countries are looking at ways to re-organise the delivery of services to better respond to population ageing and the growing burden of chronic diseases. Moving from uni-professional to multi-professional approaches to health workforce planning is particularly important in the primary care sector where the roles and responsibilities of different providers (doctors, nurses and other providers) is rapidly evolving in some countries.

- **Health workforce planning models need to address adequately the geographic distribution of health workers:** Any nationwide balance of health workers does not necessarily mean that regional shortages or surpluses do not exist. A proper assessment of gaps between supply and demand needs to go below the national level to assess the geographic distribution of health workers, and how this might evolve over time under different scenarios.

Source: Ono, T., G. Lafortune and M. Schoenstein (2013), "Health Workforce Planning in OECD Countries: A Review of 26 Projection Models from 18 Countries", *OECD Health Working Papers No. 62*, OECD Publishing, Paris, http://dx.doi.org/10.1787/5k44t787zcwb-en.

Recognising the need to strengthen workforce planning, the European Commission has funded a *Joint Action on Health Workforce Planning and Forecasting*. This Joint Action is set-up as a group of European experts that analyse future skills and competences in the health sector and inform countries on challenges and best practices on health workforce planning and forecasting. One of the main outputs of this Joint Action has been a handbook on health workforce planning methodologies across EU countries.

An increasingly important factor challenging the setting of a *numerus clausus* at the national level is the growing internationalisation of medical and nursing education and of health labour markets more generally. The growing international mobility of medical and nursing students and health workers makes it more difficult to determine, at a national level, how many students should be trained to respond to any projected demand. The Netherlands provides a good example of how this added layer of complexity and uncertainty may affect health workforce planning. In 2010, the Netherlands decided to increase the *numerus clausus* for medical education under the assumption that there would be a reduction in incoming foreign-trained doctors. However, this reduction did not occur. Following a re-assessment of the supply and demand situation three years later, the decision was made to reverse this earlier decision and return to the training level that existed up to 2010. While getting reliable data on migration patterns and making realistic projections about future developments is not easy, countries increasingly need to take into account in their health workforce planning models the inflows of foreign-trained doctors and nurses, as well as the outflows of doctors and nurses (those moving outside the country), in order to be able to assess more precisely domestic training needs.

One factor hindering health workforce policies in general and *numerus clausus* policies more specifically is weak governance and management arrangements. In several OECD countries, *numerus clausus* policies are still based on weak evidence and opaque decision-making processes. The Netherlands is an exception, as it has strengthened the governance and management structure of its *numerus clausus* policy for medical education (as well as dentistry education). Following a period of prolonged doctor shortages, the Dutch Government decided in 2000 to create the Advisory Council on Medical Manpower Planning (ACMMP), an independent health workforce planning agency composed by professionals, educational institutions and health insurance companies, with a mandate to formulate and agree on a set of recommendations for student quotas entering medicine. These recommendations are based on a solid health workforce planning model developed and maintained by the Dutch Institute of Health Service Research (NIVEL). The recommendations from this Committee are then used by the Dutch Government to decide on the number of students that should be admitted in medical education and training programmes. Since its establishment 15 years ago, this governance structure – within the Dutch context – has significantly improved the decision-making process based on solid evidence and engagement of all relevant stakeholders and has helped to reduce any mismatches between physician demand and supply (Van Greuningen et al., 2012). In many other OECD countries, the governance of *numerus clausus* policies needs to be strengthened.

Notes

1. The authors would like to thank Ian Brownwood (from the OECD Health Division) and Caroline Hager and Leon van Berkel (from the European Commission) for many useful comments.

2. One special feature of the *numerus clausus* policy in France is that student selection is made only after the first year of medical studies (which has now been broadened to be a first year of studies in health, known as *Première Année Commune aux Études de Santé)* through a national exam (*concours*). In 2010/11, only around 20% of first-year students interested in pursuing medical education were able to move on to the second year (ONDPS, 2015).

