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OECD report on medical education and training in Israel

Towards a better governance structure for health workforce planning and policy-making in Israel

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Table of Contents

Executive summary (main findings and recommendations)

Achieving universal access to medical care in Israel as in other OECD countries requires having a sufficient number of doctors, with a proper mix of generalists and specialists, and a proper geographic distribution to serve the population in the whole country.

While the number of doctors in Israel has increased over the past decade, it still remained about 10% below the OECD average in 2020 (3.3 doctors per 1 000 population in Israel compared with an OECD average of 3.7). Looking ahead, population ageing will require a growing number of doctors per population to respond to growing care needs, unless other healthcare providers play a greater role in health service delivery. The medical workforce is ageing, too. Nearly half of all licensed doctors in Israel in 2020 were aged 55 and over (up from less than one-third in 2000), the second highest share among OECD countries (after Italy). This points to a large "replacement need" and increases the urgency to train new doctors to replace those who will retire in the coming years.

The number of medical graduates from Israeli medical schools has increased significantly over the past decade, but nonetheless relative to population size the number of new graduates in 2020 remained the lowest across all OECD countries and almost two times lower than the OECD average. Furthermore, more than one in ten medical students and graduates in Israel are foreign students (mostly American students but also some Canadian students), with most of these students not intending to stay in Israel to complete their postgraduate residency training and work.

The growing number of doctors in Israel over the past decade has been driven mainly by the large number of Israeli born doctors who have obtained at least their first medical degree abroad before returning to Israel to complete their postgraduate residency training and practice. Nearly 60% of all doctors in Israel in 2020 had obtained at least their first medical degree in another country, by far the highest share among OECD countries. Nearly half of these foreign-trained doctors are Israelis who got their first medical degree abroad because of limited capacity in Israeli medical schools. However, the 2019 "Yatziv" reform concerning the accreditation of foreign medical schools to ensure minimum quality standards will sharply reduce the inflow of these Israeli students who were going to get their first medical degree abroad as it will forbid students graduating from discredited medical schools (mainly in non-OECD countries) to undertake their internship training in Israel starting in 2025. This is expected to result in a drop of nearly 30 % of new medical graduates who will become available for their one-year internship in 2025 and subsequent residency training. In many cases, these graduates from discredited medical schools were ending up practicing in the north and south of the country where there are more acute shortages of doctors. This important gap in the inflow of new medical graduates needs to be urgently addressed by increasing the number of students in existing medical schools (including the possibility by creating new branches) and considering the opening of at least one new medical school in Israel. Some support might also be provided to encourage Israeli students to study in accredited medical schools abroad as a complementary measure. Such public support might be accompanied with some conditions regarding the choice and practice location of these students when returning to Israel.

According to recent projections from the Ministry of Health taking into account the expected inflows and outflows of doctors in the coming years, the number of doctors per population in Israel is expected to peak in 2025 at a level well below the OECD average, and then to decline slightly over the next 10 years due to the combined effects of reduced inflows of new doctors, increased outflows from retirement and overall population growth. Urgent measures are therefore needed to increase the supply and training of doctors in Israel.

Postgraduate residency training programmes in Israel have been characterised by a free market approach whereby each hospital and doctor supervisor make their own decisions regarding the number and mix of new residency places that will be opened each year and freely choose the candidates to fill these posts. These decisions are often based on short-term operational needs, not on any medium to longer-term planning regarding future requirements in different specialties and different locations in the country. The matching process between the available residency places and new medical graduates is also much more discretionary than in many other OECD countries that use a more structured and transparent approach (e.g., France, Spain and United States).

Historically, medical workforce planning in Israel has been carried out on an *ad hoc* basis, with the government setting new committees in response to crises. Since 2000, more than 10 *ad hoc* advisory committees have been established and submitted their report with a set of recommendations to address the doctor shortage crises. Some of these recommendations were adopted by government, others not. By contrast, some OECD countries like the Netherlands have moved away from such an *ad hoc* approach to a more structured approach to medical workforce planning and policy-making that has proven to be effective to avoid a state of permanent crisis management.

This report calls for the development of a more permanent governance structure of medical workforce planning in Israel. The Ministry of Health has recently taken a step in the right direction by creating a new division dedicated to health workforce planning and forecasting. This effort needs to be pursued and strengthened. Some of the initial work of this new division has rightly focussed on improving the availability of data and databases that can be used to monitor the stocks, inflows and outflows of different categories of doctors. This is a crucial first step to be able to make robust planning and projections about future supply and demand. This new health workforce planning division has also started to develop some projection models regarding the supply and demand of doctors, although continuous improvements will be needed to include more variables on both the supply and demand sides and further breakdowns by different specialties and different regions. It will also be important to involve the main stakeholders in the planning process (e.g. doctor associations, medical schools, health insurers, and others) to: seek their expert views and data inputs; reach greater consensus on the magnitude of any projected shortage of doctors in general and in certain specialty areas or regions; and reach greater consensus on the policy responses to address these shortages, including any further increases in student intakes in undergraduate medical education programmes and postgraduate residency training programmes.

In the medium-term, Israel should consider the pros and cons of following the Dutch approach to medical workforce planning. The Dutch experience over the past 25 years has shown the benefits of creating a permanent independent body such as the Advisory Committee on

Medical Manpower Planning (ACMMP) that involves all the key stakeholders in medical workforce planning on an equal basis. While it took a few years initially to set up this independent Advisory Committee and reach agreement on the respective roles and equal weight of the main stakeholders, this has “paid off” in getting greater acceptance from the different stakeholders about the projected supply and demand of different categories of doctors and reaching greater consensus about recommended student intakes to avoid any shortages or surpluses and about the actual implementation of these recommendations.

The recommendations in this report do not provide any “quick fix” solutions to the current shortage of doctors in Israel, because any policy changes to medical education and training policies inevitably takes several years to have any impact on the supply of doctors given the duration of these education and training programmes. In the short-term, a number of policy options may be considered to address shortages of doctors, including increasing the retention rate of doctors as much as possible and promoting a more efficient use of their time and effort by sharing some of the administrative and simple clinical tasks with paramedical professions.

Table 1 summarises some of the main findings from this report and key recommendations to achieve structural improvements in medical workforce planning in Israel and to avoid shortages of doctors in the future.

Table 1. Main Findings and Recommendations from OECD report

MAIN FINDINGS	KEY RECOMMENDATIONS
1. Improve the governance of health workforce planning (to move away from crisis management)	
The government of Israel has traditionally set up *ad hoc* committees over the past few decades to get *ad hoc* advices and recommendations on how to address the "doctor shortage" crises, but there is a need to move away from this crisis management mode to establish a more permanent governance structure to continuously improve the evidence base and models required for proper health workforce planning and to link more closely the results of health workforce planning with policy decision-making.	→ Create a permanent structure, either within the Ministry of Health or outside, dedicated to health workforce planning, with a mandate to support the policy objective of avoiding shortages (or surpluses) of different categories of doctors and other paramedical professions. This permanent structure would be tasked to: 1) gather the required data to assess the current supply and demand of different categories of doctors and other paramedical professions; 2) to produce and regularly update projections on future requirements for different categories of doctors and other paramedical professions; and 3) to assess the implications of projected future requirements on student intakes in undergraduate medical education programmes and postgraduate residency training programmes. → Explore the feasibility of adapting the Dutch model to health workforce planning to the Israeli context. This would involve assessing the benefits and costs of establishing an independent body like the Dutch Advisory Council on Medical Manpower Planning (ACMMP), defining the governance structure of such a new advisory body in Israel and the role of the different key stakeholders (e.g. doctor associations, medical schools, health insurers, and others), and defining the relationships and interactions with the Ministry of Health, the Ministry of Education and the Ministry of Finance.
2. Increase urgently the number of Israeli students in Israeli medical schools	
The number of medical students admitted in Israeli medical schools has increased substantially over the past 20 years, but remains the lowest among all OECD countries relative to the size of the population and the number of practising doctors. The current number of students in Israeli medical schools will not be sufficient to offset the reduction in the inflows of Israeli graduates from discredited medical schools abroad (mainly in non-OECD countries) starting in 2025.	→ Increase as much as possible student intakes in the six current medical schools in Israel. → Consider opening one new medical school and open new branches of existing medical schools to further expand the training capacity (particularly in the periphery). → Regularly review the recommended student intakes in Israeli medical schools through continuous improvement in health workforce planning and data and expert views to assess future requirements.
Some Israeli medical schools have programmes for foreign students (mostly American but also Canadian students), but most of these students go back to their country upon graduation to complete their residency training and practice.	→ Close the programmes for foreign students in those Israeli medical schools where these programmes exist to free up these places for Israeli students.

The limited availability of clinical fields (or clinical rotations) for 4th, 5th and 6th year students is often cited by medical schools as an important constraint to increasing student intakes in undergraduate studies.	→ Consider different options to substantially expand the number of clinical rotations for undergraduate medical students, such as: introducing a second shift per day, increasing the number of shifts during the year, increasing the number of students per group, and providing clinical rotations outside hospitals (e.g., in primary care facilities or public health institutes). If required, provide financial assistance to increase the number of shifts per day or during the course of the year to compensate trainers for any additional cost.
3. Consider providing support to Israeli students going in accredited medical schools abroad as a complementary measure	
Some countries (e.g., Norway and Sweden) that have limited capacity in their domestic medical schools provide financial support for national students to obtain their degrees in recognised universities abroad.	→ Consider the possibility of providing financial assistance to Israeli students going to study medicine in accredited medical schools abroad as a complementary measure to increasing domestic capacity. Some conditions might be attached to receiving such financial assistance, such as an obligation for these students to serve for a certain number of years in underserved areas upon completing their residency training in Israel.
4. Move from a free market to a more structured approach to implementing postgraduate residency programmes	
Decisions regarding the number, composition and selection process of students entering into postgraduate residency training are currently left to hospitals, often based more on short-term operational needs than on any longer-term health system needs.	→ Set up a more centralised planning system to guide decisions on postgraduate residency programmes, including recommendations on the overall number of residency places to be opened and by specialty, based on assessment of future requirements. → Establish a more transparent and predictable matching system between the medical graduates waiting to undertake their postgraduate residency training and the available openings.
Current funding for residency training is built in general hospital budgets without any specific funding allocated to this training activity, with the consequence that residents are often considered simply as low-cost labour.	→ Set a dedicated budget for residency training in the Ministry of Health that would be allocated based on the number and composition of specialty training places offered in hospitals or in the community.

1. Introduction (background, context, objectives of report)

Having a sufficient number of doctors, proper mix between generalists and different specialist groups, and a proper geographic distribution of doctors, is essential for the well-functioning of health systems and achieving universal access to care in Israel as in other OECD countries.

While the number of doctors in Israel has increased over the past 15 years, it still remains about 10% below the OECD average (3.3 doctors per 1 000 population in Israel compared with an OECD average of 3.7 in 2020) and the demand for medical care has increased and can be expected to continue to increase in the years ahead. Population ageing will require a growing number of doctors per population to respond to growing health care needs, unless other healthcare providers (paramedical professions) play a greater role in delivering health services. One of the main consequences of the shortages of doctors in Israel is that doctors have a heavy workload with many working prolonged hours, as emphasised in the 2021 report from the Supreme Committee examining the nature of doctors' work and shifts in hospitals (IMA, 2021).

According to recent projections from the Ministry of Health taking into account the expected inflows and outflows of doctors in the coming years, the number of doctors per population in Israel is expected to peak in 2025 at a level well below the OECD average, and then to decline slightly over the next 10 years due to the combined effects of reduced inflows of new doctors, increased outflows from retirement and overall population growth (OECD, 2023). This highlights the need for urgent measures to counter this projected reduction.

The main policy lever for government to increase the supply of doctors is to increase the number of students admitted in undergraduate medical education programmes and postgraduate residency training, although it takes several years for such training policies to have any impact. The main objective of this review is to analyse some of the main challenges facing medical education and training policies and programmes in Israel by drawing on comparative analyses and useful experiences from other OECD countries.

While the number of students admitted in the six Israeli medical schools has increased significantly over the past decade, the number of medical graduates in Israel remained in 2020 the lowest across all OECD countries relative to the country’s population size and as a share of currently practising doctors. The number of domestic medical graduates relative to the size of the population in Israel was almost two-times lower than the OECD average in 2020. This calls for an urgent and substantial expansion in student intakes, particularly in undergraduate programmes, but also eventually when the pool of graduates will increase in postgraduate residency programmes.

But the next question that quickly arises is: by how much should the number of undergraduate and postgraduate students be increased? There is no unique and “once-for-all” definitive response to this question, and the response may vary depending on the assessment of the current and future situation and the views of different interest groups.

This report argues that those countries that have been able to better manage the supply and training of different categories of doctors have been able to develop some health workforce

planning capacity and governance structure that promotes informed exchange and consensus-building among the key stakeholders (e.g. doctor associations, medical schools, health insurers and other healthcare payers) based on the assessment of the current and future situation and the policy options to address any projected shortage (or surplus). The Netherlands provides a good example of an OECD country that has successfully managed to combine both this planning (or technical) model along with a governance structure that has promoted broad acceptance and support for the policy recommendations that are generally accepted by government and updated on a regular basis.

This report is structured as follows. Section 2 describes briefly the sources and methods that have been used in this report. Section 3 reviews trends in the number of doctors in Israel compared with other OECD countries and the age structure of the medical workforce. Section 4 reviews trends in the first step of the medical education and training process in Israel and other OECD countries – the number of students admitted and graduating from medical schools. Section 5 focusses more specifically on trends in medical student intakes in Israel, reviews recommendations from previous committees in Israel regarding student intakes, and recent developments to consolidate the health workforce planning function. Section 6 contrasts the organisation and outcome of the second step in the medical education and training process – the postgraduate residency training programmes -- in Israel compared with two OECD countries (Netherlands and France). Section 7 describes one of the best examples of a well-established and effective health workforce planning system in OECD countries – the Dutch model.

2. Methodology and data sources

This report uses a number of data and information sources to compare medical education and training policies and programmes in Israel with other OECD countries. The comparison of the number of doctors and number of new medical graduates between Israel and other OECD countries draws on the regular (annual) OECD data collection on non-monetary health workforce statistics. The definitions used in this data collection are summarised in Box 1.

The regular OECD data collection has been complemented with additional *ad hoc* data collection to analyse trends in medical student admissions in a subgroup of OECD countries and with the administration of a questionnaire to collect other complementary information (e.g., on the number of medical schools and the duration of undergraduate and postgraduate studies). This questionnaire was completed by national experts in a subgroup of OECD countries.

This report has also drawn on the vast experience from the former CEO of the Dutch Advisory Committee Medical Manpower Planning (ACMMP), Dr. Victor Slenter, to document the governance and technical approach to health workforce planning models in the Netherlands.

Box 1. Definition of doctors and medical graduates in the OECD regular data collection, national data sources and comparability limitations

The regular OECD data collection on the number of doctors and medical graduates is based on a set of common and specific definitions to maximise the comparability of data across OECD countries, while leaving the flexibility to national data correspondents to choose the most reliable source of data to respond to the data request.

Doctors

The data collection on doctors distinguishes three possible types of activities in the health system: 1) practising doctors defined as doctors providing direct care to patients; 2) professionally active doctors including both practising doctors and those who may not provide direct care to patients but nonetheless play an active role in health systems (managers, researchers, etc.); and 3) all doctors licensed to practice including those who may no longer actively practice in the country.

While most countries are able to provide data on the number of practising doctors, some countries are only able to provide data on professionally active doctors (resulting in a slight over-estimation compared with countries providing data on practising doctors) and a few countries can only provide data on all doctors licensed to practice (resulting in a larger over-estimation).

While the data for Israel on the overall number of doctors refer to those actually practicing, the data on the age structure of doctors relate to all doctors licensed to practice. This is resulting in an over-estimation of the share of doctors over age 65 compared with other countries because a greater proportion of doctors over age 65 may still be registered but no longer be active.

The data on the number of doctors in most countries include residents (physicians-in-training), except in Belgium and France (resulting in an under-estimation in these two countries).

Medical graduates

The number of medical graduates is defined as students who have graduated from domestic medical schools in a given year. In most countries, the data include both domestic and foreign students, but not in Israel where foreign students are excluded (resulting in an under-estimation compared with other countries which include these foreign students).

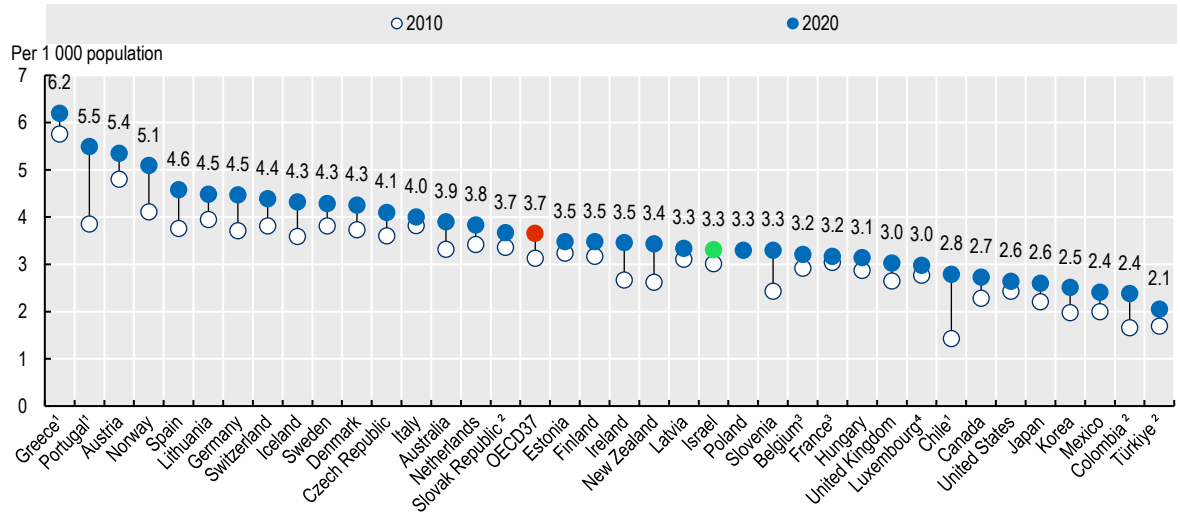
3. Overview of evolution in number of doctors in Israel and other OECD countries, and ageing of medical workforce

3.1. The number of doctors per capita has increased in Israel, but less rapidly than in most OECD countries

The number of doctors in Israel has increased over the past decade, both in absolute number and relative to the population size, which resulted in an increase in the number of doctors from 3.0 per 1000 population in 2010 to 3.3 in 2020. However, the density of doctors in Israel has increased less than in most OECD countries (the OECD average has increased from 3.1 in 2010 to 3.7 in 2020), so the gap with the OECD average has increased over the past decade (Figure 1).

The relatively small increase in the number of doctors per population in Israel reflects to a large extent the strong population growth. While the population across OECD countries increased by 6% only between 2010 and 2020, it increased by over 20% in Israel during that period. A rapidly increasing population obviously also requires a rapidly increasing supply of doctors and other health workers to respond to growing healthcare needs.

Figure 1. The density of doctors has increased in Israel over the past decade, but less than in most OECD countries



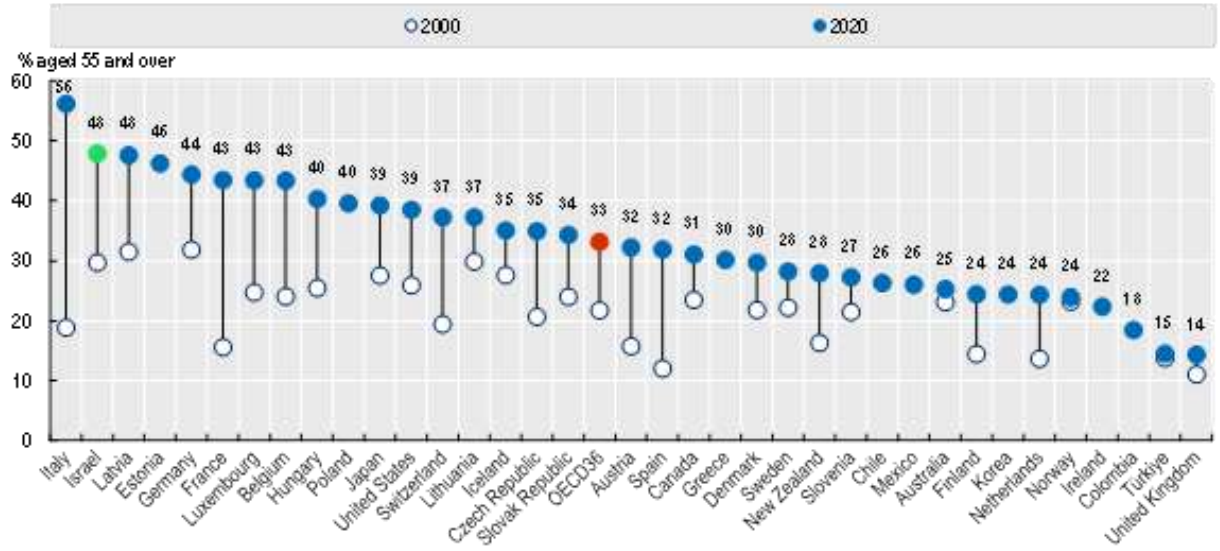
Notes: 1. Data refer to all doctors licensed to practice, resulting in a large over-estimation of the number of practising doctors (e.g., of around 30% in Portugal). 2. Data include not only doctors providing direct care to patients, but also those working in the health sector as managers, educators, researchers, etc. (adding another 5-10% of doctors). 3. Medical interns and residents are not included. 4. The latest data refer to 2017 only.
Source: OECD Health Statistics 2022 (the data for Israel is based on the Physicians Registry maintained by the Medical Professions Division and Health Information Division in the Ministry of Health)

3.2. Nearly half of all doctors in Israel are aged 55 and over, the second highest share among OECD countries

As in other OECD countries, population ageing will require a growing number of doctors per population to respond to growing healthcare needs. The medical workforce is ageing, too.

Nearly half of all doctors in Israel in 2020 were aged 55 and over (up from 30% 2000), the second highest share among OECD countries after Italy (Figure 2).

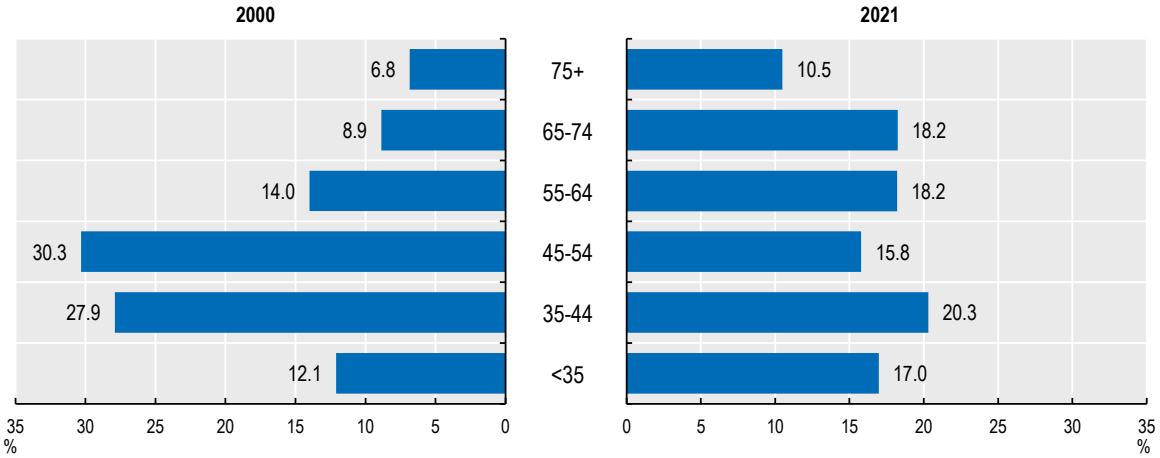
Figure 2. Israel has the second largest share of doctors aged over 55 among OECD countries, and a large proportion are already aged over 65



Note: The data for Israel relate to all doctors licensed to practice, resulting in an over-estimation of the share of doctors aged over 55 compared with other countries that have supplied data based on practicing doctors only.
Source: OECD Health Statistics 2022 (the data source for Israel is the Physicians Registry maintained by the Medical Professions Division and Health Information Division in the Ministry of Health)

Figure 3 looks more closely at the age structure of the medical workforce in Israel in 2000 and 2021. It shows that the share of doctors aged 65 and over has increased greatly over the past two decades. This ageing of the medical workforce increases the urgency to train new doctors to replace those who will retire in the coming years.

Figure 3. The share of doctors aged 65 and over has increased rapidly in Israel since 2000

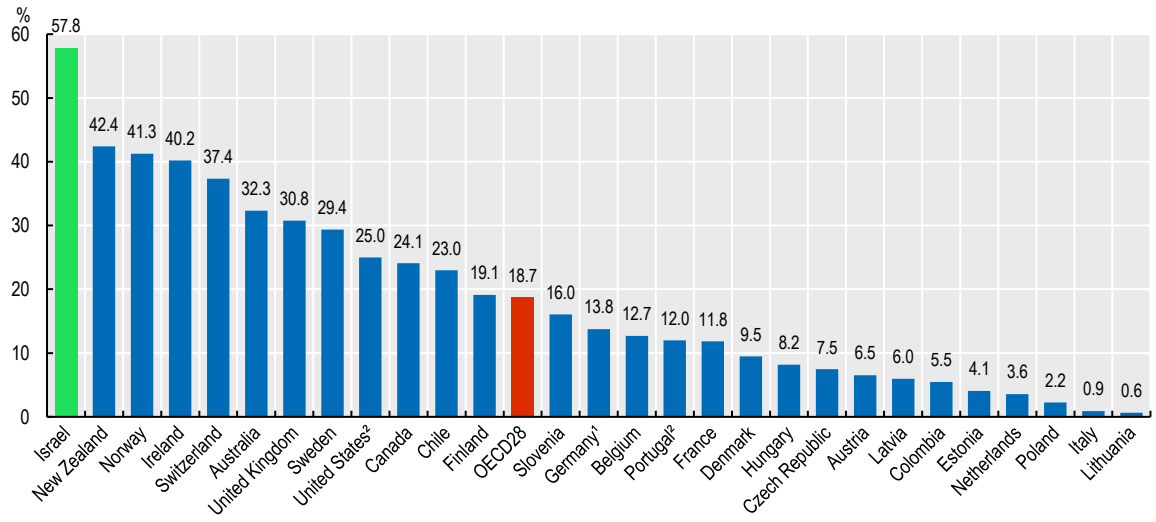


Note: These data by age structure relate to all doctors licensed to practice (not only the practicing).
Source: Physicians Registry maintained by the Medical Professions Division and Health Information Division in the Ministry of Health.

3.3. Israel has relied heavily on foreign-trained doctors, but the Yatziv reform on the accreditation of foreign medical schools will reduce sharply the inflow of Israeli overseas graduates available for internship and residency training starting in 2025

The increase in the number of doctors in Israel has been driven not only by growing numbers of domestic medical graduates completing their internship and residency training and entering the medical workforce, but also to a large extent by medical students who got their first medical degree outside Israel and went on to complete their internship and residency training and practice in Israel. These foreign-trained students and doctors include many Israeli students who went to study abroad because of a lack of places in medical schools in Israel and then returned to Israel. Israel stands out as the OECD country that relies the most on foreign-trained doctors to meet its domestic needs. In 2020, 58% of all doctors working in Israel had obtained at least their first medical degree in another country (Figure 4). This is only a small reduction from 60% in 2010.

Figure 4. The share of foreign-trained doctors in Israel was by far the highest among OECD countries in 2020



Notes: Foreign-trained doctors are defined as the place where they have obtained their first medical degree. 1. In Germany, data are based on nationality (not place of training). 2. The data for the United States and Portugal refer to 2016 and 2017 respectively.
Source: OECD Health Statistics 2022.

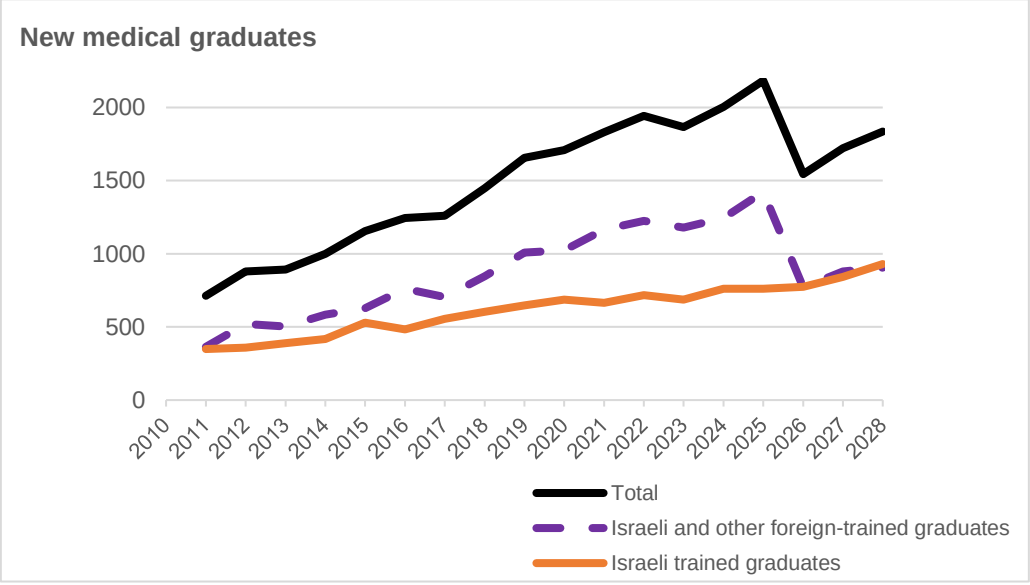
The main countries where foreign-trained doctors in Israel have obtained at least their first medical degree include Russia (although the number was declining between 2010 and 2020), Ukraine, Romania, Hungary and Moldova (with the number rapidly increasing over the past decade in these four countries). However, the inflow of medical graduates who have obtained their first medical degree in many of these countries (Russia, Ukraine, Moldova and at least some medical schools in Romania) will come to an end in 2025 when the Yatziv reform will start taking effect (Box 2).

Box 2. The Yatziv reform will restrict the accreditation of foreign medical schools and the pool of medical graduates with recognized foreign degrees starting in 2025

In 2019, the head of the Medical Professions Licensure Department in the Ministry of Health, Professor Yatziv, proposed a major reform concerning the accreditation of international medical studies to ensure minimum standards of quality. The most important proposal is to discredit (i.e. stop recognizing) degrees from medical schools in several countries (mainly non-OECD countries) in response to concerns about the quality of medical education. This proposal from the Yatziv reform was adopted, but the implementation of this new measure was deferred to 2025 to avoid affecting students who had begun their studies before 2019.

Hence, starting from 2025, only those students who have obtained a medical degree from accredited schools mainly in OECD countries will be allowed to take the exam to obtain a licence to pursue residency training in Israel. All other students who are obtaining a degree from discredited medical schools in countries like Russia, Ukraine, Moldova, Georgia and some medical schools in Romania will not be allowed to take the exam. This is expected to reduce by nearly 30% the pool of medical graduates who will be available to pursue their internship programme starting in 2025 and subsequent residency training, even after taking into account the increase in domestic graduates (Figure 5). This will result in a reduction in the number of fully-trained specialists available 5 to 7 years later (depending on the duration of the specialty training programme).

Figure 5. The number of new medical graduates available for internship is expected to fall sharply in Israel in 2025



Source: Ministry of Health

The Yatziv reform increases the urgency to expand as quickly as possible the capacity to train more students in Israel and to produce more medical graduates, as well as consider providing some support to Israeli students who are going to study in accredited schools abroad if the domestic capacity cannot be increased sufficiently rapidly.

4. Overview of trends in admission and graduation rates from medical education programmes in Israel and OECD countries

One of the most powerful levers that government in Israel and other OECD countries can use to increase the supply of doctors to replace those who will retire and meet any projected growth in demand is to increase the number of students admitted in domestic medical education programmes. This section compares the evolution of students admitted and graduating from medical schools in Israel with other OECD countries. It starts with the number of medical graduates because data are available for nearly all OECD countries based on the regular (annual) OECD data collection. It then looks at trends in student admission rates for a subgroup of OECD countries based on an *ad hoc* data collection carried out for this project.

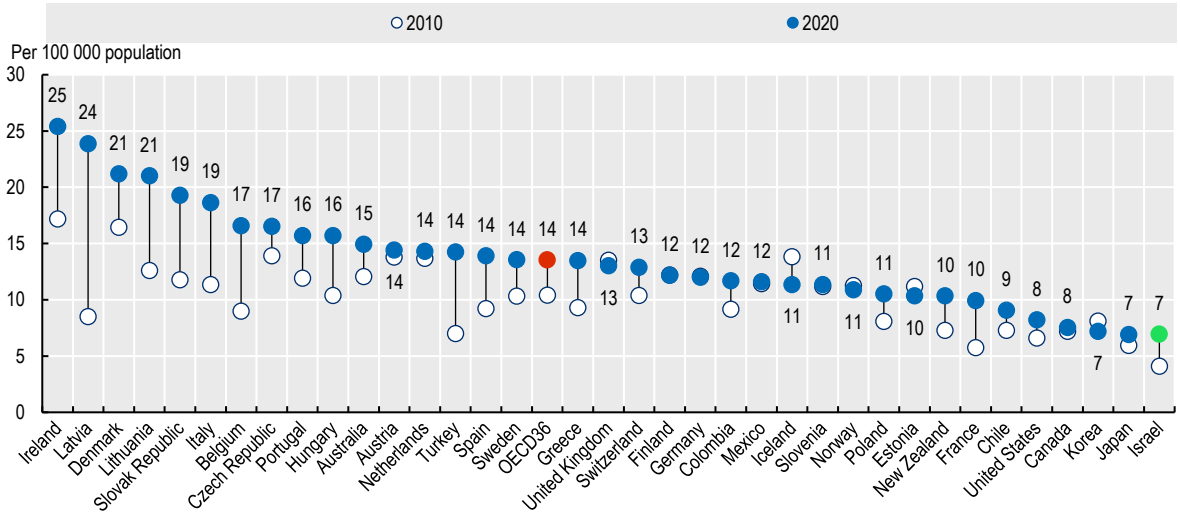
4.1. The number of medical graduates has increased in Israel, but remains the lowest of all OECD countries relative to the population size and the number of practicing doctors

The number of new domestic medical graduates is a good proxy indicator of the number of students who were admitted in medical education programmes three, four or six years earlier (depending on the length to various medical degree programmes) and a key indicator to assess the number of students who are becoming available to enter into postgraduate residency programmes (and specialty/sub-specialty training). The number of medical graduates in any given year reflects decisions that were made a few years earlier to admit students in various medical education programmes (six years earlier for undergraduate programmes that last six years, or four years for shorter programmes, usually for students who already have a university degree[1]), and the completion rates (or dropout rates) from these programmes.

When compared to both the population size and the number of currently practicing doctors, the number of new medical graduates in Israel in 2020 was the lowest among all OECD countries. Relative to population size, there were 7 new medical graduates per 100 000 population in Israel in 2020, two times less than the OECD average of 14 (Figure 6). And when measured relative to current practicing physicians, there were 21 new medical graduates per 1 000 practicing doctors in 2020, almost two times less than the OECD average (Figure 7). One way to interpret this last data on the number of medical graduates per currently practising doctor in Israel is that it would take about 50 years to replace current doctors if this graduation rate was to remain constant over time and if the country was solely relying on its domestic training capacity to replace its current supply of doctors (i.e. if there was no foreign-trained doctors coming into the country).

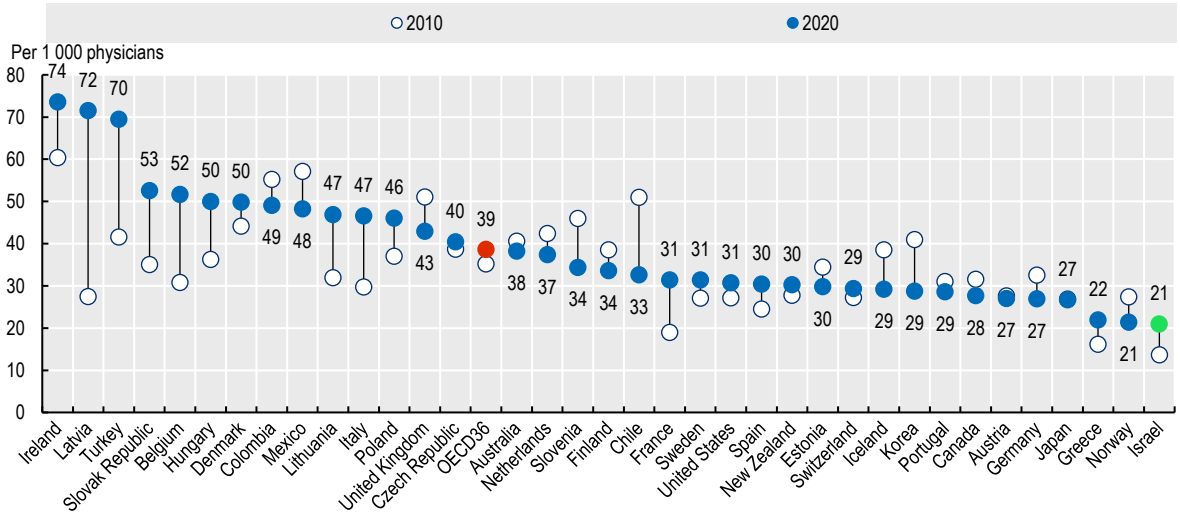
[1] See the next section for a description of the various medical education programmes in Israel.

Figure 6. Israel had the lowest number of domestic medical graduates relative to its population size in 2020 compared with other OECD countries



Notes: Medical graduates are defined as students who have graduated from medical schools in a given year. Israel excludes foreign students, while foreign students are included in many other countries (e.g., Ireland, Latvia, Lithuania, Slovak Republic, Czech Republic, Australia and Austria).
Source: OECD Health Statistics 2022.

Figure 7. Israel had the lowest number of medical graduates relative to the number of currently practicing physicians in 2020 compared with other OECD countries



Notes: Medical graduates are defined as students who have graduated from medical schools in a given year. Israel excludes foreign students, while foreign students are included in many other countries (e.g. Ireland, Latvia, Lithuania, Slovak Republic, Czech Republic, Australia and Austria).
Source: OECD Health Statistics 2022.

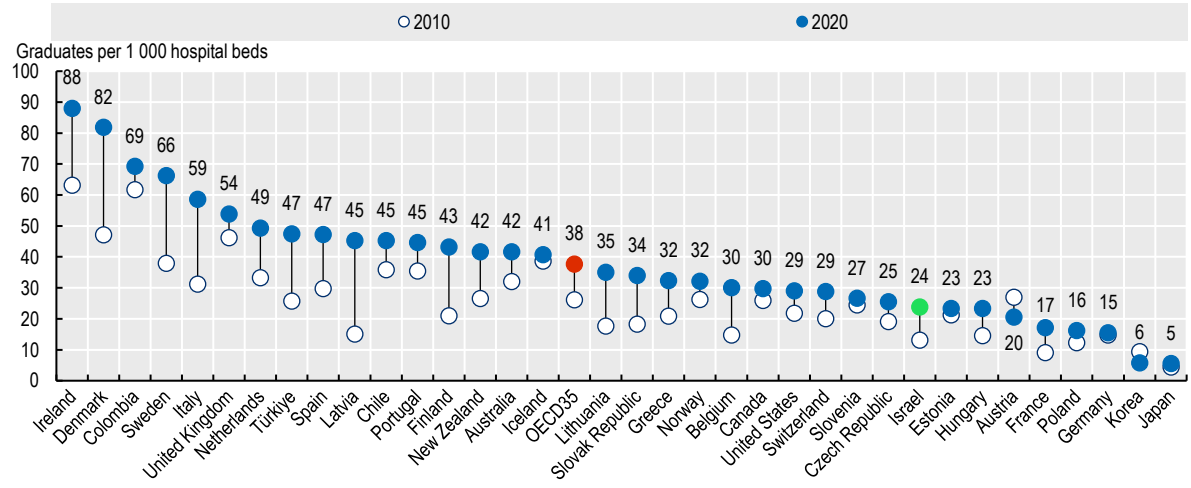
The comparability of the data on medical graduates is limited by the fact that while some countries like Israel excludes graduates from foreign student programmes, many other countries include them. In countries like Ireland, Latvia, Lithuania and the Slovak Republic, the high and rising number of medical graduates has been driven mainly by foreign students who in most cases do not stay in the country following graduation. However, to the extent that the indicator on medical graduates is used to determine the number of new graduates who will become available to start their postgraduate residency training, it is better to exclude the

foreign students who are not intending to stay in the country as Israel is doing in its data submission to the OECD.

The number of domestic medical graduates relative to overall population size was also fairly low in the two Asian countries that are members of the OECD (Japan and Korea). It was also low in Canada and the United States, two countries that have traditionally relied substantially on foreign-trained doctors to meet their domestic needs, but not to the same extent as Israel. In France, the number of domestic medical graduates relative to population size has nearly doubled over the past decade, reflecting the substantial increase in the number of students admitted in medical education (see next section). In the Netherlands, the number has been fairly stable over the past decade, but at a level two times higher than in Israel.

It is sometime argued that the medical education and training capacity in Israel is restricted by the limited number of hospital beds and hospital patients for the clinical component of the education and training programmes (e.g., the clinical rotations for students in the last three years of their undergraduate studies). Figure 8 compares the number of medical graduates per 1 000 hospital beds in Israel with other OECD countries. While the number of medical graduates relative to the number of hospital beds was not the lowest among OECD countries, it was still significantly lower than the OECD average (over one-third lower), indicating that most other countries had more graduates per hospital bed than Israel (Figure 8). Countries like the Netherlands and the United Kingdom manage to have two times more medical graduates relative to their hospital bed capacity than Israel.

Figure 8. Israel had fewer medical graduates relative to the number of hospital beds than most OECD countries in 2020, indicating sufficient capacity to provide clinical training



Notes: Medical graduates are defined as students who have graduated from medical schools in a given year. Israel excludes foreign students, while foreign students are included in many other countries (e.g. Ireland, Latvia, Lithuania, Slovak Republic, Czech Republic, Australia and Austria).Source: OECD calculations based on OECD Health Statistics 2022.