3. The EU Directive on the recognition of professional qualifications (Directive 2005/36/EC, which was replaced more recently by Directive 2013/55/EU) allows the automatic recognition of qualifications for certain professions, including doctors and nurses trained in another EU country.

4. These refer only to allopathic medical schools. In addition, new osteopathic medical schools have also opened in recent years, also contributing to the increase in student admissions.

5. In most OECD countries, general medicine is now recognised as a specialty in its own right giving it the same prestige as other medical or surgical specialties, thereby blurring the distinction between "generalist" and "specialist" training. In this section training in general medicine is distinguished from training in other specialties.

6. Interestingly, a 2013 survey of physicians in Canada sought their views about which specialty areas would be expanding in the coming years. Geriatric medicine ranked first, with more than 90% of physicians foreseeing that this specialty would be growing in the future, followed by dermatology, emergency medicine, psychiatry and neurosurgery (Buske, 2014). But despite this expected growth in the demand for geriatric medicine, the number of post-graduate trainees in geriatric medicine in 2013 remained very low and much lower than in paediatrics (CAPER, 2014).

7. In the United States, both family medicine and internal medicine doctors are considered as generalists, given that there are several similarities in their practice. Nonetheless, there remain differences in terms of patient groups (internal medicine doctors usually only consult adults and elderly people, whereas family medicine doctors also take care of children and adolescents) and areas of specialisation (for example, internal medicine doctors can sub-specialise in cardiology or pulmonology).

8. This section focusses on education programmes for NPs as this is one of the largest categories of recognised advanced practice nurses in several countries. Nonetheless other programmes exist to train advanced or specialised nurses. For example, in the United States, a variety of master's programmes are available to train clinical nurse specialists (who account for about 20% of all advanced practice nurses), nurse anaesthetists (accounting for about 13% of APNs) and nurse midwives (7% of APNs) (Institute of Medicine, 2011).

References

AAFP – American Academy of Family Physicians (2014), *Family Physician Workforce Reform – Recommendations of the American Academy of Family Physicians*, Kansas.

AAMC – Association of American Medical Colleges (2012), *A Snapshot of the New and Developing Medical Schools in the U.S. and Canada*, AAMC, Washington D.C.

AAMC (2006), *Statement of the Physician Workforce*, AAMC, Washington D.C.

AANP – American Association of Nurse Practitioners (2015), "NP Fact Sheet", available at www.aanp.org.

AANP (2013), "NP Fact Sheet", available at www.aanp.org.

ACMMP – Advisory Committee on Medical Manpower Planning (2013), *The 2013 Recommendations for Medical Specialist Training*, Capaciteitsorgaan, Utrecht.

ACMMP (2010), *The 2010 Recommendations for Medical Specialist Training*, Capaciteitsorgaan, Utrecht.

ANMF – Australian Nursing and Midwifery Federation (2014), "Submission to the 457 Integrrity Review", Australian Nursing and Midwifery Federation Journals, Kingston.

Auerbach, D. et al. (2013), "The Nursing Workforce in an Era of Health Care Reform", *New England Journal of Medicine*, Vol. 368, No. 16, pp. 1470-1472.

Bradley, D. et al. (2008), *Review of Australian Higher Education: Final Report*, Department of Education and Training, Australian Government.

Buske, L. (2014), *Demand for Physicians and their Services*, Canadian Collaborative Centre for Physician Resources, Canadian Medical Association.

CNA – Canadian Nurses Association and CASN – Canadian Association of Schools of Nursing (2013), *Registered Nurses Education in Canada Statistics 2011-12*, Ottawa.

CAPER – Canada's Definitive Source of Data on Post M.D. Training (2014), "Field of Post-M.D. Training by Faculty of Medicine Providing Post-M.D. Training 2013-2014", database available at http://www.caper.ca.

Chenot, J. (2009), "Undergraduate Medical Education in Germany", German Medical Science, Vol. 7.

CIHI – Canadian Institute for Health Information (2014), *Regulated Nurses, 2013*, Ottawa.