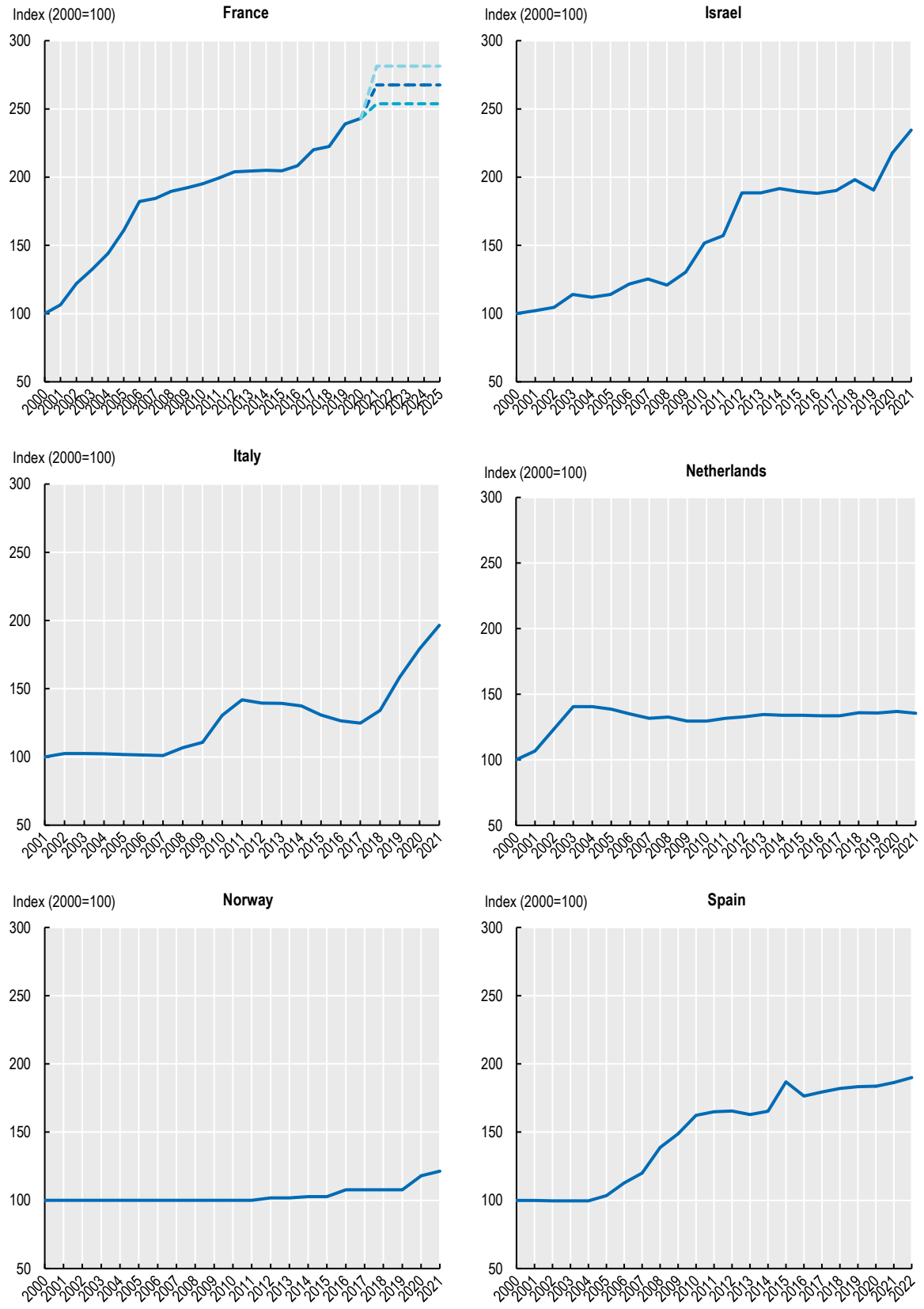
4.2. The number of students admitted in Israeli medical schools has increased as much as in other OECD countries, but it started from a low level

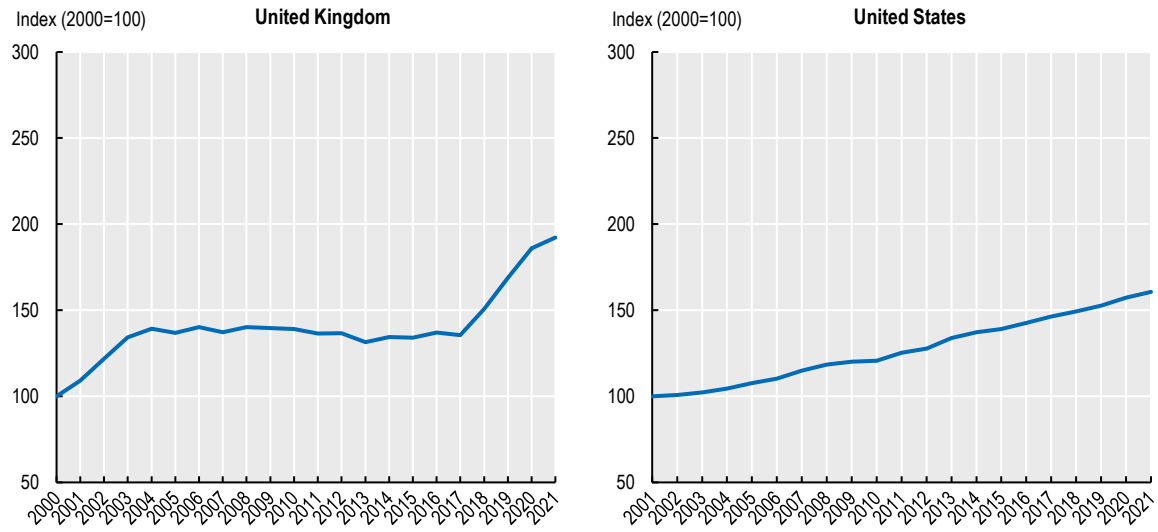
This section describes recent trends in admissions in medical education programmes in a subgroup of OECD countries, based on an *ad hoc* data collection carried out for this project.

This subgroup of OECD countries was selected based on the criteria of potential relevance to Israel and the feasibility of collecting these data.

Figure 9 shows the growth rates in student intakes in medical schools since 2000 in Israel and 7 other OECD countries. However, it is important to bear in mind that the starting point in terms of level varied widely across countries (Israel started from a lower base relative to the country's population size than all other countries). In Israel and most of these countries, the number of students admitted in medical schools has increased greatly since 2000, though at different paces and at different times. In France, the Netherlands and the United Kingdom, there was a strong increase in medical student intakes in the early 2000s, with the number afterwards stabilising at a higher level in the Netherlands, but with a further wave of expansion in recent years in France and the United Kingdom. In Italy, there was a first increase in student intakes in 2010 and 2011 (although a large part of this increase is simply due to the fact that the data coverage from 2010 onwards expanded to all medical schools rather than only 85% of the schools beforehand) and a recent big wave of expansion since 2018. In Spain, there has been a fairly steady and strong increase since 2005, with the number nearly doubling between 2005 and 2022. In the United States, the increase has also been fairly steady over the past two decades, but more moderate than in many European countries. By contrast, in Norway, the numbers were relatively stable until 2016 when the numbers started to go up slightly and there was another more important expansion in 2020 and 2021.

Figure 9. Student intakes in medical education programmes in Israel and other selected OECD countries, 2000 to 2021 (or latest year)





Note: In Italy, the large increase in student intakes in 2010 is due mainly to the fact that the data from this year cover all medical schools, while the data before 2010 only covered 85% of schools.

Sources: France: DREES, https://drees.solidarites-sante.gouv.fr/publications/les-dossiers-de-la-drees/quelle-demographie-recente-et-venir-pour-les-professions; Israel: Ministry of Health, "Degree courses of healthcare professions"; Italy: https://www.fioto.it/altreimg/Report%20Mastrillo%202021.pdf; Netherlands: Universities of the Netherlands; Norway: "Main admission to higher education at universities and colleges", Directorate for ICT and joint services in higher education and research, https://www.samordnaopptak.no/info/om/sokertall/sokertall-2021/faktanotat-hovedopptak-2021.pdf; Spain: until 2014, Ministry of Health, Social Services and Equality, and from 2015, Ministry of Universities, Statistics of University Students, EDUCAbase; United Kingdom: UCAS, https://www.ucas.com/data-and-analysis/undergraduate-statistics-and-reports/ucas-undergraduate-sector-level-end-cycle-data-resources-2021; United States: Association of American Medical Colleges (AAMC, https://www.aamc.org/data-reports/students-residents/interactive-data/2021-facts-applicants-and-matriculants-data) and American Association of Colleges of Osteopathic Medicine (AACOM, https://www.aacom.org/reports-programs-initiatives/aacom-reports/matriculants).

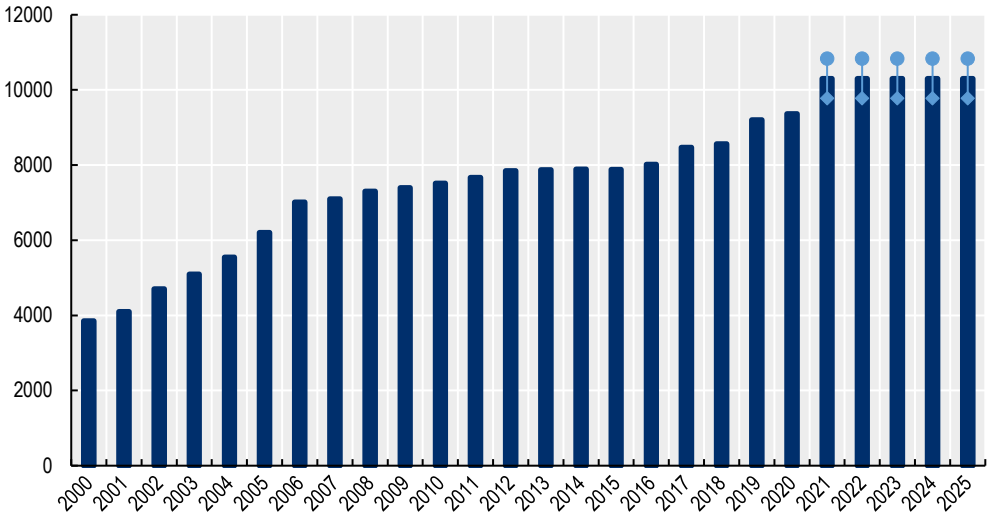
The next subsections describe briefly the rationale and practical approaches that were taken by the 7 OECD countries besides Israel to increase student intakes in medical education programmes over the past two decades.

4.2.1. Increases in student intakes in France

The number of students admitted in medical schools in France under what used to be called the *"numerus clausus"* has increased greatly since 2000, rising from 3 850 students in 2000 to nearly 10 000 in 2020, and the number will continue to rise between 2021 and 2025 under the new so-called *"numerus apertus"* (Figure 10).[2] There was a substantial expansion between 2000 and 2006 when the *"numerus clausus"* increased by over 80% (from 3 850 in 2000 to 7 100 in 2006). This expansion phase in fact started in the late 1990s, following a period of reduction in student admission in the 1980s up to the mid-1990s. Since 2016, there has been another major expansion in the number of students admitted in a context of growing concerns about current and future shortages of doctors, particularly in underserved areas (often referred as "medical deserts").

[2] The "numerus apertus" replaced the former "numerus clausus" in 2021 to reflect the fact that there would be greater flexibility in student intakes in any given year based on a minimum and maximum number rather any fixed number.

Figure 10. The number of students admitted in medical schools in France has increased greatly since 2000, and the number will continue to rise between 2021 and 2025



Note: The number of admissions is expected to be within the range of 9800 to 10800 between 2021 and 2025.
Source: DREES, https://drees.solidarites-sante.gouv.fr/publications/les-dossiers-de-la-drees/quelle-demographie-recente-et-venir-pour-les-professions

A 2021 report from ONDPS (Box 3) recommended an increase of about 20% in the number of students admitted in medicine over the five-year period 2021-2025 compared with the previous five-year period. Following the government's announcement that any fixed "*numerus clausus*" would be abandoned, the ONDPS report also recommended to introduce some flexibility in student intakes in medical schools, recommending a range with a minimum and maximum number each year (ONDPS, 2021). The French government adopted the ONDPS recommendations in September 2021, with the number of medical students set to rise within a range falling between 9 800 and 10 800 per year between 2021 and 2025 (Ministère des Solidarités et de la Santé, 2021).

The increase in medical student intakes in France has been mainly handled by increasing the number of students in existing medical schools, not by creating new medical schools.

Box 3. The National Observatory of Demography of Health Professions (ONDPS) in France is responsible for health workforce planning and making recommendations on student intakes in undergraduate and postgraduate studies

The National Observatory of Demography of Health Professions *(Observatoire National de la Démographie des Professions de Santé – ONDPS)* in France was created in 2003 to assist the Minister of Health in health workforce planning and provide analysis and recommendations to ensure that there would be a sufficient supply of different categories of doctors and other health professionals.

The ONDPS is responsible for collecting and publishing data on the demography of different categories of health professionals and to propose to government an overall number of students to be admitted in medical and other health education programmes and their regional distribution to ensure a sufficient supply across the French territory. It also provides

additional methodological support for the management of regional and local studies on practice conditions, training systems and the evolution of skill requirements for doctors and other health professions.

Until 2023, the Observatory's work was focusing on four professional groups only: doctors, dentists, pharmacists and midwives. Starting in 2023, its responsibilities will be expanded to also cover workforce planning, projections and making recommendations on student intakes in nursing and healthcare assistant programmes.

The ONDPS is an independent body, although the general secretariat supporting its technical work is part of the Research, Studies, Evaluation and Statistics branch of the French Ministry of Health.

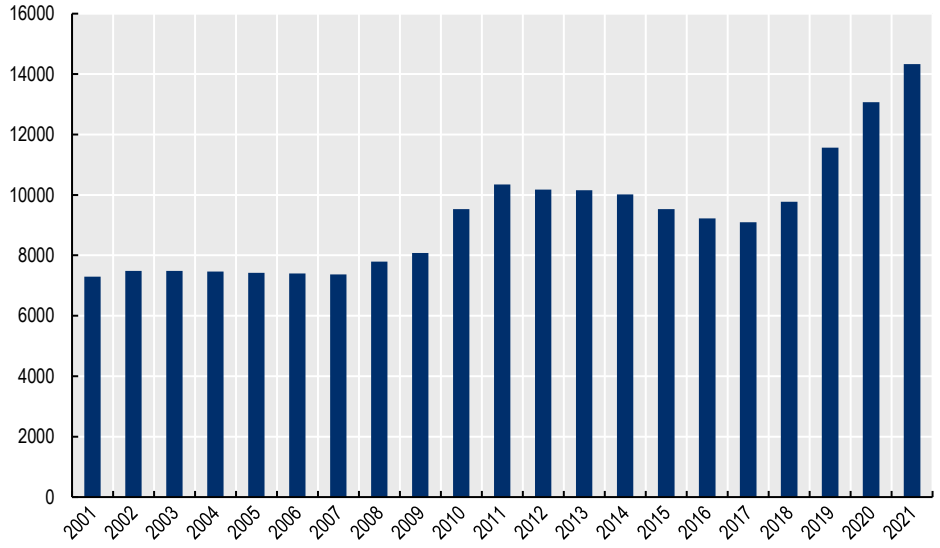
Source: ONDPS (Observatoire National de la Démographie des Professions de Santé) - Ministère de la Santé et de la Prévention (sante.gouv.fr)

4.2.2. Increases in student intakes in Italy

Since 1999, entry into medical education in Italy is regulated by the Ministry of Education, University and Research, with the selection based on a competitive entry exam. The Italian Ministry of Health consults regional authorities before formulating recommendations concerning student intakes in medical education to respond to projected future needs. These recommendations are then communicated to the Ministry of Education, University and Research, which controls the number of students admitted to medical schools.

The number of students admitted in medical schools in Italy remained relatively stable between 2001 and 2009. The large increase in 2010 is due mainly to the fact that the data from this year cover all medical schools, while the data before 2010 only covered 85% of schools. Following the global financial and economic crisis in 2008/09 and tight government budget constraints, the number of medical students admitted fell between 2011 and 2017. Since 2018 however, there has been a rapid increase in medical student intakes, with the number rising by more than 50% between 2018 and 2021 (Figure 11). This recent increase was driven partly by concerns that the number of newly-trained doctors would not be sufficient to replace all those doctors who will be retiring in the coming years (as shown in Figure 2 above, Italy has the highest proportion of doctors aged over 55, with more than 55% of all doctors falling in this age category in 2020; over 25% of doctors are 65 years old and over). The growth in the number of medical students was also driven partly by the rising number of foreign students in Italy's medical schools.

Figure 11. The number of students admitted in medical schools in Italy has increased greatly in recent years



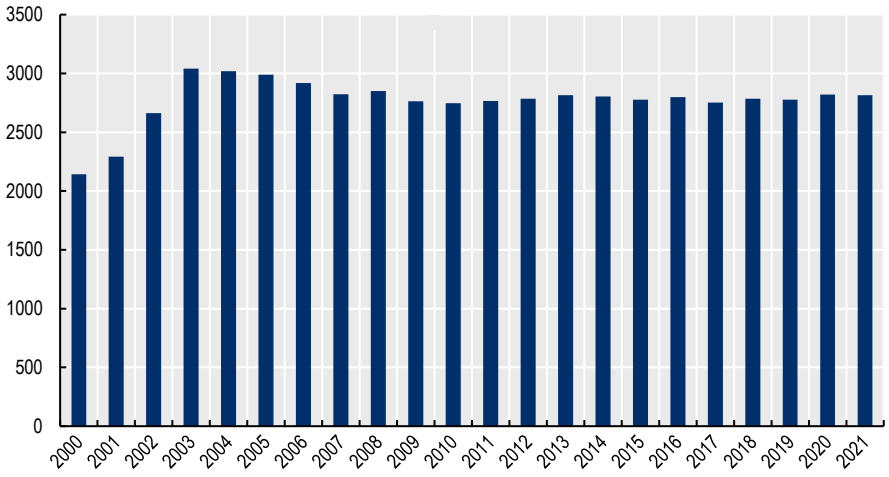
Note: The large increase in student intakes in 2010 is due mainly to the fact that the data from this year cover all medical schools, while the data before 2010 only covered 85% of schools.
Source: Mastrillio (2021), "Degree courses of healthcare professions", https://www.fioto.it/altreimg/Report%20Mastrillo%202021.pdf

4.2.3. Increases in student intakes in the Netherlands

Following the establishment of the Advisory Committee on Medical Manpower Planning (ACMMP) in the Netherlands in 1999 (see section 6.2 and section 7 below), the first recommendations from the ACMMP in the early 2000s called for a substantial expansion in the number of students admitted in medicine to avoid a projected shortage of doctors, which the government adopted. The Ministry of Education, Culture and Science and the Ministry of Health, Welfare and Sport define jointly the number of places available, and the Ministry of Education is responsible for funding. The eight medical schools in the country then establishes a capacity quota for their medical programme (under the Higher Education and Research Act) to meet these recommendations.

From 2000 to 2003, the medical student intake increased by 40% from about 2 200 in 2000 to slightly more than 3 000 in 2003. After reaching this higher level, the Advisory Committee's recommendations called for a more stable level of student intakes. The numbers have remained fairly stable over the past 20 years falling between 2 800 and 3 000 new students admitted each year (Figure 12). Section 6.2 and section 7 below provide more information on the ACMMP approach to making recommendations on student intakes and the final decisions made by government.

Figure 12. The number of students admitted in medical schools in the Netherlands increased sharply between 2000 and 2003 and has then remained relatively stable



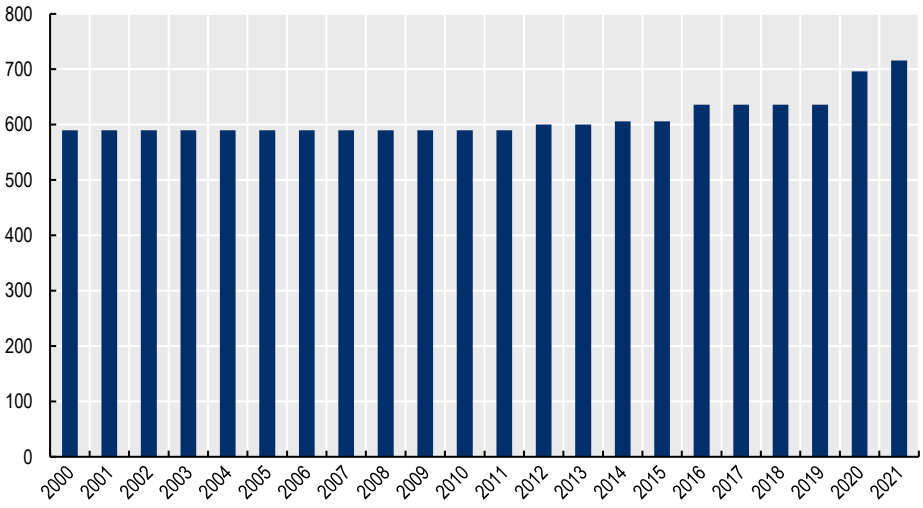
Source: Universities of the Netherlands

4.2.4. Increases in student intakes in Norway

Medical education programmes in Norway are offered in four universities (Oslo, Bergen, Trondheim and Tromsø). The number of students admitted in these medical schools only increased very marginally between 2000 and 2019, from 590 students in 2000 to 636 in 2019 (Figure 13). However, the Grimstad Committee recommended in 2019 to add a further 440 places by 2027, so that the domestic student intake would go up to 1 076 per year. The goal of the Grimstad Committee's recommendation was to educate 80 % of Norway's doctors domestically, so as to reduce the number of Norwegian students who are going to study medicine abroad because of lack of domestic capacity. The final report from Norway's 2023 Health Personnel Commission reaffirmed this goal (Norway's Health Personnel Commission, 2023). In 2020, 60 new places were allocated to the four universities with medical schools and another 20 places were added in 2021. At this pace, it is unlikely that the recommendation from the Grimstad Committee will be achieved by 2027.

The Norwegian government also continues to provide funding for Norwegian students who are going abroad to study medicine or any other recognised field of studies, providing additional capacity for students who are not able to get places at home (Box 4).

Figure 13. The number of students admitted in medical schools in Norway increased only marginally until 2019, but has started to go up in recent years



Source: "Main admission to higher education at universities and colleges", Directorate for ICT and joint services in higher education and research, https://www.samordnaopptak.no/info/om/sokertall/sokertall-2021/faktanotat-hovedopptak-2021.pdf

Box 4. Financial support for Norwegian students pursuing studies abroad

The Norwegian government offers financial support to Norwegian students studying in universities outside the Nordic region, regardless of their field of studies, through the Norwegian State Educational Loan Fund (Lånekassen). The funding support typically includes a combination of grants and loans (to be repayed with interest at a later date). Part of student loans can be converted into a grant under some conditions. The financial support is available to pay for tuition fees, basic livelihood support (housing, food and study materials), travel and additional support such as language grants.

To apply for such financial assistance, Norwegian students must have a high-school diploma from Norway, have an unconditional offer of admission to a bachelor's level or higher level degree programme from a foreign university, and apply for full-time studies. Students must renew their application every academic year and keep the Fund updated of academic progress by submitting documentation each year (proof of tuition fees payment, academic scores, diploma, etc.).

The loan remains interest-free during the study period. When students no longer receive the financial support for full-time studies, they need to start repaying the loan around nine months later (and start to pay interest on the loan if they cannot repay all the amount immediately). Up to 40% of the loan may be converted to a grant if students complete their studies and obtain their degree.