Creed, P., J. Searle and M. Rogers (2010), "Medical Specialty Prestige and Lifestyle Preferences for Medical Students", *Journal of Social Science and Medicine*, Vol. 71, No. 6, pp. 1084-1088.

De Bruijn-Geraets, D. (2014), "Evaluating Newly Acquired Authority of Nurse Practitioners and Physician Assistants for Reserved Medical Procedures in the Netherlands: A Study Protocol", *Journal of Advanced Nursing*, Vol. 70, No. 11, pp. 2673-2682.

Delamaire, M. and G. Lafortune (2010), "Nurses in Advanced Roles: A Description and Evaluation of Experiences in 12 Developed Countries", *OECD Health Working Papers*, No. 54, OECD Publishing, Paris, http://dx.doi.org/10.1787/5kmbrcfms5g7-en.

Department of Health (2012), "The Health and Education National Strategic Exchange – Review of Medical and Dental School Intakes in England", UK Government.

DREES (2014), "Les affectations des étudiants en médecine à l'issue des épreuves classantes nationales en 2013", *Études et Résultats*, No. 894, Paris.

DREES (2011), "Les affectations des étudiants en médecine à l'issue des épreuves classantes nationales en 2010", Études et Résultats, No. 767.

European Federation of Nurses Associations (2012), "Caring in Crisis: The Impact of the Financial Crisis on Nurses and Nursing – A Comparative Overview of 34 European Countries", Brussels.

Freund, T. et al. (2015), "Skill Mix, Roles and Remuneration in the Primary Care Workforce: Who Are the Healthcare Professionals in the Primary Care Teams Across the World?", *International Journal of Nursing Studies*, Vol. 52, No. 3, pp. 727-743.

General Medical Council (2014), *A Reference Guide for Postgraduate Specialty Training in the UK*, London.

Harris, J.E. et al. (2013), "Specialty Choice in Times of Economic Crisis: A Cross-sectional Survey of Spanish Medical Students", *BMJ Open*, Vol. 3, No. 2.

Hawthorne, L. (2012), "Health Workforce Migration to Australia – Policy Trends and Outcomes 2004 to 2010", University of Melbourne, Melbourne.

Health and Human Services (2014), "The Future of the Nursing Workforce: National- and State-level Projections, 2012-2025", US Department of Health and Human Resources, Rockville, Maryland.

Health and Human Services (2013), "Projecting the Supply and Demand for Primary Care Practitioners Through 2020", US Department of Health and Human Resources, Rockville, Maryland.

Health and Human Services, Health Resources and Services Administration (2004), "What Is Behind HRSA's Projected Supply, Demand, and Shortage of Registered Nurses?, Washington, D.C.

Health Resources and Services Administration (2013), "Projecting the Supply and Demand for Primary Care Practitioners Through 2020", Bureau of Health Professions, National Center for Health Workforce Analysis, Health Resources and Services Administration.

Health Workforce Australia (2014), "Australia's Future Health Workforce – Nurses Detailed", Department of Health, Canberra.

Health Workforce Australia (2013), "Australia's Health Workforce Series: Nurses in Focus", Melbourne.

Health Workforce Australia (2012), "Australia's Health Workforce Series: Doctors in Focus", Melbourne.

Iglehart, J. (2013), "The Residency Mismatch", *New England Journal of Medicine*, Vol. 369, No. 4.

Institute of Medicine of the National Academies (2011), *The Future of Nursing: Leading Change*, *Advancing Health*, Washington D.C.

Joyce C., J. Stoelwinder and L. Piterman (2007), "Riding the Wave: Current and Emerging Trends in Graduates from Australian University Medical Schools", *Medical Journal of Australia*, Vol. 186, No. 6, pp. 309-312.

Kemp D. and A. Norton (2014), *Review of the Demand Driven Funding System*, Department of Education, Australian Government.