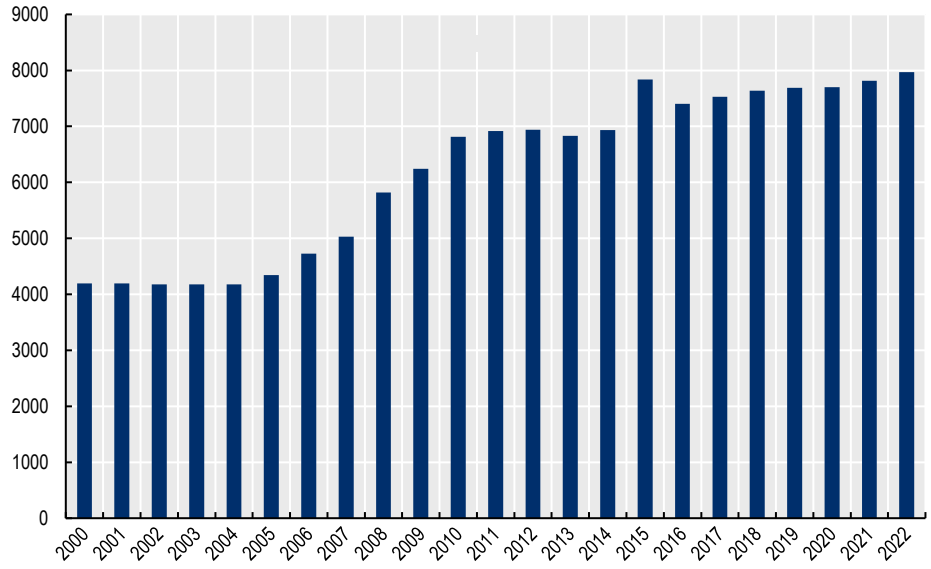
Source : Lanekassen - https://lanekassen.no/en-US/gjeld-og-betaling/what-are-student-loans/.

4.2.5. Increases in student intakes in Spain

Since 1994, Spain has regulated the number of students admitted to medical schools. The National Council on University Policy, which is reporting to the national Ministry of Education and regional Ministries of Education, is responsible for proposing the number of students admitted in medical schools each year (the "*numerus clausus*"). These proposals are then approved or adjusted by the autonomous regions and implemented in respective universities.

Over the past two decades, there has been a fairly steady increase in the number of students admitted in medical schools in Spain. Between 2004 and 2022, the number of new students nearly doubled, rising from about 4 200 in 2004 to nearly 8 000 students in 2022 (Figure 14). This increase is designed to tackle the projected reduction in the number of doctors in the coming years. This projected reduction is based on estimates that around 8 000 doctors will retire annually in the future, and the country has been planning to fill this gap with new graduates.

Figure 14. The number of students admitted in medical schools in Spain nearly doubled between 2004 and 2022



Source: Until 2014, Ministry of Health, Social Services and Equality; from 2015, Ministry of Universities, Statistics of University Students

The increase in the number of medical students was made possible by the opening of 18 new medical schools across the country between 2008 and 2022, bringing the number up to 46 medical schools in 2022.

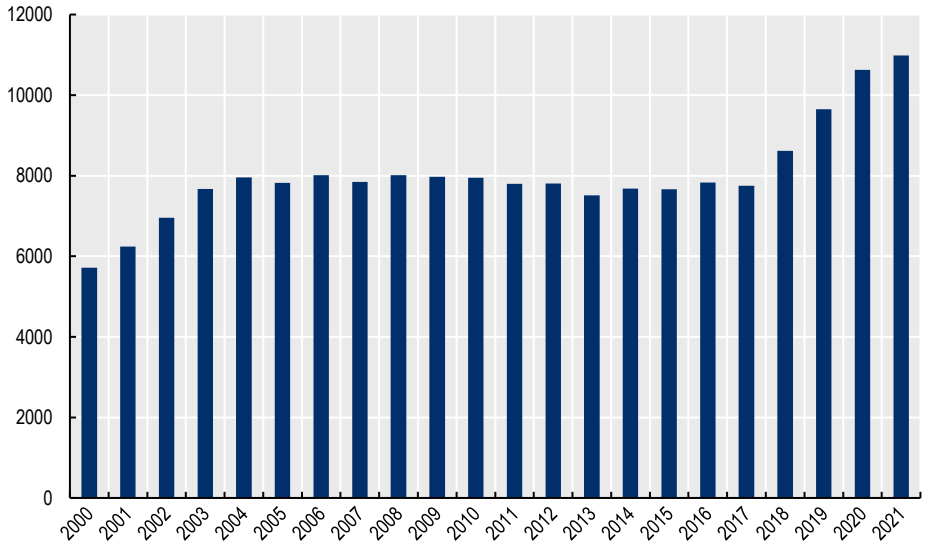
4.2.6. Increases in student intakes in United Kingdom

Admissions in medical education in the United Kingdom have nearly doubled since 2000, rising from 5 700 new students in 2000 to nearly 11 000 in 2021 (Figure 15). There was a first wave of expansion between 2000 and 2004, with the number then remaining fairly stable up to 2017, followed by a new wave of expansion starting in 2018.

In October 2016, the Secretary of State for Health announced the Government's commitment to gradually expand undergraduate medical training places by 1 500, starting from September

2018. The stated aims of this expansion were to increase the supply of doctors and to provide more opportunities for students with the talent and ambition to train as a doctor. The number of medical students admitted exceeded these initial objectives: 870 additional students were admitted in 2018, an additional 1 030 students in 2019, and an additional 975 students in 2020. Between 2017 and 2021, the number has increased by over 40% (from 7 750 in 2017 to nearly 11 000 in 2021).

Figure 15. Admissions in medical schools in the United Kingdom nearly doubled since 2000



Source: Universities and Colleges Admissions Service (UCAS), https://www.ucas.com/data-and-analysis/undergraduate-statistics-and-reports/ucas-undergraduate-sector-level-end-cycle-data-resources-2021

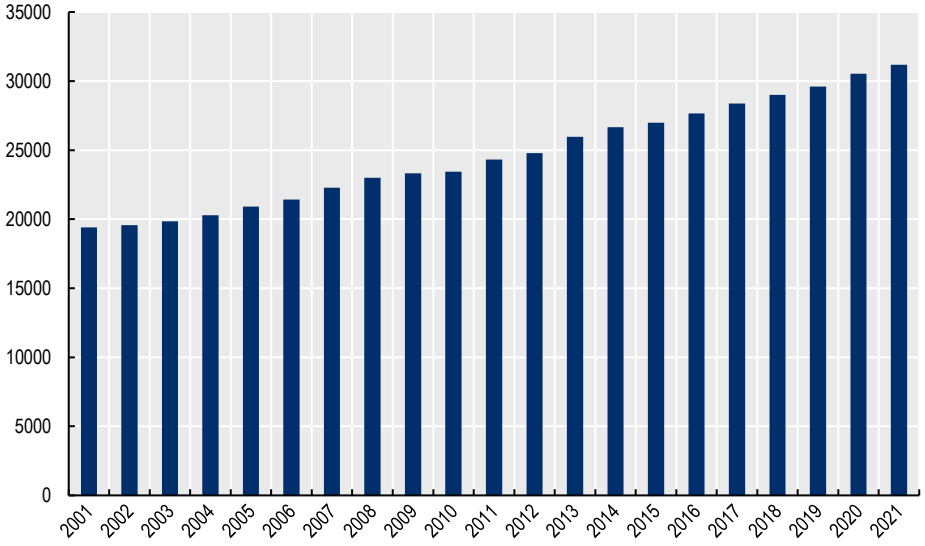
The growing number of medical schools allowed this large increase in student intakes, together with the increase intakes in existing schools. In 2021, there were 40 universities with a medical school across the United Kingdom, nine more than in 2014. In addition, a number of existing medical schools were relatively small and able to expand further.

Medical schools said that the main limiting factor to further expand student intakes was access to clinical placements, particularly in primary care settings. However, the new primary care tariff for undergraduate studies adopted in April 2022 is expected to address this constraint and increase substantially the number of clinical placements in primary care. For the first time, this new undergraduate tariff introduces consistent national resourcing of medical student clinical teaching regardless of setting (hospital or primary care).

4.2.7. Increases in student intakes in the United States

The United States has also seen a substantial, albeit gradual, increase in the number of students admitted in medical schools over the past two decades, although the growth has been more modest than in the United Kingdom and France. Between 2001 and 2021, student intakes in American medical schools increased by 60%, from around 19 000 students in 2001 up to nearly 32 000 in 2021 (Figure 16). This growth was linked to various reports raising concerns about growing shortages of doctors. 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). This objective has been met.

Figure 16. Student intakes in medical schools in the United States increased by 60% between 2001 and 2021



Source: Association of American Medical Colleges (AAMC, https://www.aamc.org/data-reports/students-residents/interactive-data/2021-facts-applicants-and-matriculants-data) and American Association of Colleges of Osteopathic Medicine (AACOM, https://www.aacom.org/reports-programs-initiatives/aacom-reports/matriculants)

Two main factors have supported the increase in student intakes in the United States: 1) at least 30 new medical schools have opened over the past 20 years; and 2) existing medical schools have expanded their student intake.

At the same time, the number of Americans studying medicine abroad has also increased, notably in Caribbean countries, but also in European countries and in Israel. Most of these American students have had the intention to come back to the United States to complete their postgraduate residency training and practice. One of the issues has been that the number of residency training posts has not kept pace with the growing number of domestic graduates and American students graduating from medical schools abroad, thereby creating a bottleneck particularly for foreign graduates wishing to complete their medical training in the United States. The Resident Physician Shortage Reduction Act of 2023 aims to gradually expand the number of publicly-supported medical residency positions by 14,000 over seven years (AAMC, 2023).

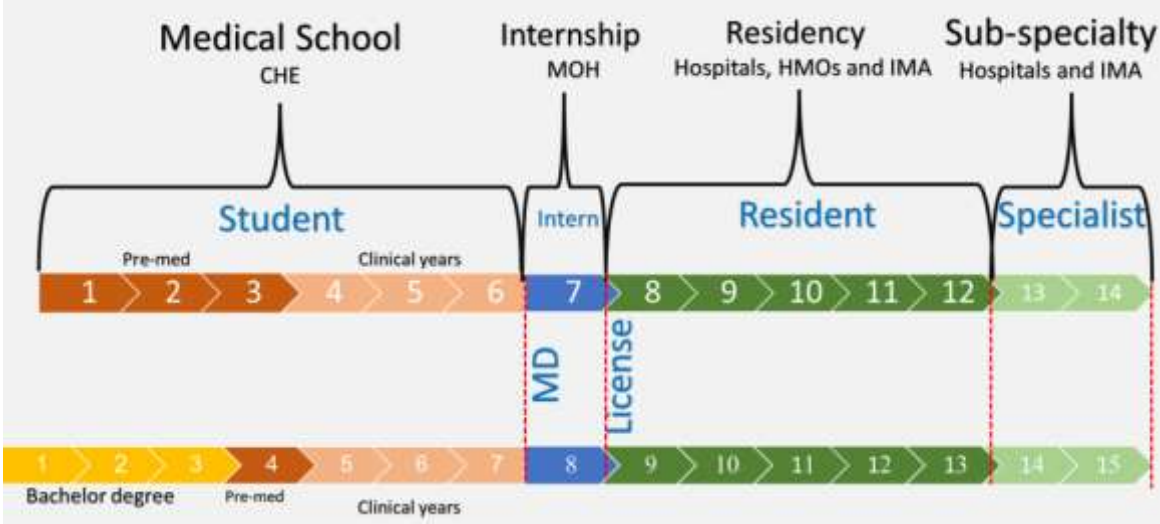
5. Review of medical student intakes in Israel over the past 20 years

5.1. Introduction: Overview of medical education and training pathway in Israel

As in other OECD countries, the first step in the education and training of doctors in Israel is for students to obtain a first medical degree from a recognized medical school. These studies generally last 6 years for students coming directly from high school (4 years only for students who already have a bachelor's degree). In Israel, this is followed by a one-year internship period, which is required to get a license to practice and pursue postgraduate residency training. The final step in the training process is the residency (or specialty) training, which

lasts 5-7 years depending on specialties. So overall, it takes 12-14 years for students entering a medical school from high school to complete their education and training (Figure 17). Box 5 briefly compares the length of the education and training process of doctors in Israel with other OECD countries.

Figure 17. The education and training pathway to become a doctor in Israel



Source: Ministry of Health

Box 5. How does the duration of medical education and training in Israel compare with other OECD countries?

In many other OECD countries (e.g. France, Italy, Netherlands, Spain), the first medical degree for students entering university directly from high school lasts 6 years, as is the case also in Israel.

By contrast with Israel, some countries such as France and Italy do not have a one-year internship period at the end of the first medical degree, and students move immediately into residency training. Some other countries like Spain and Portugal do have such a one-year internship period. In the Netherlands, this internship period only lasts 6 months and occurs at the end of the last year of the first medical degree. In Israel, the 2021/22 Gamzo Committee recommended to reduce the length of the internship period and to include it in the last year of the first medical degree, as done in the Netherlands (see Annex 1).

Postgraduate residency training programmes in other OECD countries generally last 4-6 years, depending on the country and specialty, about one year less than in Israel.

This section focusses on trends in student intakes in basic medical education programmes in Israel. It starts by providing a brief overview of the historical development of medical schools in Israel since its creation in 1948 and reviews student intakes over the past two decades in the growing number of medical schools (six medical schools now). It then summarises some of the key findings and recommendations from a number of previous *ad hoc* committees that

successive Israeli governments have set over the past few decades to address the persisting issue of doctor shortages and to obtain policy advice about medical student intakes as an important lever to increase the supply. This section concludes with a call for the establishment of a more stable and permanent health workforce planning function and governance structure in Israel that would help achieve greater consensus among the main stakeholders on the future requirements of different categories of doctors and other paramedical professions.

5.2. The growing number of students admitted in medical schools in Israel was made possible by the expansion of existing medical schools and the creation of new schools

The first medical school in Israel was created in 1949 (Hadassah School of Medicine in Hebrew University). Three additional medical schools were created in the 1960s and 1970s (Sackler Faculty of Medicine in Tel Aviv University, Ruth and Bruce Rappaport Faculty of Medicine in the Technion in Haifa, and the Faculty of Health Sciences at the Ben-Gurion University of the Negev in Beer Sheva). The two most recent medical schools were established in 2011-12 (the Faculty of Medicine at Bar Ilan University in Safed) and in 2018 (Adelson School of Medicine in Ariel University).

These six medical schools offer different medical education programmes for students entering university directly from high school (6 years track), for students who already have a university bachelor's degree (usually 4 years track), and for foreign students (Table 2).

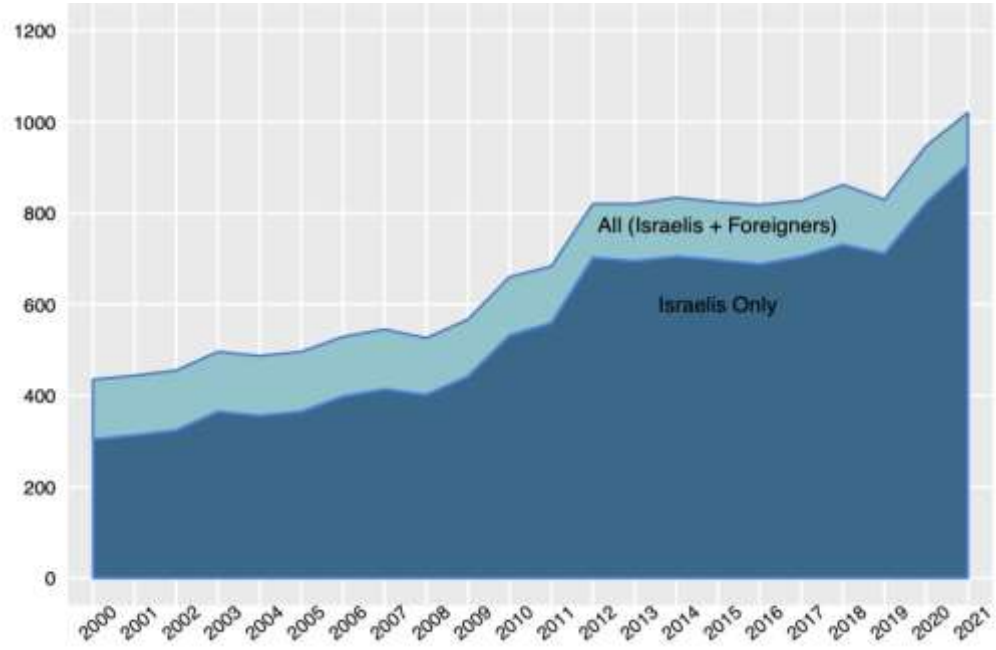
Table 2. Brief overview of the six medical schools in Israel

	Name	Year of establishment	Programmes offered	Newly-enrolled students (2021)
1.	Sackler Faculty of Medicine, Tel Aviv University	1964	• 6 years track • 4 years track • Foreign students	• 125 • 76 • 57 Total: 258
2.	Hebrew University Hadassah School of Medicine, Jerusalem	1949	• 6 years track • "Tzameret" Military	• 120 • 72 Total: 192
3.	Faculty of Health Sciences, Ben-Gurion University of the Negev, Beer Sheva	1974	• 6 years track • Foreign students	• 160 • 32 Total: 192
4.	Ruth and Bruce Rappaport Faculty of Medicine, The Technion, Haifa	1969-70	• 6 years track • Foreign students	• 133 • 24 Total: 157
5.	Faculty of Medicine, Bar Ilan University, Safed	2011-12	• 4 years track • 3 years track	• 103 • 48 Total: 151
6.	Adelson School of Medicine, Ariel University	2018	• 4 years track	• 70

Note: The order of medical schools is based on the number of newly-enrolled students in 2021.
Source: Ministry of Health.

The number of new students admitted in medical schools in Israel has increased substantially over the past 20 years. Figure 18 shows the overall increase in all medical schools, including a breakdown of students between Israeli students and foreign students in the three medical schools offering foreign student programmes. The overall number increased from 435 students in 2000 to 1 020 in 2021. This increase has been driven mainly by a rise in domestic (Israeli) students, as the number of foreign students has decreased slightly over time (from about 130 in 2000 to 110 in 2021). While the number of students admitted in medical schools has increased greatly over the past two decades, it started from a very low base in 2000, and this growth also occurred along with strong population growth in Israel. This explains why Israel still had the lowest number of medical graduates per population in 2020 among all OECD countries, as shown in Figure 6 above.

Figure 18. Increase in student intakes in Israeli medical schools between 2000 and 2021



Source: Ministry of Health

The increase in student intakes over the past two decades was made possible through both increasing the capacity in existing medical schools and the creation of two new medical schools in 2011-12 and 2018. Table 3 shows trends in admission of new students by medical schools and type of programmes since 2010. The number of students has increased particularly rapidly in the four medical schools that offer 4-year or 3-year programmes for students who already have a bachelor's degree.

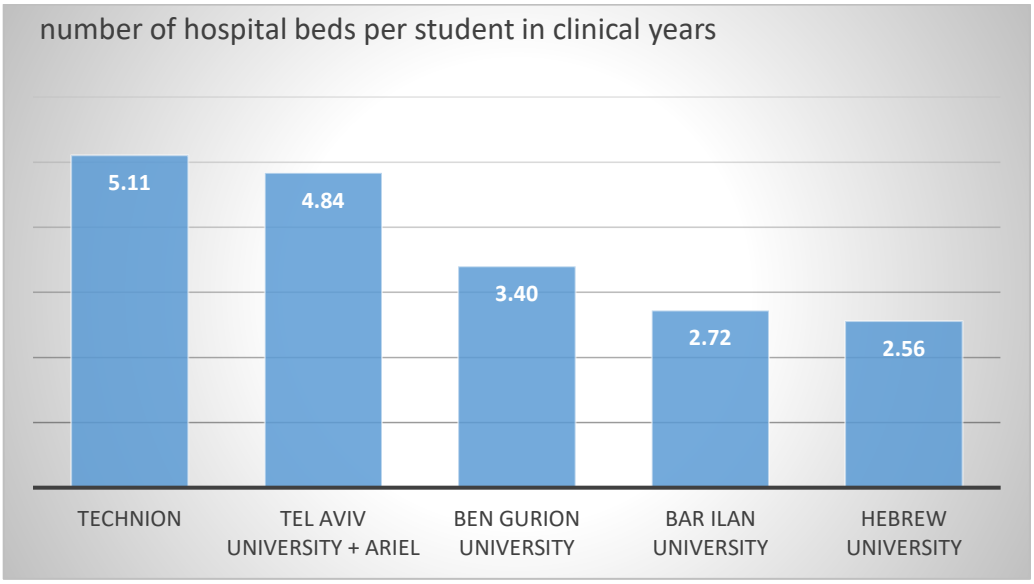
Table 3. Number of new medical students in Israel by medical school and programme, 2010 - 2021

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Tel Aviv 6 years track	118	124	122	123	119	121	123	115	124	120	125	125
Tel Aviv 4 years track	59	68	65	66	63	64	62	65	73	70	75	76
Tel Aviv Foreign students	61	62	59	62	63	63	64	61	63	61	62	57
Hebrew University 6 years track	104	110	105	109	109	111	105	100	110	110	110	120
Hebrew University "Tzameret" Military	70	69	72	70	70	71	68	68	70	70	72	72
Ben Gurion 6 years track	76	79	85	88	90	117	110	117	120	119	125	160
Ben Gurion Foreign students	35	33	33	35	32	32	34	29	33	31	35	32
Technion 6 years track	105	109	130	121	133	110	120	130	112	100	120	133
Technion Foreign students	32	29	26	28	34	32	32	33	35	26	27	24
Bar Ilan 4 years track			69	71	70	64	64	75	79	77	72	103
Bar Ilan 3 years track			54	47	51	39	36	34	43	45	54	48
Ariel 4 years track											70	70
Total Israeli students	**532**	**559**	**702**	**695**	**705**	**697**	**688**	**704**	**731**	**711**	**823**	**907**
Total Foreign students	**128**	**124**	**118**	**125**	**129**	**127**	**130**	**123**	**131**	**118**	**124**	**113**
Total number of students	**660**	**683**	**820**	**820**	**834**	**824**	**818**	**827**	**862**	**829**	**947**	**1020**

Source: Ministry of Health

As noted in section 4 above, it is sometimes argued that medical education capacity in Israel is restricted by the limited number of hospital beds and hospital patients for the clinical part of education programmes (e.g., the clinical rotations for students in the last three years of undergraduate studies). Figure 19 shows that the number of beds in hospitals affiliated to the six medical schools compared with the total number of students in their last three clinical years varied two-fold between the medical school that had the lowest ratio (Hebrew University) and the highest ratio (Technion Faculty of Medicine) in 2022. This suggests that there is still some extra capacity in those medical schools where the beds per student ratio is relatively high.

Figure 19. The number of hospital beds per student in clinical years varies greatly across medical schools



Note: The number of beds only includes those in major fields (i.e., departments that can teach major subjects such as Internal medicine, surgery, paediatrics). Ariel university has been affiliated with Tel Aviv university. The data refer to 2022.
Source: Ministry of Health

The increase in the number of students admitted in Israeli medical schools over the past two decades was supported by the many *ad hoc* advisory committees that were set up to suggest possible ways to address doctor shortages.

5.3. Previous *ad hoc* advisory committees in Israel have called for a strengthening of health workforce planning and increases in medical student intakes

Over the past few decades, successive Israeli governments have established a number of *ad hoc* committees to seek advice on how to deal with the shortage of doctors and to make recommendations on medical student intakes to address these shortages, often as a response to a crisis. Already in 1990, the State Commission of Inquiry on the functioning and efficiency of the healthcare system in Israel (Netanyahu Committee) recommended the establishment of a health workforce planning division in the Ministry of Health to collect information and data on the current health workforce and develop models to assess future needs and demand based on demographic changes, technological changes and other factors that might affect the demand for doctors and other categories of health workers. Only in the past few years has the Ministry of Health taken steps to start building such a health workforce planning division.

Annex 1 summarises some key findings and recommendations from some of these previous committees that have been asked to provide advice to government. Many of the recommendations of these *ad hoc* committees have called for a substantial increase in medical student intakes, with these recommendations based on various quality of data and workforce planning models. While some of these recommendations were adopted by government and have contributed to the growing number of student intakes, many others were

not. Most of these past *ad hoc* committees emphasise the need for a long-term planning process, given the time it takes to train new doctors.

5.4. Recent development in health workforce planning in the Israeli Ministry of Health is a first step in the right direction, but it needs to be consolidated

Over the past few years, progress has been achieved within the Ministry of Health to develop a health workforce planning and forecasting capacity by creating a new dedicated division. Progress has been achieved in improving databases and filling key data gaps to support health workforce planning, including on the number of residents pursuing their specialty training programmes in different teaching hospitals (see section 6). This new division has developed a new and more robust projection model for doctors, including key variables on the projected inflows and outflows.

As the OECD noted in its earlier review of health workforce planning models in OECD countries, health workforce planning is not an exact science that will give definitive results. Workforce planning models need to be continuously developed and regularly updated to take into account the availability of new and better data, changes in demographic and non-demographic factors that may affect the supply and demand, and the effects of new policies on the inflows and outflows of doctors and other paramedical professions (OECD, 2013).

As the Dutch example shows, the strengthening of the health workforce planning capacity also needs to go hand-in-hand with a governance structure that will support both the continuous development of the models and acceptance and support of the recommendations arising from the projections by key stakeholders (see section 7).

6. Review of postgraduate residency training programmes in Israel and selected OECD countries (Netherlands and France)

This section reviews the second step in the education and training process of doctors in Israel and other OECD countries following the obtention of a first medical degree – the postgraduate residency training programmes. By comparison with other OECD countries, the organisation of residency training in Israel and the selection process of medical graduates into the different specialty training programmes is driven mainly by free market forces with little government planning and interventions.

This section compares the organisation and outcome of postgraduate training programmes in Israel with two other OECD countries (Netherlands and France). Annex 3 provides additional information on the selection process of medical graduates in residency programmes in two other OECD countries (United States and Spain).

6.1. The current organisation and selection process in residency training programmes in Israel is based mainly on a free market approach

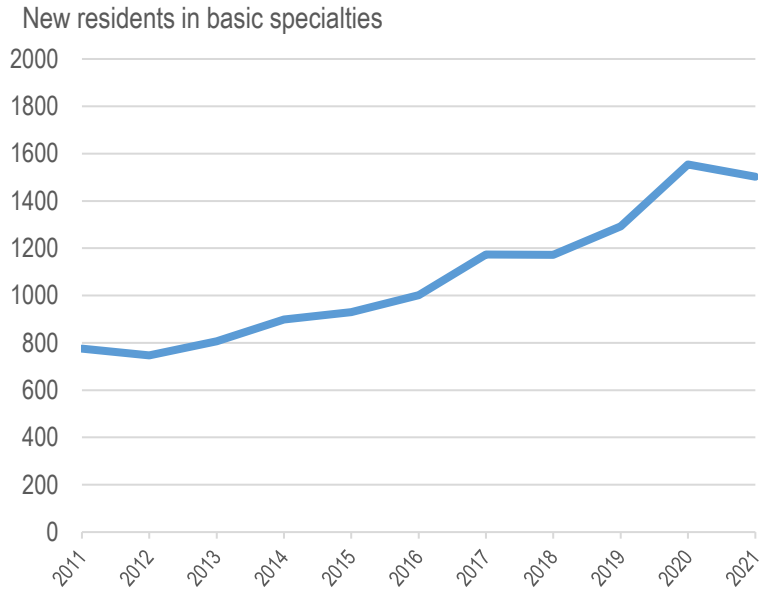
By comparison with other OECD countries, the organisation of residency training programmes in Israel is characterised by a free market approach with little government interventions. Funding for residency training programmes are included in the general budget of accredited training hospitals, and training hospitals and the Israeli Medical Association (IMA) are free to

determine how many residency positions will be opened each year and in which specialty. These decisions are often based on short-term operational considerations rather than longer-term considerations about future health system requirements that would include the needs of other stakeholders such as HMOs, which are also providers of secondary care in Israel. The allocation of places in each training hospital is based mainly on the capacity and desire of training hospitals and specialist doctor supervisors to take on more residents, not on the needs in the region where training hospitals are located. The selection process of residents is left at the discretion of each training hospital and specialist training supervisor. The IMA is also responsible for regulating residencies, determining the syllabus (content) for each residency, deciding which departments are eligible to train residents, and tracking the resident's progress during the training, including final specialty exams. The Ministry of Health does not have full data on the number of residents per specialty and cannot plan the training based on a national perspective of healthcare needs in Israel.

The maximum number of residency training places that may be offered in any given year is driven by the number of new domestic graduates from Israeli medical schools who are successfully completing their one-year internship and the large number of Israeli graduates who have obtained their first medical degree abroad and are also in the process of completing their internship in Israel.

Figure 20 shows that there has been a substantial increase in the number of new residency training places in Israel over the past decade, with the number nearly doubling between 2011 and 2021. This large increase was made possible by the sharp increase in both the number of new domestic graduates from Israeli medical schools and Israeli graduates who obtained their first medical degree abroad. However, as noted in the previous section, the Yatziv reform is expected to lead to a sharp reduction in the number of Israeli graduates from abroad who will be available to start their internship and residency training in 2025.

Figure 20. The number of new residents increased greatly in Israel over the past decade



Note: These data only include new residents in basic specialties (not in subspecialties). The small reduction in 2021 followed the particularly large increase in 2020 to respond to urgent needs during the first year of the COVID-19 pandemic.
Source: Ministry of Health

In 2021, the highest number of new residents In Israel were specialising in internal medicine (267 new residents or 18% of the total in that year), although there has been a sharp reduction between 2020 and 2021 that followed a sharp increase in 2020 (Table 4). Family medicine was the second largest specialty of new intake of residents in 2021. While the number of new residents in family medicine steadily increased between 2017 and 2021, they still only represented about 15 % of the overall intake in 2021. By comparison, at least 40 % of new intake in residency training programmes in the Netherlands and France are in family medicine (see next sections).

When it comes to other specialties, the numbers fluctuated by more than 10 % either upward or downward in most specialties between 2017 and 2021 in both smaller specialties and larger ones. This indicates a lack of long-term planning at the national level.

The COVID-19 pandemic had an impact on the overall number and composition of residency posts in 2020. The number of residents increased greatly in some specialties in 2020 (e.g., emergency medicine, clinical microbiology, and anaesthesiology), with the number then coming down at least slightly in 2021.

Table 4. New residents in Israel by clinical specialties, 2017 to 2021

	Intake of residents				
Basic specialties	**2017**	**2018**	**2019**	**2020**	**2021**
Anatomic pathology	10	10	19	13	17
Anaesthesiology	75	73	80	116	91
Child and adolescent psychiatry	13	12	20	12	19
Clinical immunology and allergology	1	0	1	1	1
Clinical microbiology	2	2	0	14	6
Dermatology and venereal diseases	3	10	13	13	20
Diagnostic radiology	42	49	53	42	39
Emergency medicine	28	35	36	63	46
Forensic medicine	0	4	2	2	0
General surgery	55	49	55	54	58
Geriatrics	27	24	32	49	70
Internal medicine	243	220	225	345	267
Neurology	22	28	36	40	37
Neurosurgery	9	7	11	9	10
Nuclear medicine	1	6	7	5	6
Obstetrics and gynaecology	105	106	96	105	114
Occupational medicine	5	2	8	8	5
Oncology	22	22	17	29	21
Ophthalmology	61	45	51	53	51
Orthopaedic surgery	64	60	62	58	66
Otolaryngology diseases and head and neck surgery	23	37	25	28	35
Paediatrics	140	134	170	179	176
Plastic surgery	15	9	14	17	14
Psychiatry	52	55	66	68	63
Public health	4	2	4	5	10
Thoracic surgery	10	9	10	12	7
Urologic surgery	15	19	16	22	27
Vascular surgery	4	8	4	9	8
Family medicine	**122**	**135**	**160**	**183**	**218**
Overall number of new residents (basic specialties)	**1173**	**1172**	**1293**	**1554**	**1502**

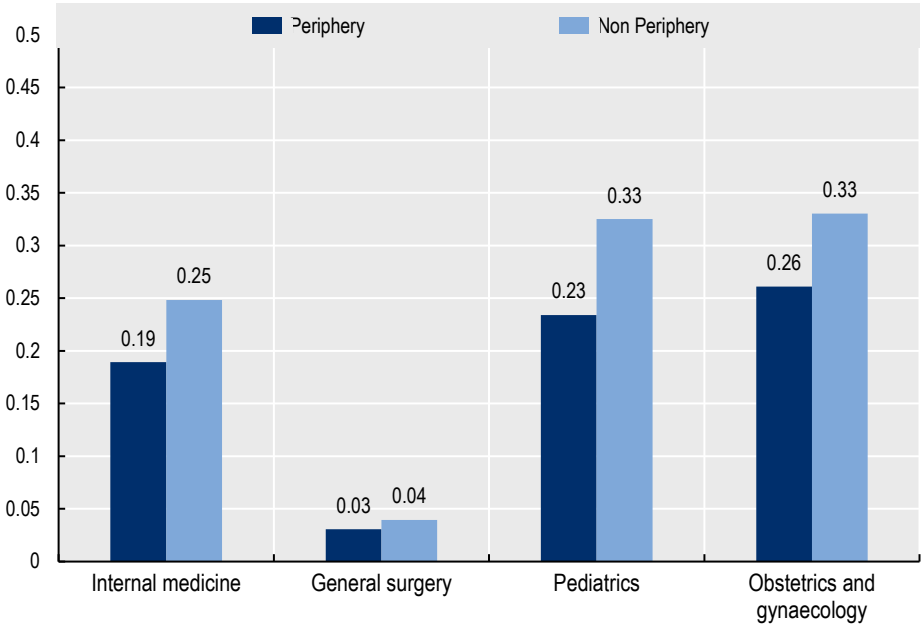
Note: These data only include new residents in basic specialties (not in subspecialties).
Source: Ministry of Health

The increase in the number of residency positions over the past ten years was spread out across the different teaching hospitals to various extent. When looking at the situation in 2022, there was a lot of variation in both the overall number of residents (in all years, not only the new residents) across the 24 training hospitals, ranging from less than 50 in some hospitals to over 400 in others. There was also substantial variations in the number of beds per resident, ranging from about 2 beds in some hospitals to over 6 beds in others. There was no clear correlation between the number of residents and the number of hospital beds per resident: some hospitals that have a low number of residents have a high number of beds per resident and vice versa. This suggests somee further room to increase the number of residency training

places in several hospitals if there were to be a growing pool of new medical graduates to fill these positions.

As shown in Figure 21, the number of residents per hospital bed in large specialties such as obstetrics and gynaecology, paediatrics, general surgery and internal medicine, also varies by geographic areas. It is significantly lower in the periphery (about 30 % lower) than in the non-periphery areas. This also suggests possible room for expansion in hospitals in the periphery.

Figure 21. The number of residents per hospital bed in the periphery is generally much lower



Note: The data refer to all residents (not only new residents) and refer to 2022.
Source: Ministry of Health

That being said, it is important to bear in mind that the capacity to provide residency positions depends not only on the availability of hospital beds, but also on the availability and quality of the specialist trainer (supervisor) and other training staff if the residency is intended to provide meaningful and quality training experiences. The capacity also depends on the possibility to do at least part of the residency training outside hospitals.

6.2. Residency training in the Netherlands is based on robust workforce planning, consensus recommendations from stakeholders, and government decision-making

By contrast with Israel, the approach to set the overall number and composition of new residency training places in the Netherlands is based on greater planning by the various stakeholders and greater government interventions. As described in more detail in section 7, since 2000 the ACMMP has been tasked to make recommendations to government on the annual intake in postgraduate residency training programmes for each medical specialty, based on the projected supply and demand.[3]

6.2.1. Planning of residency training by specialty in the Netherlands

Since 2000, the ACMMP has issued comprehensive recommendations on intakes in residency training programmes by specialty about once every three years (2000, 2003, 2005, 2008, 2010, 2013, 2016, 2019 and 2022). In addition to these recommendations covering all specialties, the ACMMP has also issued "interim" recommendations on some occasions over the past 20 years focussing on specific clinical areas. Such interim recommendations are issued if it becomes apparent from the continuous monitoring of healthcare supply and demand that interim adjustments are required. For example, some interim recommendations have concerned general practice and some specialties (e.g., gastroenterology).

Based on the projected supply and demand under the most likely scenarios, the ACMMP calculates the required annual intake in residency training programmes by specialty. Table 5 presents the results of these recommendations from the last two ACMMP comprehensive reports in 2019 and 2022 for 31 specialties and family medicine (general medical practice). The recommended number of residency places in most clinical specialties either remained stable or increased slightly between the 2019 and 2022. However, the most striking change has been a recommendation to increase greatly the number of residents in family medicine/general practice (by 35 %). This recommendation was driven by three main factors: 1) the rising demand for primary care due to demographic changes; 2) an increasing "horizontal substitution" of tasks from different specialty areas to general practice (e.g. GPs doing a greater share of follow-up checks for patients following hospital discharges and providing a greater share of relatively simple care and treatment for people with chronic conditions); and 3) projected increasing outflows of GPs in the coming decade due to retirement and earlier exit from the profession. Recent evidence about increasing working hours among GPs after the pandemic was also interpreted as an indicator of growing shortages (ACMMP, 2022c).

[3] Section 7 describes the main variables used in the projection models on both the supply and demand sides.

Table 5. Recommended intake in residency training in clinical specialties and general medicine in the Netherlands, 2019 and 2022

Specialty	Recommended intake for 2019	Recommended intake for 2022	Change between 2019-2022 (%)
Anaesthesiology	79	79	0.0%
Cardiology	62	58	-6.5%
Cardio-thoracic surgery	6	6	0.0%
Dermatology and venereology	25	29	16.0%
General surgery	67	62	-7.5%
Internal medicine	116	126	8.6%
Otorhinolaryngology	20	18	-10.0%
Paediatrics	59	65	10.2%
Clinical chemistry	10	14	40.0%
Clinical physics	20	25	25.0%
Clinical genetics	8	9	12.5%
Clinical geriatrics	33	36	9.1%
Respiratory medicine	39	41	5.1%
Gastroenterology	27	24	-11.1%
Medical microbiology	18	20	11.1%
Neurosurgery	6	7	16.7%
Neurology	48	49	2.1%
Obstetrics and gynaecology	44	40	-9.1%
Ophthalmology	35	38	8.6%
Orthopaedics	35	28	-20.0%
Pathology	18	19	5.6%
Plastic surgery	14	19	35.7%
Psychiatry	176	179	1.7%
Radiology	63	63	0.0%
Radiotherapy	14	15	7.1%
Rheumatology	17	19	11.8%
Rehabilitation medicine	31	31	0.0%
Sport medicine	7	7	0.0%
Hospital pharmacy	27	29	7.4%
Emergency medicine	40	42	5.0%
Urology	23	24	4.3%
Total clinical specialties	**1187**	**1221**	**2.9%**
General medical practice	**879**	**1190**	**35.4%**

Note: This table does not include all the recognised medical specialties in the Netherlands (e.g. it does not include specialists for the mentally disabled and in social medicine).
Sources: ACMMP (2019), Main report of the Advisory Committee on Medical Manpower Planning: recommendations for 2021-2024, ACMMP (2022), Capaciteitsplan 2024 tot 2027 Deelrapport 1 and Deelrapport 2.

An ACMMP recommendation does not necessarily or immediately lead to a change in the intake in various clinical specialties or general medicine. In response to the recommendation, the Minister of Health issues a policy intention regarding the number of residency training places, followed by a decision in principle. This decision in principle is usually taken in the

spring following the comprehensive recommendations offered by the ACMMP. The funding implications are then included in the budget for the following year. This means that there is generally a two-year period between the time that the ACMMP issues its recommendations and the implementation of these recommendations.

While the ACMMP recommendations have generally been followed by government, the actual intake has not always been the same as the recommendations for at least two reasons. First, the actual intake depends on the willingness and capacity of University Medical Centers (UMCs) and teaching hospitals to create residency training posts. This includes the availability of a sufficient number of trainers to provide training and supervise residents. Second, the actual intake depends also on the preferences of medical graduates and their willingness to accept the available training places at the locations offered. A number of training places remains vacant in any given year.

6.2.2. Selection process of residents in the Netherlands

The selection process of residents in the Netheralnds differs across specialties (based on historical factors) and has also evolved over time. Medical graduates have to apply when a vacancy is opened. For more than half of clinical specialties, vacancies are opened by clinical specialists in local hospitals. The rest of clinical specialties have centralized the application process at a regional or national level. The procedure is generally the same: the vacancies are posted in medical magazines and dedicated websites. The applications are then screened by a selection team of registered trainers, followed by job interviews with selected applicants and reference checks.

Applications for vacancies in family medicine are centralized at the national level. Applicants can give one or more regions of preference for their residency, although they can be assigned to another region. If they decline this region, they can apply again for a residency in family medicine only one more time.

6.2.3. Funding of residency training programmes in the Netherlands

The funding of residency training programmes in the Netherlands changed in 2006 and has since then been more centralized in the Ministry of Health. Before 2006, the financing of residency training programmes was exclusively provided by regional health insurance companies and integrated in the budgets of accredited teaching hospitals. Accredited hospitals received extra money for training medical graduates from the insurance companies, most of the time based on historical data. In 2006, as a result of the recommendations from the “Biesheuvel” Committee (see section 7), hospitals had to start competing with each other. To create a level playing field between training and non-training hospitals, the budgets for training residents in the different specialties were transferred from health insurance companies to the Ministry of Health. The financing of the programme for GPs, specialists for the elderly and specialists for the mentally disabled has always come directly from the Ministry of Health.

Since 2006, the intake for nearly all residency training places in the Netherlands is therefore no longer controlled locally but nationally.[4] The Ministry of Health initially managed these budgets itself, but this responsibility was transferred in 2013 to the Dutch Healthcare Authority (NZa). A separate organisation (BOLS) is responsible for specifying the national intake quota across the eight Education and Training Regions and UMCs.

6.3. Residency training in France is based on workforce planning at national and regional level, and residency openings are filled through a transparent selection process

Since 2004, the overall number of residency training places (which in France are called internships) opened each year is determined mainly by the number of students in French medical schools who are taking the National Ranking Exams towards the end of their 6th year of medical studies as well as those students who are completing their medical studies abroad with a recognised degree who are also taking the National Ranking Exams to pursue their postgraduate specialty training in France.

6.3.1. Planning of residency training places by specialty and region

The ONDPS in partnership with all actors (regional health agencies, universities, representatives of professional associations and medical students) proposes a plan each year to the French Ministry of Health and Ministry of Higher Education regarding the distribution of the internship/residency places that will be opened across the 44 different clinical specialties and the 28 University Hospital Centers (*CHU*) (Ministry of Health and Prevention, 2021). While all students taking the National Ranking Exams are eligible to pursue their internship training, their ranking in the exams determines their choice of specialty and location (see next subsection).

The allocation of the internship/residency places and their regional allocation across the 28 University Hospital Centers is determined based on a number of supply and demand factors. On the supply side, the variables include the density of doctors (GPs and specialists) aged under 70, the share of doctors aged 55 and over, and the number of internship posts filled by 100 000 population over the past four years. Regarding the regional allocation, the number is based notably on the density of doctors and the share of doctors who remain in the region where they have been trained after completing their training. On the demand side, the variables include changes in population size and population structure (people aged 60 and over) by region and the poverty rate (as an indicator of healthcare needs).

The government announces the plan for new internship posts in July each year, although not all vacant posts end up being filled either because some new graduates who have taken the ECNs decide to stop their medical training completely or because they decide to wait at least a year to take the exams again with the hope to have a better ranking and a better opportunity

[4] The financing of public health specialist training programmes is financed partly by the Ministry of Health and partly by other ministries or organisations that employ these specialists. Overall, the Ministry of Health currently finances 95% of all residency training programmes.

to choose their preferred specialty and location. One of the government priorities has been to reduce the number of vacant posts.

Table 6 shows the evolution in the number and allocation of internship training posts opened by specialty in 2017 and 2021. The total number of internship places opened increased by 5.9% between 2017 and 2021 (equivalent to an increase of nearly 500 places). These numbers do not include the relatively small number of new interns/residents who are pursuing their internship under a public service engagement contract (233 in 2017 and 266 in 2021)[5].

Since 2017, the French government decided that at least 40% of all internship/residency places should be allocated to general practice to address the current and future projected shortage of GPs. In addition, the government has also identified some specific priority areas on certain occasions. For example, following the pandemic, the government decided in 2021 to at least temporarily increase the number of internship/residency posts in intensive care and reanimation. This explains why the largest increase in percentage between 2017 and 2021 has been in intensive care and reanimation, although the increase in absolute number is small. There has also been a significant increase in gynaecology and ophthalmology. On the other hand, the number of posts in occupational health has decreased by about 10% during that period.