Ketel, N. et al. (2012), "The Returns to Medical School in a Regulated Labour Market: Evidence from Admission Lotteries", Faculty of Economics and Business, Amsterdam School of Economics Research Institute.

Malgeri, A., P. Michelutti and M. Van Hoegaerden (2015), *Handbook on Health Workforce Planning Methodologies Across EU Countries*, Ministry of Health of the Slovak Republic.

Medical Careers (2014), "Postgraduate Doctors", www.medicalcareers.nhs.uk/postgraduate_doctors.

Miani, C. et al. (2015), *Best Practice: Medical Training from an International Perspective*, Rand Corporation

Mirvis, D. (2013), "Choosing a Medical Specialty: The Difference Between What Students Want and What Society Needs", *Journal of Health Policy Research*, Vol. 2, No. 18.

NHS (2014), "Securing the Future GP Workforce Delivering the Mandate on GP Expansion – GP Taskforce Final Report", Department of Health, UK Government.

Ono, T., G. Lafortune and M. Schoenstein (2013), "Health Workforce Planning in OECD Countries: A Review of 26 Projection Models from 18 Countries", *OECD Health Working Papers No. 62*, OECD Publishing, Paris, http://dx.doi.org/10.1787/5k44t787zcwb-en.

ONDPS – Observatoire national de la démographie des professions de santé (2015), "Rapport 2013-2014: La régulation démographique des professionnels de santé par les flux d'étudiants, la situation démographique des chirurgiens-dentistes, bilan de la filiarisation", Paris.

Petterson. S. et al. (2012), "Projecting US Primary Care Physician Workforce Needs: 2012-2025", *Annals of Family Medicine*, Vol. 10, No. 6, pp. 503-509.

Pong, R. (2012), "Post-M.D. Training in Family Medicine in Canada: Continuity and Change over a 15-year period", Ottawa.

Santana, P., H. Peixoto and N. Duarte (2014), "Demography of Physicians in Portugal: Prospective Analysis", *Acta Médica Portuguesa*, Vol. 27, No. 2, pp. 246-251.

Spitzer, A. and B. Perrenoud (2006), "Reforms in Nursing Education Across Western Europe: Implementation Processes and Current Status", *Journal of Professional Nursing*, Vol. 22, No. 3, pp. 162-171.

Van Greuningen, M., R.S. Batenburg, L.F.J Van der Velden (2012), "Ten Years of Health Workforce Planning in the Netherlands: A Tentative Evaluation of GP Planning as an Example", *Human Resources for Health*, Vol. 10, No. 1:21, BioMed Central, London, http://www.human-resources-health.com/content/10/1/21.

Annex 3.A1
Medical and nursing education and training programmes pathways in OECD countries

Medical education and training

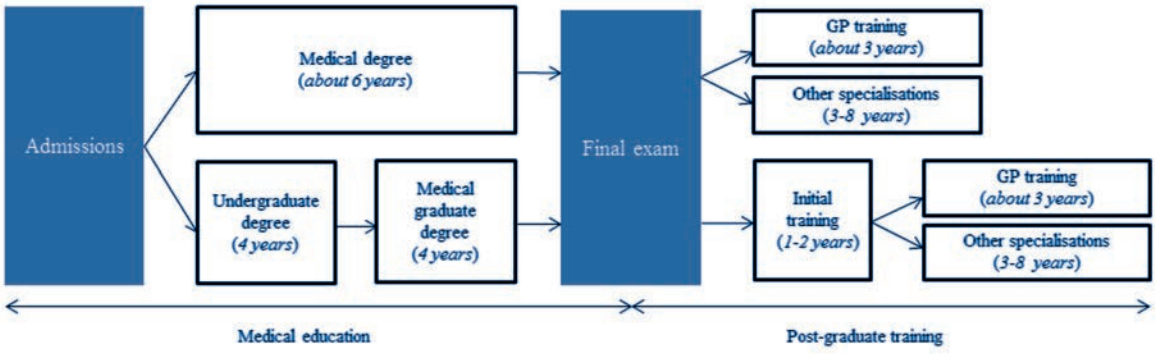
Over the past decades, the education and training pathways for students in medicine have become increasingly diversified in most OECD countries, with more possible entry points for prospective students and "passerelles" (bridges) between fields of studies, as well as greater choices to specialise in various fields in post-graduate training programmes.