Table 6. Posts opened in internship/residency training by specialty and general medicine in France, 2017 and 2021

Specialty	Posts opened in 2017	Posts opened in 2021	Change between 2017-2021 (%)
Surgical			
Maxillo-facial surgery	24	26	8.3%
Oral surgery	12	12	0.0%
Orthopaedics	116	123	6.0%
Paediatric surgery	24	26	8.3%
Plastic surgery	27	28	3.7%
Cardiothoracic surgery	25	25	0.0%
Vascular surgery	29	28	-3.4%
Visceral and digestive surgery	77	83	7.8%
Obstetrics and gynaecology	197	211	7.1%
Neurosurgery	21	25	19.0%
Ophthalmology	129	152	17.8%
Otorhinolaryngology and cervico-facial surgery	76	83	9.2%
Urology	61	62	1.6%
Medical			
Allergology	27	28	3.7%
Anatomy and cytopathology	56	59	5.4%

[5] Since 2009, the French government has introduced a public service engagement contract for medical students and interns/residents through which the government pays them an allocation during their studies (EUR 1200 per month) in exchange for students and interns/residents committing to work in designated underserved areas for a minimum amount of timing following the completion of their training. The duration of the work in underserved areas is equal to the period during which they receive the allocation and cannot be less than 2 years. The number of new contracts per year for interns has been limited to 200 to 300 in recent years. Most of these contracts have been signed with interns/residents in general medicine (CNG, 2021).

Anaesthesiology and reanimation	445	486	9.2%
Dermatology and venereology	90	100	11.1%
Endocrinology	80	89	11.3%
Clinical genetics	20	21	5.0%
Geriatrics	200	193	-3.5%
Medical gynaecology	64	84	31.3%
Haematology	44	45	2.3%
Hepato-gastro-enterology	122	132	8.2%
Infectious diseases	47	54	14.9%
Cardiovascular medicine	170	184	8.2%
Emergency medicine	460	474	3.0%
Occupational health	138	124	-10.1%
Intensive care and reanimation	64	95	48.4%
Internal medicine and clinical immunology	113	130	15.0%
Forensic medicine	26	26	0.0%
Nuclear medicine	31	33	6.5%
Physical medicine and rehabilitation	94	101	7.4%
Vascular medicine	44	46	4.5%
Nephrology	76	81	6.6%
Neurology	121	128	5.8%
Oncology	117	121	3.4%
Paediatrics	316	336	6.3%
Respiratory medicine	116	123	6.0%
Psychiatry	494	532	7.7%
Radiology	245	256	4.5%
Rheumatology	83	86	3.6%
Public health	85	87	2.4%
Medical biology	110	107	-2.7%
General medicine	**3132**	**3280**	**4.7%**
Total number of internships/residents	**8048**	**8525**	**5.9%**

Note: A small number of additional posts were also available for those students who have signed a public service engagement contract. Most of these places were in general medicine (181 out of 233 places in 2017, and 238 out of 266 places in 2021).
Sources : 2017 : https://www.legifrance.gouv.fr/jorf/id/JORFTEXT000035138392. 2021 : https://www.legifrance.gouv.fr/download/pdf?id=7KWk6d3KoPgLV20BRNIjai-C-eBJAZCppc3EUOnVlHI=

In addition to allocating interns by specialty, the ONDPS works in cooperation with all actors to propose an allocation of new interns/residents across the 28 University Hospital Centers (CHUs). The main aim of the regional allocation is to balance the need to increase the allocation of posts in those regions that have the lowest supply of doctors while at the same time reducing the number of unfilled posts (because these regions are also often the least popular among new medical graduates).

6.3.2. Selection process of residents in France

Since 2004, France uses the National Ranking Exams (*Épreuves Classantes Nationales* or ECN) at the end of the 6th year of medical education (the final year before students get their medical degree) to allocate postgraduate students in internship posts in different specialties

and University Hospital Centers based on their ranking and preferences. However, the selection system will be modified in 2024.

The current ECN exams take place in June each year over several half-days, during which students have to respond to multiple choice questions. These exams are organised by the National Management Center (Centre National de Gestion or CNG), a body that is also responsible for organising the national process for allocating internship/residency places. A few weeks after the ECN (around mid-July), a ministerial decree from the Ministry of Higher Education and Research and the Ministry of Health sets the number of available internship/residency posts by specialty and University Hospital Center for the coming year. A few days later, the selection process starts. This process occurs in two stages:

- The first stage (referred to as « simulation ») lasts until the end of July. All students who have taken the ECN can register their preference by order of priority on a dedicated platform. This simulation allows them to situate themselves and think about their options. They can modify their preferences as many times as they wish up until the end of July.
- The second stage starts in early August. Some students choose to leave the selection process because they were not ranked sufficiently high to hope to be selected in their preferred specialty and location, so they prefer to take the exam again in the following year. Those students who remain in the selection process can take into account possible modifications in internship/residency offers until the final selection procedure starts at the end of August. The candidates are then invited to confirm their preferred choice one after the other, based on their ranking. While waiting to confirm their choice, the candidates can still modify their choice until the last minute, based on remaining openings. This last step in the process lasts about three weeks.

Table 7 shows the number of students that were ranked following the ECN, the potential number of students that could seek an internship/residency post (which is equivalent to the number of posts offered) and the number of students who actually got a final offer between 2019 and 2022. The number of internship posts offered was slightly lower than the number of students who took the ECN exams because students in military health services take the ECN but then follow a different process to complete their postgraduate training and also because there is a small dropout rate. In 2022, 333 students who took the ECN were European students (i.e. obtained their first medical degree from a medical school in another European country, including French students who went to study abroad). As already noted, since 2017, 40% of internship/residency posts in France must be in general medicine.

Table 7. Number of students ranked after the National Ranking Exams (ECN), number of internship posts offered, and number of final allocation of internships in France, 2019-2022

	2019	2020	2021	2022
Students taking the National Ranking Exam	8728	8820	9032	9298
Internship posts offered	8507	8578	8791	9024
in general medicine	*3403*	*3433*	*3518*	*3634*
Final internship posts	8308	8424	8579	8854

Note: Students must make a selection between 44 specialties and 28 University hospital center (CHU). General medicine must account for 40% of posts offered.
Sources: Centre National de Gestion (CNG), https://www.cng.sante.fr/candidats/internats/concours-medicaux/etudiants/epreuves-classantes-nationales-ecn and Journal Officiel n°0166 (20/07/2022), n°0167 (21/07/2021), n°0193 (07/08/2020) et n°0168 (21/07/2019), https://www.legifrance.gouv.fr/.

Starting in 2024, the ECN will be replaced by three types of evaluation to access internship/residency posts: 1) National Dematerialised Exams (*Épreuves dématérialisées nationales* or EDN), 2) Structured and Objective Clinical Exams (*Examens cliniques objectifs et structurés* or ECOS); and 3) other meaningful student experiences.

The EDN will start immediately at the beginning of the school year (6th year of studies in medicine) in October and take place over four half-days of three hours. They will account for 60% of the overall mark concerning the choice of specialty. The EDN will be divided in three hierarchical levels of knowledge: 1) knowledge required of all doctors regardless of their specialty; 2) more specialized knowledge useful to an intern; and 3) subspecialty knowledge. Students will need to have a minimum mark of 14/20 for the first level of knowledge to successfully pass the EDN and participate in the next step of the process (ECOS).

The ECOS will be oral exercises to evaluate the reaction of future doctors when confronted with different clinical situations (e.g., prescriptions, prevention interventions, etc.). The ECOS will be held in May. Candidates will be evaluated based on ten situations over a two-day period. Students will need to have a minimum mark of 10/20 to access internship/residency (if they mark below 10, they will have the opportunity to take again ECOS the following year). The ECOS will account for 30% of the overall mark.

Finally, 10% of the overall mark will be based on other meaningful student experiences (such as volunteering activities, national or international mobility, professional experiences, etc.). Information about these student experiences will need to be submitted before mid-July.

Under the new selection system, students will not get a unique ranking as is the case under the current ECN system, but rather 13 rankings according to different specialty groups. The national process to select internship/residency posts will continue to be managed by the CNG and will remain similar to the current one based on the ECN, except that it will take into account the ranking of students within each of the 13 rankings. The overall objective is to increase the likelihood that students who are very good in a given specialty will be able to choose and be selected in that specialty.

Annex 3 describes the selection process of residents in the United States and Spain.

7. Example of good governance and evidence-based medical workforce planning and policy-making: The Dutch model

The Netherlands provides a good example of a well-established and well-functioning medical workforce planning and policy-making approach, which has involved all the main stakeholders in the discussion and consensus-building exercises to guide policy decisions on student intakes. This approach was introduced about 25 years ago and has since then been expanded to cover not only medical workforce planning (i.e., doctors), but also a growing number of paramedical professions.

The main characteristics of the Dutch approach to medical workforce planning is political independence, professionalism and involvement of key stakeholders in developing projection models and making recommendations to government regarding medical student intakes to avoid shortages (or surpluses) of different categories of doctors, and a commitment to update regularly (every three years) these projections and recommendations to take into account changing circumstances.

Since 1999, the Dutch approach to health workforce planning given a central role to an independent (non-government) organisation, the Advisory Council on Medical Manpower Planning (ACMMP), which has been given the mandate to involve all key stakeholders in the workforce planning process and make recommendations to government based on the best available evidence about future requirements.

The first part of this section on the Dutch model describes briefly the history that led to the creation of the ACMMP in 1999, its governance structure and its link with the Ministry of Health, while the second part is slightly more technical and describes some of the main characteristics of the projection models that were initially developed for doctors, but have been increasingly applied with some adaptations to several paramedical professions.

7.1. The governance of medical workforce planning in the Netherlands provides a central role to the independent Advisory Council on Medical Manpower Planning (ACMMP)

7.1.1. Introduction: Brief history of medical workforce planning in the Netherlands before the creation of the ACMMP in 1999

Since the early 1900s, the Ministry of Education in the Netherlands was responsible for financing medical schools, with the main aim being to supply enough medical graduates to fill the vacancies for medical specialty training programmes and thereby train a sufficient number of new doctors.

After World War II, the demand for healthcare and for doctors increased substantially following the introduction of the Health Insurance Act and the growth of the Dutch population. After a few years, a shortage of doctors led to growing waiting lists and consequently to questions in parliament. This led the Ministry of Education to order medical schools to increase their student intake. However, there was unfortunately no knowledge about how much the intake should be increased. This lack of knowledge was aggravated by the fact that increasing student intakes only has its first small effects on the supply of medical doctors after about 10-12 years (depending on specialties). In the meantime, the growing shortage of doctors

increased the pressure on government to increase even more student intakes to show to the population that it was addressing the problem. About 6 years after the medical schools raised their intake, the first additional number of medical graduates started to apply for a vacancy for specialty training, but it then turned out that there were not enough vacancies for specialty training programmes because the hospitals had not reached agreement with health insurance companies about the extra budget needed to provide these additional training placements. This led to a "reservoir" of medical graduates and to unemployment of some medical graduates. In response to the unemployment of these medical graduates, the parliament then asked the Ministry of Education to reduce the intake of medical students and about 10-12 years later, the situation was back to where it started.

A vicious cycle had started. In the Netherlands, this was called a "pig cycle", because the price for pig meat was directly related to the number of farmers starting to breed pigs, with high meat prices leading to more farmers breeding pigs, resulting in lower meat prices and less farmers breeding pigs one year later.

The fluctuations between shortage and surplus of medical graduates became larger after each cycle. In the early 1980s, there were over 2,000 medical graduates unemployed, resulting in a waste of money and human capital. Following reductions in the number of medical students, by the mid-1990s, over 100,000 people in the Netherlands had no access to a family physician, who is acting as a gatekeeper to specialists.

Once again, an advisory committee was established in June 1992, this time by the Ministry of Health, to address the issue. However, there was an important difference compared with all the earlier committees: this time the committee was composed not only of medical professors but also of politicians and experts in governance issues (the committee "Biesheuvel", as it was led by a former prime minister, Barend Biesheuvel). The mission of this committee was broader than merely looking at the supply of medical personnel as it was also asked to redesign the acute healthcare system as a whole. The committee published its report in 1994 (Biesheuvel, 1994). Regarding the supply of medical personnel, the committee concluded that the only way to end the "pig cycle" was to stop addressing *ad hoc* problems of shortage and surplus that were caused by previous governments' *ad hoc* interventions. The committee recommended that the supply of doctors be monitored by a permanent and non-governmental organisation, with a board consisting of all three major stakeholders: doctors, training institutes, and health insurance companies. The responsibility of this new non-governmental organisation should be to advise government and stakeholders about changes needed in the intake of both medical students in medical schools and medical graduates in specialty training programmes. The government would then take final decisions, based on these recommendations. Because they would be involved in the process, the various stakeholders could anticipate on the decisions, training institutes could adjust their education and training capacity accordingly. The government endorsed this key recommendation from the Biesheuvel committee.

7.1.2. Mission and growing scope of activities of ACMMP

Following a few years of negotiations, the ACMMP was established in 1999 with the objective of putting an end to the decades-long cycle of doctor shortages and surpluses. Since 2000, the ACMMP has been issuing regularly (about once every three years) projections of doctor requirements and recommendations on the desired intake in the various postgraduate clinical

training programmes to avoid shortages or surpluses of doctors. The ACMMP also provides projections and recommendations on student intake in the initial (undergraduate) medical education programme to ensure a sufficient supply of graduates to take on the residency training posts. These projections and recommendations serve as a basis for government and stakeholders to make decisions regarding medical education and training.

Over the years, the government has gradually expanded the number of professions for which they are seeking ACMMP projections and recommendations. The professions now go well beyond doctors and include dentists and paramedical professions such as nurse practitioners, physician assistants, specialised hospital nurses, and mental health personnel. Annex 2 provides the list of all 85 medical and paramedical professions covered in its 2022 report.

7.1.3. Governance structure of ACMMP

The board of the ACMMP consists of the three groups of major stakeholders:

1) **Doctors, dentists and paramedical professions**:
   - Royal Dutch Medical Association, representing all medical doctors and the RGS/CGS (KNMG)
   - Clinical Specialist Association (FMS)
   - Association for Psychologists, psychotherapists, and their specialisms
   - Family Physicians Association (LHV)
   - Specialist for the Elderly Association (Verenso)
   - Dutch nursing and caring Association (V&VN)
   - Public Health Association (NVVG/ NVAB/ KAMG)
   - Royal Dutch Association of Dentists and Dentists-specialists (KNMT)
   - Union for Employed Medical Doctors Association (LAD)

2) **Training institutes**:
   - Dutch Association of University Medical Centers (NFU)
   - Dutch Association of Hospitals (NVZ)
   - Dutch Association of Nursing Homes for the Elderly (Actiz)
   - Dutch University Association (UN)
   - Dutch Association for Applied Sciences (HBO raad)
   - Dutch Association for Mental Facilities (GGZ Nederland)

3) **Health insurance companies:**
   - Association of Health Insurance Companies (ZN)
   - Health insurance company (CZ)
   - Health insurance company (Achmea)

All three groups have 9 votes on the board. Board members are all designated by their association. The members are expected to be active in the field, in a position where they are responsible for doctors, and be able to make a difference. Usually, they are Chief Medical Officer in their own organisation and board member in their association with the portfolio of manpower and training. Box 6 provides a quick overview of the positions that these three major stakeholders have usually taken in discussion on student intakes in undergraduate and postgraduate training programmes.

Box 6. Positions usually taken by the three major stakeholders involved in the ACMMP regarding student intakes in medical education and training programmes

Past experience in the Netherlands shows that the three major stakeholders involved in medical workforce planned have tended to take the following positions when it comes to making recommendations about the intake of students in medical education and training programmes.

1) Doctor representatives

The position from representatives of doctors has varied depending on the situation and specialty. In general, doctor representatives on the ACMMP board have tended to support the approach of training slightly more doctors than deemed necessary to fulfill the projected demand for several reasons, such as:

- Board members are usually more senior and older doctors. Because most doctors are still self-employed, they may be interested in having more competition between several new doctors when they are selling their practice;
- The association of a particular specialty may want to take over activities from another specialty in the future;
- The association may be interested in expanding to gain more power.

However, sometimes board members may want to create a shortage in their clinical specialty to create better negotiating conditions with health insurance companies, although this can backfire. Between the advice of the ACMMP and the first noticeable change in workforce, there is a lag of 5-8 years, so health insurance companies may have ample time to take countermeasures to address any shortages (e.g. through task substitution between related specialties, such as ophthalmologists and optometrists).

2) Training institute representatives

Training institutes have usually supported an increase in student intake, but at a slow rate to be able to manage the growth in a satisfactory way. An exception to this drive to expand occurs when all the existing institutes reach their maximum capacity and a new additional training institute has to be created.

3) Health insurance company representatives

Health insurance companies have usually taken the position of making sure there is a sufficient number of doctors because they have the responsibility to provide adequate access to health services to their customers and can be fined if they can't deliver healthcare in the end. They don't want to have too few doctors, nor too many to avoid the risk of supplier-induced demand. They exert a stable influence on the ACMMP recommendations.

The ACMMP board gets its recommendations from the **Chambers**. The Chambers are composed in the same way as the board, with the same three groups of stakeholders. In the Chambers, doctors from the workplaces are designated by their respective associations to share their workforce information, exchange and discuss research findings, and provide best expert views about future developments. Most of the planning and recommendations work by specialty is done by the Chambers.

The Board and Chambers are supported by a dozen of employees in the **Bureau** of the ACMMP. The Bureau employees share ideas and research findings, commission research initiated by the Chambers, and use the members of the Chambers and the Board to approach other key informants.

Since its establishment in 1999, the ACMMP has been financed by the Ministry of Health. Its current budget is about € 2 million per year to pay mainly staff cost and the commissioning of research.

7.1.4. Stakeholders involved in delivering postgraduate medical training

Training for clinical specialists (which usually lasts 5 or 6 years) is completely carried out in accredited hospitals. Most University Medical Centers (UMCs) are accredited (by the RGS) for all 28 clinical specialties, 1 so-called “profile”, and 3 clinical technological specialties. All other hospitals are either not accredited or accredited for only some specialties. Each UMC is affiliated with (mostly adjacent) accredited hospitals to form a “training region” per specialty. Each UMC is also responsible for coordinating the allocation of medical residents per specialty between the accredited hospitals. At a national level, the 8 UMCs and 61 regular hospitals are involved in an organisation called “BOLS”, which each year has to distribute all new clinical residents between the 8 training regions and between all hospitals in each training region. Each training hospital is financed by the Ministry of Health for the extra costs of training per resident.

Training for family physicians (GPs), specialists for the elderly and specialists for the mentally disabled (all usually lasting 3 years) is also done in a working environment, but there are recall days for theoretical learning one day every two weeks in every UMC. These medical trainees are employed by one organisation, the “SBOH”, that allocates the trainee to organisations accredited for training medical doctors. In all three training programmes, the second year of the traineeship is spent in another organisation (e.g. the emergency ward of a general hospital or the mental ward of a mental health hospital). Most of the time, the third year of training is done in another organisation than the first year.

Box 7 provides an overview of the governance structure to ensure the quality of medical training.

Box 7. The governance structure to ensure the quality of medical training in the Netherlands

Historically medical doctors formed a guild that had established its own regulations and quality systems before there were any laws. The only law currently applicable to the training of medical doctors is the Law on Professions in Individual Health Care (“BIG”). This law describes the requirements for the training of medical students and medical graduates.

One organisation, the College for Medical Specialisms ("CGS"), is responsible for the quality of the training of medical specialists. This College designs the regulations and specifications for each medical specialty, for trainers of medical graduates, and for training hospitals. It is responsible for:

- The creation of new medical specialties, the termination of existing medical specialties, the definition of the curriculum for each specialty and the terms and conditions each individual specialist has to comply with in order to be reregistered every five years;
- The content of the training programme for medical trainers and other terms and conditions that medical trainers have to comply with;
- The conditions for training hospitals regarding facilitations for trainer, trainee, and staff.

A second organisation, the Registration Office for Medical Specialists ("RGS"), is responsible for implementing and maintaining the CGS rules that have been adopted by the Ministry of Health. The RGS is an executive organisation responsible for (the quality of):

- registration and follow-up of all medical trainees;
- registration of their progress, their completion or dropout of medical training;
- registration of medical specialists as licensed to practice;
- reregistration every five years of every medical specialist;
- registration and reregistration of medical specialist trainers;
- accreditation of training hospitals (for specialists) and training institutes (for GPs and public health specialists).

Both organisations are positioned within the Royal Dutch Medical Association and funded through the billing of applicants.

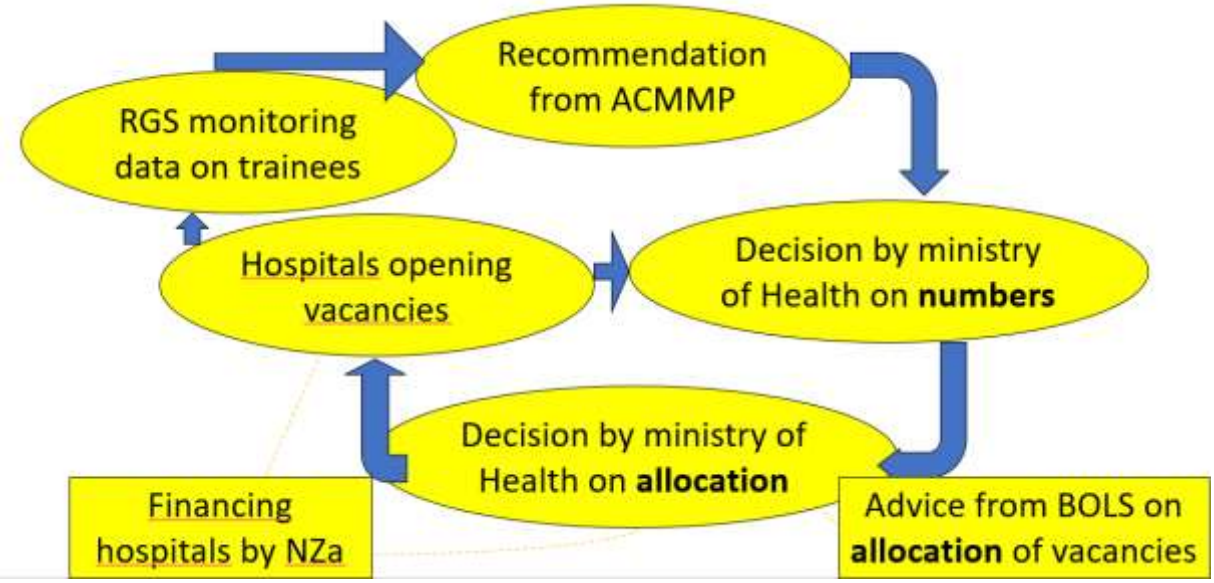
7.1.5. Cycle of health workforce planning, recommendations and policy-making

The ACMMP usually work based on a 3-year cycle, starting after the new comprehensive recommendations (in the winter) have been brought to the attention of the government. The most recent recommendations to government were issued in late 2022 for clinical specialties (ACMMP, 2022a, 2022b, 2022c), and in January 2023 for all other professions.