Figure 3.A1.1 shows a few of the most common pathways in initial medical education and post-graduate training in different OECD countries. In some countries, such as the United States, medical education is offered mainly as a graduate degree, following completion of a first bachelor degree in biology or other fields. In other countries, such as France, medical education comes in the form of an undergraduate degree, with students accessing medicine directly from secondary education. Some other countries offer a hybrid model of medical education, with possibilities to enter both at the undergraduate and/or graduate levels for eligible students. For instance, in the United Kingdom, while the majority of students still access medicine right from secondary school (undergraduate degree), since 2000, some universities accept students with background in life sciences, dentistry or biomedicine, into the third year (the start of a graduate degree). These additional entries into medical education programmes were designed to enlarge access to students who hold a bachelor in a relevant field.

Once a student completes basic medical education, he/she typically has to take a final exam which might serve to validate his/her degree, rank them for their post-graduate training and, in some cases, also grant them with a medical license (often accompanied with some conditions regarding their scope of practice). The following step is usually some specialty training through some forms of internship or residency period. Each country offers various medical specialties of different lengths. Generally, training to become a Family Doctor/General Practitioner (GP) is one of the shortest specialties, averaging three years in many countries. Other specialisations, notably surgery, take longer. In the United States, residency programmes usually last on average three to eight years, but if a student decides to pursue a more advanced sub-specialty, the training can prolong up to eleven years. In some countries, an initial training of one to two years (normally in hospital) precedes any specialty training. For instance, in the United Kingdom, a two-year post-graduate training (called "foundation training") was introduced right after medical school in 2005 (Medical Careers, 2014). During this training period, new graduates rotate, every 3 to 4 months, between different specialities. The first year leads to registration with the General Medical Council. The completion of the second year allows the trainee to apply for specialty training programmes (General Medical Council, 2014).

In most countries, the number of specialties and subspecialties in post-graduate training programmes has increased over time. For example, in Canada, the number of fields of specialisation in post-graduate training has increased from 76 in 1996/97 to 86 in 2013/14 (CAPER, 2014).

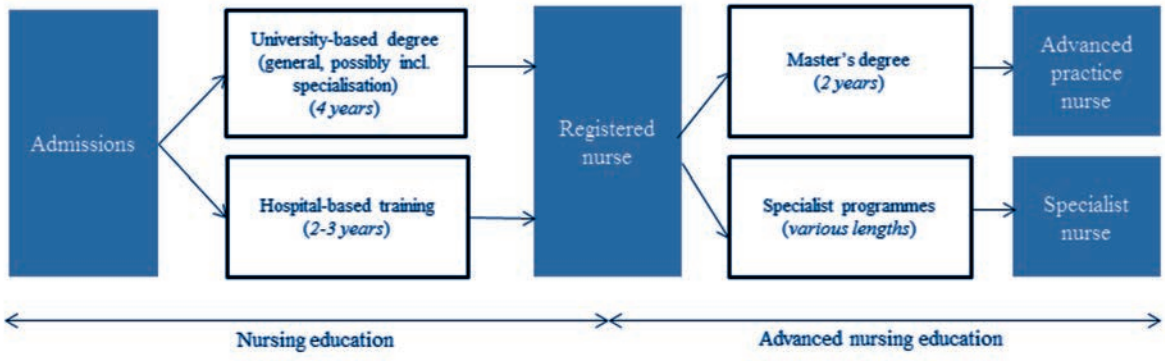
Figure 3.A1.1. Models of entry into medical education and post-graduate training



Nursing education and training

Across OECD countries, there are also several models for initial, specialised and advanced nursing education (Figure 3.A1.2). During the 1980s, with the developments in health services and increased complexity of care, in many OECD countries, nurse education shifted from hospital based training programmes to university based degrees. This led to a new era of nurse education, allowing nurses to not only access undergraduate, but also post-graduate level education. In Europe, over the last three decades, there have been two main phases of reform to harmonise nurse education. Firstly, by creating a unified European platform of nursing programmes and licencing, to improve the level of graduates, and allow mutual recognition across EU countries. Secondly, to integrate nursing programmes within higher education systems and have university based degrees (Spitzer and Perrenoud, 2006).

Figure 3.A1.2. Models of entry to basic nursing education and more advanced education paths



Following their first university degree, nurses have numerous options for more advanced studies or specialisation. For example, in certain countries, nurses can opt for more advanced studies (e.g., a master's degree) to become an Advanced Practice Nurse (APN) such as a Nurse Practitioner. In the United States, a range of master's degrees are

available to prepare students for an array of different positions as APNs such as NPs, Clinical Nurse Specialists, Clinical Nurse Leaders, among others. PhD programmes can be also pursued after a master's degree and are usually more research oriented (Institute of Medicine, 2011).

Registered nurses can also further enhance their professional knowledge and scope of practice by choosing a specialty programme. A wide variety of programmes may be available in each country. In the United Kingdom, four main tracks are predominant: clinical, management, education and research. For each one of these options, several career options exist depending on the level of education the student reaches. Whereas a postgraduate degree might allow for a career as a nurse consultant, a PhD would open the option to become a professor at University.

Annex 3.A2
Trends in graduates from medical and nursing education programmes in OECD countries

Changes in *numerus clausus* policies in medical and nursing education programmes can also be assessed by looking at the number of graduates from these programmes. The number of graduates can serve as a proxy to measure decisions on admissions a few years earlier. However, trends in graduation rates may also be influenced by any changes in dropout rates during these studies. Given that completing a medical or nursing education programme takes several years, the number of graduates will reflect decisions on *numerus clausus* taken several years earlier (about 5 to 6 years in the case of medical education and about 3 to 4 years for nursing education), as well as the dropout rates of students during these programmes.

Data on the number of graduates from medical and nursing education programmes are available for nearly all OECD countries, based on national responses to the OECD/Eurostat/WHO Joint Questionnaire on non-monetary health care statistics. Table 3.A2.1 shows the trends in number of graduates from medical education programmes in OECD countries between 2005 and 2013. In most OECD countries, the number of graduates has increased between 2005 and 2013, with the growth rate being particularly strong in Australia, Finland, France, Poland and Portugal, reflecting the strong rise in admission rates five to six years earlier. There has also been a strong rise in the number of medical graduates in Slovenia and Belgium. On the other hand, the increase has been much more modest in Italy, Japan and Sweden. Austria and Korea are the only countries where the number of medical graduates has decreased between 2005 and 2013. In Korea, these numbers are not expected to grow significantly in the coming years given that student intakes in medical education programmes have remained fairly stable between 2007 and 2012.

As is the case for medical graduates, the number of nursing graduates has also increased in most of OECD countries from 2005 to 2013. This increase has been particularly strong in countries such as Chile, Mexico, Poland and Turkey (Table 3.A2.2). In Poland, the number of nursing graduates increased from about 7 000 in 2006 to over 13 500 in 2013. The growth rate has been much slower in Austria (virtually nil or even slightly declining).