In the year following the recommendations, the ACMMP spreads the recommendations and provides any additional information to all stakeholders. The government (Ministry of Health) discusses the recommendations in the spring, makes a decision in principle, and adjusts the budget for the next year. It informs parliament about the decision and about any possible deviation from the ACMMP recommendations, providing some justification for any such deviation. At the same time, it asks BOLS (a dedicated organisation of the UMCs), the Association of Hospitals and the Association of clinical specialists to advise them before the summer on the specific allocation of all the vacancies for clinical specialist training between the UMCs and the other accredited hospitals for the following year. It also asks SBOH to open vacancies for the training of family physicians (GPs), specialists for the elderly and the mentally disabled for the following year as well.

BOLS usually advises government on the allocation of vacancies before summer. Government then makes a decision on the recommended allocation of vacancies for clinical specialist training and releases the corresponding budgets for each hospital. The actual budgets are then controlled by the Dutch Health Authority, in cooperation with the RGS because they register the actual employment of residents. Hospitals usually opens the recruitment of new medical graduates in the fall and fills the vacancies starting the next year. Government asks BOLS each year to advise them on the allocation of vacancies each year. The ACMMP monitors the filling of the vacancies for 3 years and includes the results in their next recommendations (Figure 22).

Figure 22. Decision-making process of postgraduate specialty training programmes in the Netherlands (from initial recommendation to actual implementation)



Notes: BOLS is a dedicated organisation of University Medical Centers (UMCs), Association of Hospitals and Association of clinical specialists. RGS is the Registration Office for Medical Specialists, an organisation responsible for implementing and maintaining the quality of training of medical specialist standards that have been adopted by the Ministry of Health.
NZa is the Dutch Healthcare Authority, an autonomous administrative authority falling under the responsibility of the Ministry of Health, Welfare and Sport.
Source: ACMMP

7.2. The medical workforce planning models have continuously evolved and have been extended to paramedical professions

This section describes the main characteristics and evolutions of the medical workforce planning models that are used to make recommendations in student intakes in undergraduate and postgraduate training programmes in the Netherlands.

7.2.1. Initial steps to develop medical workforce planning models

When the ACMMP was founded in 1999 and the members of the first board were designated, the first task was to develop a workforce planning model that would be suitable to guide policy decisions for all medical professions. All members of the board participated in a two-day workshop (organised by a branch of Tilburg University). The workshop was chaired by a

professor who was an expert in logistics and shared decision making. Two consulting organisations with experience in medical manpower planning were invited: one organisation was a for-profit private consulting firm (Prismant), the other was a not-for-profit semi-governmental organisation (NIVEL, the Netherlands Institute for Health Services Research). Both organisations were asked to share their experiences with the ACMMP and to co-develop with the ACMMP a software programme to forecast the supply and demand for doctors. The ACMMP committed to develop the software programme with the two organisations and that all the calculations work would be divided between the two organisations in the future. The two organisations agreed to this.

The initial division of responsibility was that NIVEL would do all the calculations for the GPs and public health specialists parts of the model, while Prismant would do all the calculations for the clinical specialists. This situation remained stable and acceptable to all parties until 2019, when Prismant closed its research department and terminated its activities for the ACMMP. Since then, NIVEL has done the forecasting work for all medical doctors.

7.2.2. Planning model for postgraduate medical specialty training programmes

As discussed before, since its creation, the main task of the ACMMP is to make recommendations on student intakes in various medical specialties based on future projections of requirements. The initial planning model contained three main components: 1) a supply side, 2) a demand side, and 3) a "working process" component. Each of these three components have been maintained and developed over time, and require forecasts based on available data and research. In the absence of any data or research on some variables/parameters, the model also uses expert opinions.

The forecasts for medical specialists cover a fairly long period (12 to 18 years). This is because there is a 1 to 2 years gap between the release of the recommendations and the first effect on the inflow of medical graduates being admitted in residency programmes. It then takes another 4 to 8 years (depending on the specialty, part-time training or other factors) for medical graduates to complete their training. This means that the ACMMP recommendations on entry into various medical specialty programmes have no effect in the next 5 to 10 years. Because of that, the forecasts for all three components of the model cover a period of 12 to 18 years.

a. Supply side

The supply of doctors in the model over the next 20 years includes five main variables (or groups of persons):

- Current number of full-time equivalents (FTEs) practising medical specialists
- Current number of medical graduates in training to become medical specialists (residents);
- Future number of medical graduates who will start training in the next 1-2 years before the new recommendations are introduced;
- Future number of medical graduates who will start training after the new recommendations have been introduced;
- Number of foreign-trained medical specialists immigrating into the country.

Most of the time, it is possible to gather data on the first three groups, and these data have also become more reliable over time. The fourth group is determined by the ACMMP

recommendations. The fifth group (the number of foreign-trained doctors moving into the country) is the most difficult to quantify with a high degree of certainty. Data on the number of foreign-trained doctors immigrating in the Netherlands are available, but the size may vary from year to year. The size of foreign-trained doctors coming in the Netherlands may be affected by family, economic or humanitarian/refugee reasons, but these immigrants may also leave the Netherlands at their own discretion after a few years. The ACMMP has a policy to strive for being self-sufficient when making its medical manpower recommendations.

All five groups change over time in their gender composition, and hence in full-time equivalents (FTEs). In total, the ACMMP collects and uses 20 variables/parameters to measure the supply of medical specialists. Each of these variables/parameters is discussed in the Chambers and the value for each variable/parameter is agreed upon.

b. Demand side

The demand for doctors is forecasted by using four variables/parameters:

- Current unmet demand
- Expected changes in population size and structure
- Expected epidemiological changes
- Expected socio-cultural changes

The ACMMP sometimes adjust the current supply of various medical specialists based on evidence of current unmet demand (e.g. current shortages as reflected by high number of vacancies for medical specialists and long waiting lists for treatment) or surpluses (e.g. unemployment or temporary appointment of recently registered doctors).

The ACMMP uses the demographic forecasts of the National Bureau of Statistics (CBS) to assess future changes in population size and structure (gender and age). The ACMMP uses the “middle variant” of the forecasts as input for this parameter. For each specialty, the ACMMP also uses recent data on the consumption of health services by gender and age. Using these in conjunction with the expected population changes in 12 to 18 years provide fairly good estimates of the expected change in demand for health services and doctor services over the next 12-18 years period. This is then brought together with the supply in the so-called “demographic variant” of the model.

Based on available data, research and expert opinions, the model also includes estimates of epidemiological changes. A good example is the growing number of obese people and the need for diabetes care, ophthalmologic care, and knee and hip replacements. However, sometimes there is a lack of data and expert opinions are taken into account. If the members of Chambers cannot reach a unanimous decision on a single value for a parameter, they must reach consensus on the minimum and the maximum values.

When it comes to socio-cultural changes, the ACMMP reviews factors that might alter healthcare consumption in the future, based mainly on expert opinions of the members of Chambers.

c. Working process component

This last component of the model contains five variables/parameters:

- Subject-matter evolutions
- Efficiency evolutions
- Horizontal substitution
- Working time changes
- Vertical substitution.

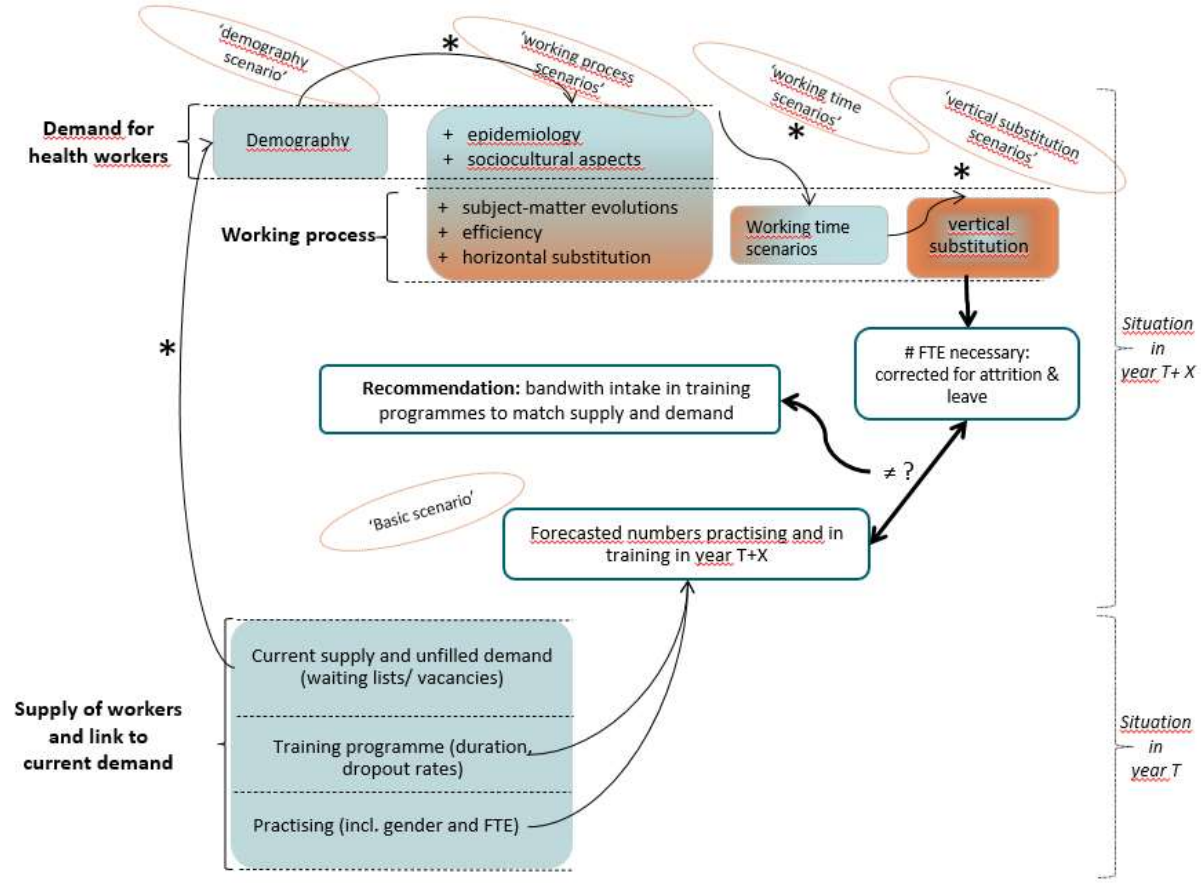
Subject-matter evolutions concern new techniques or developments in certain specialties (e.g., the restriction of X-ray photos or the use of new surgical techniques). Efficiency evolutions is a difficult variable to measure: although in theory one might expect efficiency gains to occur almost all the time, in the Netherlands the current general consensus is that some sources of efficiency gains have not kept up with the rise in administrative burden due to “defensive medicine”, which reduces efficiency. Horizontal substitution involves transferring the demand for health services from one medical specialty to another (e.g., from a specialist to a GP). Working time changes relate to the possible evolutions in the working time of doctors in the future. Vertical substitution involves transferring medical services to non-doctors. For specialists, this task shifting will mostly be with nurse practitioners (NPs) or physician assistants (PAs). For GPs, this can also be with NPs or PAs, but also with administrative personnel, psychologists and other categories of workers.

The agreed values for these five parameters are combined together, and this results in two “working process” scenarios. In one scenario, all the changes the experts agreed upon are considered to last for the entire forecasting period (12 to 18 years). In the other scenario, the changes are only projected to have an effect for the first 10 years, without a status quo projected afterwards (this is because of the uncertainty that these expected changes will last for more than 10 years).

Separate scenarios are developed for the last two variables. The working time of doctors is a hotly debated issue in the Netherlands. Up until the 1990s, full-time work was the standard in most specialties. This changed from 2000 onwards for GPs and shortly afterwards for specialists. Newly-registered specialists nowadays seem to choose to work for the equivalent of a workweek of 4 days or even less. But at the same time, full-time employed specialists work on average 48 hours per week (plus shifts), and full-time self-employed GPs work on average 57 hours a week (plus shifts), indicating that many doctors work very long hours. The model produces two scenarios based on two different working time scenarios in the future.

The model also produces two scenarios related to vertical substitution: the first scenario assumes that there is no (additional) vertical substitution, whereas the second scenario assumes a certain degree of (additional) vertical substitution (Figure 23).

Figure 23. ACMMP scenarios based on different assumptions regarding the supply, demand and "working process" of doctors in the Netherlands



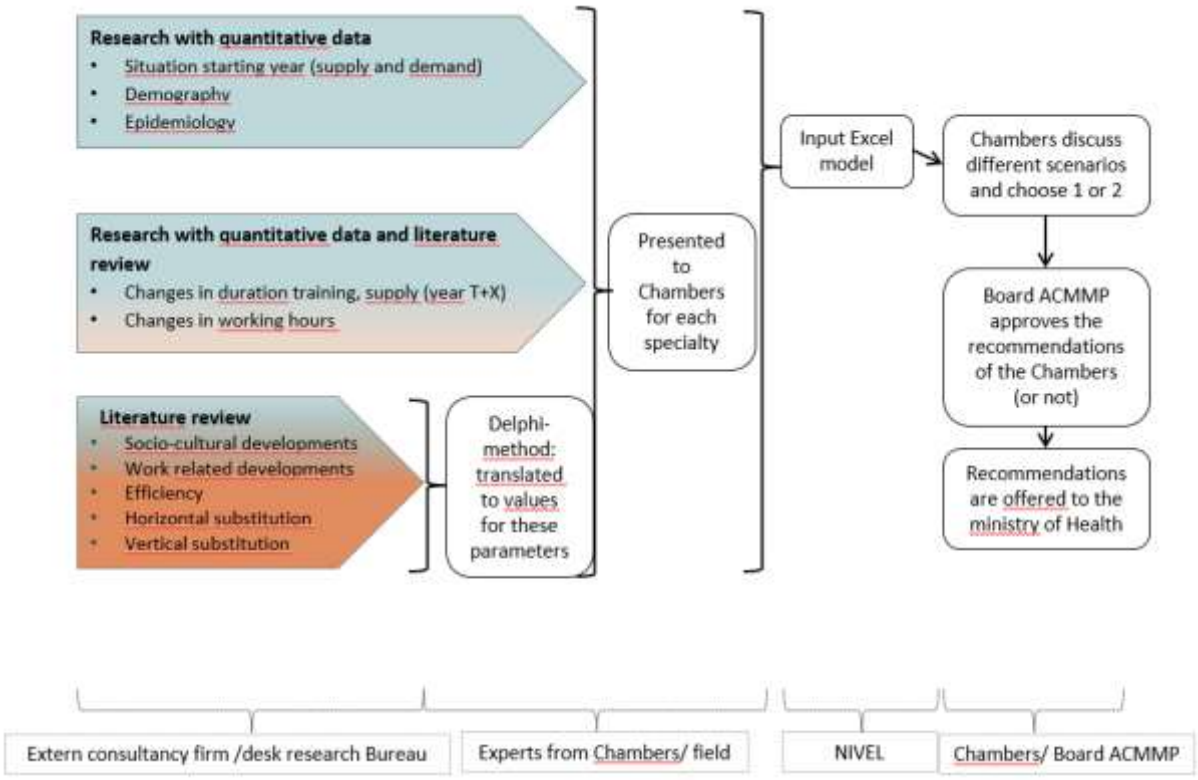
Source: ACMMP

All the values for the variables/parameters for each specialty discussed in the Chambers are sent to NIVEL and entered in the model. The results are then presented in the Chambers for all scenarios and translated into different recommendations regarding the desired intake in residency training programmes for each specialty. The experts in the Chambers discuss these recommendations and decide which recommendation (or two recommendations) regarding the intake in training programmes will be presented to the ACMMP board. When two recommendations (a range) are presented to the board, this gives the board an insight in the uncertainty surrounding the recommendation. If accepted, this also indicates that government has to make the ultimate decision.

7.2.3. Process from the planning models to making policy recommendations

Figure 24 provides an overview of the internal processes between the start of the planning process to the final recommendations provided to the Ministry of Health. The last row at the bottom indicates who has the primary responsibility for the activity throughout this process.

Figure 24. Overview of process from ACMMP planning to recommendations to Ministry of Health



Source: ACMMP

Figure 25 provides a more concrete illustration of the flow of students entering into residency programmes in 2021 based on the ACMMP recommendations from 2019. It shows that the pool of students waiting to be admitted in postgraduate training (residency) programmes was fuelled by the 2 800 medical students who started their studies in 2015, with 2 390 completing their master's degree six years afterwards. A small number of immigrants with a recognised medical degree also joined the pool of students waiting to be admitted in postgraduate training programmes. Out of the total 6 765 students waiting for admission, 2 920 were admitted in residency programmes in 2021, with most of them admitted in clinical specialist programmes and general medicine programmes.

Figure 25. Example of intake in residency training programmes in the Netherlands in 2021, based on previous ACMMP recommendations and Ministry of Health decisions

Source: ACMMP

7.2.4. Planning model to make recommendations on student intake in undergraduate medical education programmes

While the main task of ACMMP is to make recommendations on the intake in postgraduate residency training programmes, the ACMMP also offers recommendations on the desired intake in initial medical education programmes. These recommendations are based mainly on the objective of having a sufficient pool of medical graduates to start postgraduate training, bearing in mind that there is a time lag of 5 to 6 years between the time that students are admitted in medical education programmes and when they obtain their first medical degree. This implies that a sufficient pool of medical graduates should be available to absorb fluctuations in postgraduate training places in the medium to longer term. If the projections foresee an increase in the recommended intake in postgraduate training programmes in the coming years, more medical students should be admitted in undergraduate studies to increase the pool of new graduates. Conversely, if the projections foresee a reduction in the recommended intake in postgraduate programmes in the coming years, the number of students should be reduced to avoid having an excessively large pool of graduates who may not have the opportunity to complete their postgraduate training.

The ACMMP makes projections on the desired intake of medical students for the 8 medical schools in the Netherlands based on a combination of the projected number of medical graduates in the coming years and the present pool of medical graduates waiting for a resident

post. This involves a “back calculating” to establish the number of medical graduates required to keep the pool at a sufficient level (usually 1.5 times the number of medical graduates entering residencies each year). Once the number of required medical graduates is determined, the data on immigrant medical graduates and on attrition of medical students in the 6-year or the 4-year programme are used to determine the number of medical students to be admitted in medical schools.

The ACMMP usually provides a recommended range of students to be admitted in initial medical degree programmes, with a minimum and maximum number. However, the adoption of these recommendations has been a complex matter. The Ministry of Education, Culture and Science and the 8 medical schools are the principal actors. The Ministry of Education makes the final decisions on the number of medical students who will be funded. Table 8 shows the ACMMP's recommendations between 2009 and 2021, and the actual intake. The ACMMP's recommendations have fluctuated over time to stabilise the level of medical graduates available to start postgraduate specialty training pool. Overall, the actual intake until 2011 was slightly higher than the ACMMP recommended intake. As of 2011, the recommended intake was temporarily increased by 300 to 400 places to reduce any dependency on foreign graduates and foreign-trained doctors. The actual intake also increased slightly between 2011 and 2013, falling between the recommended minimum and maximum level. From 2014 onwards, the ACMMP recommended to lower significantly the number of students in the initial degree programme for four reasons. First, it became clear that the medical schools had managed to raise the success rate for the 6-year Bachelor's-Master's programme from 81% to nearly 90% of students completing their studies. Second, medical schools were largely filling the additional places with transfer students at the master’s degree level, thereby reducing the duration of studies to 3 years only. Third, the success rate for these transfer students admitted in these 3-year programmes was even greater than for the 6-year programmes (95% success rate). Fourth, the intake in postgraduate training programmes fell behind the number of new medical graduates, resulting in a growing pool of graduates waiting to start their residency training. However, the Ministry of Education chose not to implement these lower recommended intakes. As a result, the pool of medical graduates waiting to pursue their training has continued to increase to reach over 5 000 in 2016, 6 700 in 2019 and 7 500 in 2022.

Table 8. ACMMP recommendations and actual student intakes in initial medical education programmes, 2009 to 2021

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Min.	2,545	2,545	2,850	2,850	2,850	2,400	2,400	2,400	2,200	2,200	2,850	2,850	2,850
Max.	2,700	2,700	3,100	3,100	3,100	2,700	2,700	2,400	2,700	2,700	2,850	2,850	2,850
Actual	2,830	2,832	2,877	2,901	2,942	2,926	2,927	2,918	2,918	2,972	2,966	2,992	2,962

Sources: ACMMP and Association of Universities in the Netherlands (VSNU)

7.2.5. Growing number of professions covered in workforce planning models

Building on the successful introduction of the workforce planning model for doctors in the early 2000s, the Ministry of Health asked the ACMMP in 2009 to start making recommendations for the dentist workforce, though these training programmes were under the responsibility of the Ministry of Education. The model that had been developed for medical specialists proved to be suitable also for making recommendations for dentists. However, the Ministry of Education did not use the ACMMP recommendations and decided to train much fewer dentists than recommended. As a result, the Ministry of Health has since then been confronted with shortages of domestically-trained dentists, which has led to massive and uncontrollable immigration of dentists from other countries.

In 2013, the Ministry of Health asked the ACMMP to start making recommendations for 5 other occupations in mental healthcare besides psychiatrists: psychotherapists, psychologists, clinical psychologists, clinical neuropsychologists, and addiction physicians (as of 2017). While the training of psychologists was the responsibility of the Ministry of Education, the other four professions were under the responsibility of the Ministry of Health. Because the Ministry of Health wanted to have a complete picture of mental healthcare providers, they also wanted insights in the training of psychologists. The same model as for medical specialists was used again, with minor adaptations.