Table 3.A2.1. Trends in number of graduates from medical education programmes, OECD countries, 2005-13

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Australia	1 798	1 884	2 117	2 389	2 361	2 662	3 011	3 179	3 573
Austria	1 569	1 456	1 835	1 814	1 726	1 466	1 413	1 170	..
Belgium	763	681	732	758	851	980	1 125	1 180	1 176
Canada	1 878	1 957	2 047	2 122	2 339	2 449	2 533	2 641	2 662
Chile	746	750	664	815	1 101	936	1,077	1,355	1,036
Czech Republic	1 069	1 041	1 108	1 163	1 319	1 458	1 460	1 591	1 338
Denmark	1 152	1 122	1 192	1 121	1 204	1 210	1 179	1 039	1 032
Estonia	106	128	106	112	120	149	125	147	144
Finland	337	395	367	546	500	603	621	790	624
France	3 441	3 354	3 843	4 202	4 429	4 689	5 646	5 883	..
Germany	8 870	8 724	9 574	9 857	10 069	9 894	9 572	9 587	9 801
Greece	1 472	1 635	1 599	..	..	..	..	..	..
Hungary	1 151	1 069	1 005	960	923	1 040	1 148	1 374	1 496
Iceland	44	40	36	49	37	44	44	49	..
Ireland	594	641	726	673	722	785	738	781	931
Israel	312	310	296	325	300	314	377	304	408
Italy	6 415	6 143	6 816	6 796	6 682	6 732	6 699	6 631	6 735
Japan	7 392	7 639	7 647	7 434	7 561	7 619	7 631	7 501	7 639
Korea	4 363	3 973	4 354	4 454	4 449	4 064	3 992	4 096	4 009
Mexico	11 638	10 619	11 936	12 912	12 631	12 812	13 231	13 618	11 716
Netherlands	1 756	1 842	2 019	2 022	2 075	2 276	2 456	2 467	2 422
New Zealand	297	287	284	308	337	317	351	348	379
Norway	467	461	497	496	516	551	568	619	578
Poland	2 349	2 308	2 550	2 727	2 788	3 081	3 349	3 549	3 757
Portugal	736	812	1 029	1 101	1 126	1 262	1 287	1 394	1 426
Slovak Republic	557	509	535	458	421	577	590	621	690
Slovenia	162	128	129	174	162	229	206	266	245
Spain	4 064	3 951	3 841	3 922	3 882	4 299	4 199	4 457	4 770
Sweden	805	910	932	950	993	969	1 010	1 126	986
Switzerland	622	594	612	667	729	813	744	782	786
Turkey	4 494	4 532	4 899	4 872	4 753	5 087	5 138	4 981	4 949
United Kingdom	6 820	7 390	7 520	8 115	8 210	8 490	8 435	8 840	8 450
United States	18 516	18 635	19 140	19 532	20 555	20 469	21 522	21 799	22 963

Note: There is no data for Luxembourg as there is no medical school in that country.

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

Source: OECD Health Statistics 2015 (the database includes the underlying sources in each country).

StatLink http://dx.doi.org/10.1787/888933326247

Table 3.A2.2. Trends in number of graduates from nursing education programmes, OECD countries, 2005-13