2013 was also the first year when the ACMMP, upon the request from the Ministry of Health, presented recommendations for the training of Nurse Practitioners (NPs) and Physician Assistants (PAs). A few years later, the independent position of NPs and PAs was anchored in the "BIG" register (the mandatory registration for 12 health professions), although there were some restrictions in their scope of practice. Since 2013, the ACMMP has gradually incorporated in its model different scenarios of vertical substitution between different categories of doctors and NPs and PAs, and the implications for the training of these medical and paramedical professions (Box 8).

Box 8. The ACMMP models have gradually included vertical substitution of tasks between doctors and nurse practitioners (NPs) and physician assistants (PAs) in its workforce planning

Over the past 10 years, the ACMMP workforce planning models have gradually taken into consideration in its scenarios the potential implications of different vertical substitutions of tasks between doctors and paramedical professions such as NPs and PAs on the demand and required training for these professions.

The ACMMP started to make recommendations on student intakes in NPs and PAs training programmes in 2013, but it was only in 2019 that it issued for the first time future projections for these two professions. These projections included different scenarios on possible vertical substitution from doctors (specialists and GPs) to NPs and PAs within the broader forecasts of the overall requirement (demand) for both NPs and PAs.[6]

[6] The ACMMP had already produced forecasts on the 3-year training programme for mental health NPs before 2019. This group of NPs in mental healthcare was included with other NPs.

Table below shows trends in the actual intake in both training programmes, the number of registered and practising NPs and PAs, and the number of FTEs between 2008 and 2019. It confirms that the ACMMP's early projections regarding the rapid increase in NPs and PAs were correct. The number of FTE NPs and PAs increased eightfold between 2008 and 2019. Between 2016 and 2019 alone, 1 000 additional FTE NPs and PAs were added to the workforce.

The number of practising NPs has increased by another 1 000 FTEs over the past three years to reach 4 100 in 2022, whereas the number of PAs increased by 500 FTEs to reach 1 450 in 2022 (ACMMP, 2022a). Given that many of these NPs and PAs have or will be practising in hospitals, the vertical substitution scenarios are becoming more realistic not only for GPs but also for many medical specialists.

Table 18: Nurse practitioners and physician assistants: intake in the training programme, number of registered and practising persons and FTEs practising

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Intake of NP	281	346	390	384	458	338	382	407	462	500	552	620
Registered NP			801		1,316				2,783			3,643
Practising NP	517	667	883	1,147	1,442	1,775	2,046	2,384	2,638	2,895	3.194	3,494
NP FTE	**432**	**557**	**737**	**887**	**1,316**	**1,566**	**1,809**	**2,107**	**2,333**	**2,572**	**2,823**	**3,066**
Intake of PA	110	128	132	132	156	118	116	140	184	193	230	271
Registered PA			251		409				724			1,047
Practising PA	78	149	218	271	348	448	547	641	762	858	953	1,058
PA FTE	**73**	**139**	**203**	**251**	**323**	**414**	**505**	**592**	**704**	**775**	**863**	**951**
Total FTEs	**505**	**696**	**940**	**1,138**	**1,438**	**1,980**	**2,314**	**2,699**	**3,037**	**3,347**	**3,686**	**4,027**

Source: HBO raad/Prismant

In 2015, the Ministry of Health asked the ACMMP to set up a system to make recommendations for an additional 16 paramedical professions, of which 10 were specialised hospital nursing professions and the other 6 important hospital-related professions. A 17th profession, the ambulance nurse, followed in 2018.

The ACMMP set up a data retrieval system to obtain the necessary data on the supply and demand from each hospital for each of these 17 professions, given that there were no trustworthy data on these paramedical professions. After analysing the data, recommendations were delivered to each hospital and so-called “FZO” regions regarding the training of these specialised hospital personnel.[7]

[7] “FZO” regions are regional platforms were all hospitals in a circumscribed region try to coordinate the training of these specialized paramedical professions. Up until the ACMMP recommendations, these platforms had no data to work with.

7.3. Conclusions on the strengths and weaknesses of the Dutch experience in medical workforce planning

Over the past almost 25 years, the Netherlands has developed an effective and widely accepted approach to medical workforce planning that combines a well-functioning governance structure and robust and continuously evolving workforce planning models, involving the key stakeholders throughout the planning process and the policy recommendations process. The governance structure provides a central role to a permanent and independent Advisory Committee (ACMMP) in bringing together all the key stakeholders to discuss future requirements of different categories of doctors and to make recommendations to government regarding medical student and residency intakes to avoid shortages or surpluses. The key stakeholders include professional associations, medical schools and other training institutes, and health insurers. Since the beginning, the work of the ACMMP has been supported by the technical expertise provided initially by two organisations, but since 2019 by only one semi-governmental organisation (NIVEL, the Netherlands Institute for Health Services Research). NIVEL is tasked to develop the health workforce planning models based on the scenarios envisaged by the ACMMP stakeholders and has also been tasked to gradually extend the planning models beyond the medical workforce to other paramedical professions with some adjustments.

The strong links between these two elements – the governance structure and the more technical robust modelling work -- is crucial to the well-functioning and continuous improvement and extension of the Dutch health workforce planning approach. Without robust and constantly evolving technical planning models (and the underlying data and estimates feeding these models), it is not possible for stakeholders to have serious discussions on the impact of different scenarios on the projected supply and demand (requirements) for different categories of doctors and other paramedical professions, and to come up with robust recommendations on student intakes to address any current or projected imbalance (shortages or surpluses). At the same time, without a governance structure that involves the key stakeholders throughout the process, it would be much more difficult to get their acceptance and support for the projection model results and the recommendations that arise from these models to fill any projected imbalance.

The main **strengths** of the Dutch governance approach to medical workforce planning include the following:

- Because all stakeholders are represented in the independent ACMMP, government and the Ministry of Health is not confronted all the time in dealing with all the various interest groups that have some interest in medical and training policies. If and when interest groups want to influence government policies, they can be referred to the ACMMP.
- The independent recommendations of the ACMMP are a key reference for government. While government makes the final decisions, they only need to justify decisions if they deviate in any significant way from the ACMMP recommendations.
- The ACMMP recommendations can be used by government when the financial results of the Ministry of Health are audited each year by the Court of Auditors. All of the

annual expenses for the residency training of medical graduates (over € 1 billion per year) can be justified to the Court by referring to the ACMMP recommendations.

- The ACMMP has fostered major improvements in health workforce databases. The government and Ministry of Health can consult these databases to respond to all kind of questions in parliament. The ACMMP can also do rapid research for government if necessary (due to a provision in its budget).
- The ACMMP has fostered structural and ongoing attention on health workforce planning, without much time and energy from government and Ministry of Health spent into it.
- If things go wrong, the government can refer to the ACMMP (which is composed of the key stakeholders).
- From the stakeholders' point of view, the ACMMP provides a mechanism/platform to exchange ideas and data on workforce planning in a structured way and allows them to become part of a highly respected and influential organisation.

The strong influence of the ACMMP's projections and recommendations means that the freedom for government in determining student intakes is limited, which might be considered a disadvantage (a loss of government control). However, the government and Ministry of Health always has the possibility of not following the ACMMP recommendations, provided that it offers some justification for not doing so.

One of the main **weaknesses** of the Dutch governance approach is the lack of involvement of the Ministry of Education in the health workforce planning process, particularly in determining student intakes in initial medical education programmes. The relation between the Ministry of Education and the Ministry of Health has sometimes been uneasy. In general, the Ministry of Education has opposed any reduction in student intakes in initial medical education programmes for a number of reasons, including that this is the most expensive education programme, so any reduction in student intakes may imply significant budget cuts and it may be difficult to get the budget "back" if student intakes increase in the future. One of the consequences of the large number of students admitted in medical education programmes in recent years is that this has led to a growing pool of medical graduates waiting to start their postgraduate residency training (a "reservoir" larger than what the ACMMP and Ministry of Health considered to be necessary). Some governance mechanisms still need to be put in place to reconcile the different views of the Ministry of Education and Ministry of Health regarding the intake of students in medical education programmes.

The establishment of the permanent and independent ACMMP nearly 25 years ago has helped put an end to previous decades-long cycles of highly politicised discussions about doctor shortages or surpluses in the Netherlands. successive Dutch governments have gradually expanded the mandate of ACMMP to cover a growing number of medical and paramedical professions. The latest 2022 ACMMP report and recommendations covers no less than 85 professions (as noted in Annex 2), which is a clear recognition of the perceived benefits, acceptability and adaptability of the approach.

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Annex 1. Overview of key findings and recommendations from past committees on health workforce planning in Israel (non-exhaustive list)

Year	Committee	Key findings and recommendations
1990	Netanyahu Committee (State Commission of Inquiry on the functioning and efficiency of the healthcare system in Israel)	Recommended that the Ministry of Health establish a division on health workforce planning to collect information and data on the workforce in various professions and collect information on needs, demands and uses of health services based on demographic changes, technological changes and other factors affecting demand. This new division would also formulate conclusions regarding future health workforce needs in each profession, and based on these forecasts, formulate plan for education and training programmes in different health occupations.
2002	Fazi Committee	Recommended that the number of medical graduates in Israel should increase to 900 per year.
2003	State Comptroller's Report 53B	Recommended that the Ministry of Health should map the workforce in various medical professions (including geographically), collect up-to-date data from hospitals, health insurance funds and the National Medical Association, and create a database that would make it possible to define those professions that are in shortages, examine the scope of any workforce crisis and offer solutions.
2007	Levi Committee	Recommended the establishment of another medical school and to increase the number of medical students in Israel to 600 per year (this recommendation was implemented). Recommended the establishment of a 4-year track for medical studies (also implemented). Recommended to implement exams for students who have obtained their medical degree abroad.
2007 2010	Ben Nun Committee Horeb Committee	Recommended the establishment of an additional medical school by 2011 (Safet). Recommended to increase the number of medical students in Israel to 700 per year starting in 2012, and to 800-900 in the future. Recommended that action be taken to reduce the number of international students studying in Israel while compensating universities for any loss revenues. Encourage interns/residents to study in specialty in need and discourage interns/residents to study in specialty in surplus.
2018	Marom Halperin Committee	Formulated a plan to increase the number of medical students in Israel to 950 per year. This plan included: opening a 4-year course in Ariel; reducing/abolishing foreign student programmes; abolishing the "Nicosia" programme; increasing the number of students at Bar Ilan. Proposed to adjust the number of postgraduate specialty training places available to the number of graduates.

		Proposed the establishment of a body to monitor the fulfilment of the goals and recommendations.
2018	State Comptroller's Report 683	Noted that the Ministry of Health does not have centralized information on the number of internship positions in each department and each hospital and does not know how many of these positions are filled or vacant. Noted that the Ministry of Health does not have a multi-year plan to determine the future needs in each field of specialization, and how many internship places should be added in each field and in each hospital. Noted that these gaps reflect an uninformed management of the medical personnel in the country and a failure in strategic planning of the Ministry of Health.
2019	Prime Minister's Office National Economic Council (Preparation for 2040 in the field of doctor training)	Recommended an increase in the number of medical students in Israel to approximately 1,200-1,500 new students by 2026, so that the number of new doctors in 2035 would reach approximately 1,800-2,100 per year (including foreign graduates). Proposed new ways to deal with limitations in clinical placements in the training of doctors in Israel, including examining possible opportunities for clinical placements in the community. Noted the need to adjust financial incentives for training medical students. Noted the need to develop tools to encourage the recruitment of doctors to the periphery. Noted the need for a more structured match between the number of medical graduates in Israel and the number of postgraduate specialty training places that are opened each year, and the need to opened up residency places based on future needs. Recommended to apply measures to raise the quality of medical graduates from abroad who seek to receive a license in Israel. Proposed the establishment of a forum on behalf of the government and the Ministry of Health in which representatives of university deans, hospitals and other bodies would participate and recommend ways to meet the goal of training a sufficient number of new doctors.
2021/22	Gamzo Committee (Committee for Long-Term Planning of Medical Personnel in Israel)	Recommended to increase the number of medical students receiving a license in Israel to 2000 per year by 2035 (up from 1721 in 2020). Recommended to reduce the internship period to a minimum while advancing the medical degree to the end of the sixth year and the possibility of cancelling the internship year for graduates who start directly their postgraduate residency training. Recommended to abolish programmes for foreign students studying in Israeli medical schools. Promoted measures to encourage the return to Israel of Israeli students studying abroad and Israeli doctors living and working abroad. Recommended to maintain contact with Israeli students studying abroad through some registration. Recommended to improve the quality of medical students studying abroad by subsidizing outstanding students subject to students' commitment to work in some specific geographic areas or fields.

		Recommended to increase the number of students with a primary residential connection to shortage areas. Supported the launch of the Ilanot programme in 2022 with 60 participating medical students (30 students in the north and 30 students in the south from Negev and Galilee or who have a significant connection to these areas). Supported the gradual expansion of the Ilanot programme to 100 students (50+50) by 2025, as part of the process of increasing the overall number of students in Israel. Recognised the responsibility of the Ministry of Health for planning an appropriate mix of medical professions based on needs and demand.
2022	Biar and Levi Committee (Committee of the Council for Higher Education on the structure of medical studies and mapping of clinical fields in medical studies)	Recommended a shortening of the duration of studies to get a medical degree and awarding the degree upon graduation (in the sixth or fourth year of study depending on the academic programme). Recommended to move towards a unified formal assessment at the end of the last academic year (preparation of one integrated exam). Recommended to increase the number of medical students by 400 gradually over 4 years. Recommended expanding clinical placements in the community (including in child health centers and women's health centers).

Source: Ministry of Health, 2022

Annex 2. List of medical and paramedical professions covered in the 2022 ACMMP report and recommendations in the Netherlands

Profession	Recommended intake as of 2024
Medical/Surgical professions	
Anaesthesiology	79
Cardiology	58
Cardiothoracic surgery	6
Dermatology and venereology	29
Surgery	62
Internal diseases	126
Ear-nose-throat specialism	18
Paediatrics	65
Clinical chemistry*	14
Clinical physics*	25
Clinical genetics	9
Clinical geriatrics	36
Pulmonary diseases/ tuberculosis	41
Gastroenterology	24
Clinical microbiology	20
Neurosurgery	7
Neurology	49
Obstetrics/ gynaecology	40
Ophthalmology	38
Orthopaedics	28
Pathology	19
Cosmetic surgery	19
Psychiatry	179
Radiology	63
Nuclear medicine	0
Radiotherapy	15
Rheumatology	19
Rehabilitation medicine	31
Emergency medicine**	42
Sport medicine	7
Urology	24
Clinical pharmacy*	29
Family physician	
Family physician	1190
Specialists for elderly and mentally disabled	
Specialist for the elderly	305
Specialist for the mentally disabled	43
Public Health specialists	
Occupational specialist	258
Insurance specialist	233
Youth care physician**	154
Youth care specialist	154
Indication and advice physician**	73
Indication and advice specialist	5
Donor physician**	15

Donor specialist	2
Policy and advice physician**	20
Policy and advice specialist	18
Infectious diseases physician**	`37
Infectious diseases specialist	35
Environmental physician**	4
Environmental specialist	3
Tuberculosis physician**	1
Tuberculosis specialist	1
Forensic physician**	27
Public health specialist	30
Physician assistant/Nurse practitioner	
Physician assistant clinical care	139
Physician assistant general practice	70
Physician assistant ambulatory care	62
Physician assistant other sectors	15
Nurse practitioner clinical care	180
Nurse practitioner general practice	69
Nurse practitioner ambulatory care	213
Nurse practitioner other sectors	12
Nurse practitioner mental health	248
Facio dental professions	
Oral hygienist	353
Dentist	375
Oropharyngeal surgeon	15
Orthodontist	15
Mental professions	
Addiction physician	33
Psychologist	1885
Psychotherapist	171
Clinical psychologist	249
Clinical neuropsychologist	26
Paramedical professions	
Nurse anaesthetist	356
Infectious diseases expert	80
Plaster cast master	40
Clinical perfusionist	19
Operating theatre assistant	729
Radio diagnostic lab technician	291
Radio therapeutic lab technician	128
Dialysis nurse	339
Intensive care paediatric nurse	112
Intensive care neonatology nurse	122
Intensive care nurse	791
Paediatric oncology nurse	28
Paediatric nurse	519
Obstetrics nurse	294
Oncology nurse	531
Emergency ward nurse	351
Ambulance nurse	224

Notes: *clinical technological specialties ** “profile” physician, not a complete specialty (yet).
Source: ACMMP (2022a).

Annex 3. Selection process in residency programmes in United States and Spain

This annex describes the selection process of students in postgraduate residency training programmes in the United States and Spain. While the specific approach to select and allocate students in these two countries varies, the one common feature is that a more structured and transparent approach is used than the current approach in Israel where decision-making is left at the discretion of each hospital.

1. United States: The Medical Residency Selection is based on the Match process[8]

The residency matching process in the United States involves a long process that lasts about six months from the start to the end, and includes applications, interviews, travel, ranking of preferred programmes, and the use of algorithms for the matching process. The overall aim is to match medical students into residency programmes, according to the preferences of both the students and the programmes, through a process operated by the Electronic Residency Service (ERAS) and the National Resident Matching Program (NRMP).

Residency Application Process

The residency application process starts each year on September 15th. Medical students submit their applications via the Electronic Residency Application Service (ERAS), including:

- A completed ERAS Application
- Their personal statement
- Letters of recommendation
- Medical Student Performance Evaluation (MSPE or "Dean's Letter")
- Medical School Transcript
- USMLE/COMLEX-USA (licensing exam) transcript

International Medical Graduates (IMGs) who have completed their medical studies outside the United States must also include:

- Their ECFMG Status Report
- A Postgraduate Training Authorization Letter (PTAL or "California Letter") if they seek to train in California.

Interview season

Applications are reviewed by residency programme directors, faculty, programme coordinators and other administrative staff. Selected applicants are then invited to interview. The interview season lasts from early October to mid-February. Applicants travel to hospitals nationwide to attend interviews, where they meet with programme leadership and faculty, and tour hospital facilities. They are also evaluated by faculty on how well they would fit in that particular residency programme.

[8] This section is based largely on information provided on this website from Thalamus: The Ultimate Guide to the Medical Residency Match Process – Thalamus (thalamusgme.com).

Submission of a Rank Order List

Throughout the interview process, applicants begin composing a preliminary Rank Order List (ROL). This is a list of the residency programmes in which they would be happy to train, ranked in order of their preference. On the other side, residency programmes create ranked lists of interviewed candidates they desire to have as residents. These lists are finalized in mid-February through formal certification with the NRMP. Once finalized, ROLs are entered into the Matching system for the algorithm to do its job.

The NRMP Match algorithm

The NRMP Match is determined by a mathematical algorithm that aims to optimize satisfaction for applicants and programmes, according to their ranked choices. The algorithm is "applicant-proposing" or "applicant-centric," meaning that it favours the applicants who are placed into programmes based on the order they have ranked them. For a match to occur, both applicants and programmes must rank each other. Additionally, residency programmes must have available positions remaining.

The algorithm starts by attempting to match each applicant to their first-choice programme. If there is a match with a residency programme, the candidate is "tentatively" matched. This means that the candidate will match at that institution, as long as applicants ranked higher than that candidate at that particular institution do not occupy the available positions.

If an applicant's first choice is already occupied by higher-ranked candidates or a "tentatively" matched candidate is subsequently displaced, the algorithm will attempt to match the displaced candidate to their second choice. And then to their third choice and so on.

Once a candidate has matched into their most preferred available choice with no higher ranked candidates securing remaining available positions, a "tentative" match becomes a "confirmed" match. This is the programme where the candidate will complete their residency training.

Once rank choices for all candidates have been run through the algorithm, the match is considered final. This leads to Match Week, the last stage of the residency match process.
The final step: Match Week and Supplemental Offer and Acceptance Program (SOAP)

"Match Week" is held on the third week of March. It ends with "Match Day". On the Monday, applicants are informed of whether they successfully matched into residency positions by email and through the NRMP R3 system—but not *where* they matched.

Applicants who have not matched become eligible for the Supplemental Offer and Acceptance Program (SOAP), which is an additional accelerated supplemental matching process that takes place between Monday afternoon and Thursday morning. There is still opportunity for applicants to match to a programme, it just will not be one that was on their list. Unfilled residency programmes are offered to unmatched applicants on their own preference lists.

The six-month-long residency match process culminates in Match Day on the Friday of Match Week. All applicants open an envelope at noon that finally reveals their residency programme matches.

2. Spain: a merit-based and competitive selection process[9]

Established in the 1980s, the Spanish selection system for medical residency programmes acts in accordance with the principles of fairness, transparency, and equality. The selection process of specialty candidates is based mainly on a national competitive exam as well as the grades during the school years.

Step 1: Announcement of the available residency positions

The residency selection process consists of several steps throughout the year, starting with the approval of residency positions. The posts are determined on the basis of the financial budget and training capacity of the accredited training institutions, as well as the national need for specialists announced by the Ministry of Health and the autonomous regions. In total, 47 specialties are available to the candidates. Candidates must hold an approved diploma from a Spanish or foreign medical school and pass the national competitive exam to become eligible for the selection.

Step 2: Selection based on academic and exam performance

The second step is the selection of candidates. Spain uses a merit-based scoring system, which takes into account the combination of the national exam score and the average medical school grade. The national exam is held annually and accounts for 90% of the final score. The exam is a multi-choice test with 175 questions and lasts 4 hours, and there is a minimum pass score to become eligible to select a programme. The medical school grade is calculated using the average annual grades throughout medical school and has a weighting of 10% in the final grade. The final score aims to reflect the overall performance of the candidates. The whole process, including the marking of the exam and the announcement of the rankings, is transparent and open to reviews by candidates.

Step 3: Ranking and allocation

The final step involves the ranking of all candidates nationally on the basis of their final scores. Once the rankings have been announced, the students select training programmes sequentially based on their rankings in the exam. Those at the top of the rankings submit their residency and institution preferences earlier than others, while those at the bottom are left to choose the remaining available placements. In many cases, those at the bottom of the rankings prefer to opt out of the process and prepare for the exam for the next year.

[9] This section is based largely on information provided in the article from Freire, Infante, de Aguiar *et al.* (2015).