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Australia	..	..	..	13 096	13 782	14 886	16 005	16 318	17 306
Austria	..	4 758	4 898	4 890	4 006	4 662	4 813	4 598	..
Belgium	4 147	3 324	3 566	3 476	4 022	4 542	4 140	4 735	5 305
Canada	..	..	15 489	14 928	15 221	16 831	18 858	19 340	19 144
Chile	2 474	2 760	2 438	2 840	4 932	7 061	6 436	6 939	7 705
Czech Republic	4 843	5 029	3 643	1 612	1 457	1 283	1 822	1 810	1 565
Denmark	4 393	4 555	4 627	4 984	4 597	5 214	5 348	5 167	..
Estonia	483	470	591	377	472	418	456	463	479
Finland	2 349	2 453	2 633	2 981	3 076	3 368	3 430	3 594	3 747
France	20 982	20 982	21 648	21 566	22 122	22 311	23 113	26 447	25 619
Germany	36 588	38 155	37 499	35 877	36 968	36 860	36 959	42 256	44 620
Hungary	4 213	4 031	3 684	3 158	3 369	2 863	2 544	2 596	3 364
Iceland	200	276	224	327	206	248	208	224	..
Ireland	1 425	1 508	1 410	1 572	1 440	1 641	1 720	1 518	1 528
Israel	1 150	1 080	1 009	957	860	848	879	1 109	1 271
Italy	9 046	9 388	10 491	10 091	10 821	9 776	11 389	12 153	13 860
Japan	44 852	45 805	46 253	47 704	46 968	48 740	49 429	50 158	52 058
Korea	..	29 600	32 224	35 099	38 293	45 268	46 997	45 889	48 861
Luxembourg	90	89	88	81	89	101	130	130	61
Mexico	5 051	5 655	7 046	7 265	9 175	10 879	11 492	12 336	12 752
Netherlands	5 406	5 562	5 876	6 181	6 323	6 519	6 338	6 222	6 302
New Zealand	1 310	1 403	1 318	1 372	1 343	1 454	1 522	1 627	1 966
Norway	3 652	3 593	3 696	3 282	3 488	3 200	3 347	3 522	3 653
Poland	..	6 938	7 918	9 187	8 428	9 653	17 323	12 395	13 561
Portugal	2 954	3 457	3 594	3 571	3 792	3 706	3 391	3 005	2 666
Slovak Republic	1 731	3 732	..	2 713	3 061	3 167	3 159	3 430	3 416
Slovenia	1 480	1 723	1 788	1 711	1 641	1 665	1 679	1 614	1 598
Spain	8 699	8 764	8 748	8 987	9 472	10 098	11 654	8 194	8 783
Switzerland	4 540	4 549	4 960	5 124	5 738	5 983	6 180	5 699	6 759
Turkey	5 386	5 709	7 001	3 927	4 288	11 597	14 046	14 865	..
United Kingdom	19 982	20 940	21 388	20 398e	18 268e	20 666e	21 606e	23 412e	27 006e
United States	149 501	164 190	173 495	185 801	194 575	201 611	202 692	208 495e	200 341e

Note: e stands for estimated figure.

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

Source: OECD Health Statistics 2015 (the database includes the underlying sources in each country).

StatLink http://dx.doi.org/10.1787/888933326258

Annex 3.A3
Sources of data for number of students admitted to medical and nursing education

Table 3.A3.1. Sources of data for number of students admitted in medical education

	Type of source	Source name
Australia	Website	Medical Deans
Austria	Website	STATcube, Statistical Database of Statistics Austria, Studies at public universities
Belgium	Contact through email	Executive Office Education and Training
Canada	Website	Association of Faculties of Medicine of Canada
Finland	Contact through email	Ministry of Social Affairs and Health
France	Website	DREES
Germany	Website	Statistisches Bundesamt
Ireland	Website	Higher Education Authority
Japan	Website	Ministry of Education, Culture, Sports, Science and Technology
Netherlands	Website	Advisory Committee for Medical Manpower Planning
New Zealand	Website	Medical Deans
Poland	Contact through email	Ministry of Health
Portugal	Website	Directorate General of Higher Education, Directorate General of Statistics of Education and Science
Spain	Contact through email	Ministry of Health, Social Services and Equality
Sweden	Website	Statistics Sweden
Switzerland	Website	Swiss Statistics
United Kingdom	Website	Universities and Colleges Admissions Services
United States	Website	Association of American Medical Colleges and American Association of Colleges of Osteopathic Medicine

Table 3.A3.2. Sources of data for number of students admitted in nursing education

	Type of source	Source name
Australia	Website	Higher Education Statistics, highereducationstatistics.education.gov.au
Belgium	Contact through email	Executive Office Education and Training
Canada	Website	Canadian Nurses Association/Canadian Association of Schools of Nursing
Finland	Contact through email	Ministry of Social Affairs and Health
France	Website	Ministry of Health : http://www.legifrance.gouv.fr
Netherlands	Contact through email	Kiwa.nl
Portugal	Website	Directorate General of Higher Education, Directorate General of Statistics of Education and Science
Spain	Contact through email	Ministry of Health, Social Services and Equality
United Kingdom	Website	Health Education England and Department of Health
United States	Website	National League for Nursing