Cross-country analysis of health worker mobility across the European Union and neighbouring countries (2010 – 2022)

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List of abbreviations

EU	European Union
EEA	European Economic Area
EPSU	European Federation of Public Service Unions
HOSPEEM	European Hospital and Healthcare Employers' Association
ILO	International Labour Organization
IOM	International Organization for Migration
OECD	Organization for Economic Co-operation and Development
RPD	Regulated Professions Database
UHC	Universal Health Coverage
UN	United Nations
UN SD	United Nations Statistics Division
UK	United Kingdom
WHO	World Health Organization

About Pillars of Health

Pillars of Health is an alliance of EU-based organisations that wants to contribute to an equitable geographic distribution of health workers across the European Union (EU), to ensure that all European citizens have equal access to health workers. In 2021, as part of the Pillars of Health project, lead partner organisation Wemos (the Netherlands) joined forces with the Center for Health Policies and Services (Romania), Media Education Centre (Serbia), and VU Athena (the Netherlands) to identify ways to address the negative effects of excessive health worker migration and recruitment. In 2022, we also started collaborating with the Association of Democratic Physicians (Verein demokratischer Ärzt*innen (vdää*)) (Germany). Moving forward, we aim to do joint advocacy within a wider coalition. Together, we aim to influence policy-makers so they actively implement policies that mitigate the negative effects of health worker migration and mobility, and instead contribute to a strong and sustainable health workforce across the EU. Read more about Pillars of Health, and join us.

This report is part of a series on health workforce migration and mobility in the focus areas of Pillars of Health: Germany, France, Romania, Serbia and EU level.

This report was written by the following authors from the Pillars of Health partner the Athena Institute (Vrije Universiteit Amsterdam, Netherlands).

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Executive summary

Introduction

The international **migration and mobility of skilled workers, including health professionals**, is increasing. This is also the case within the European Union (EU) and neighbouring countries. When large numbers of medical doctors and nurses emigrate following labour market demands, apparent trade-offs may emerge between tackling staff shortages and improving health service provision in receiving countries, while weakening the capacity for service delivery in sending countries. In 2010, the World Health Assembly adopted the World Health Organization's (WHO) Global Code of Practice for the International Recruitment of Health Personnel, to respond to these challenges. For the EU specifically, the European Federation of Public Service Unions (EPSU) and the European Hospital and Healthcare Employers' Association (HOSPEEM) signed a code of conduct on ethical cross-border recruitment and retention in 2008.

This report provides a cross-country analysis of health worker mobility data within the EU and neighbouring countries from 2010 – 2022. It is based upon desk research and secondary and publicly available data retrieved from the Organization for Economic Co-operation and Development (OECD) database and the European Commission Regulated Professions Database (RPD). This report focuses on medical doctors and nurses in specific, by 1) illustrating the current reliance on foreign(-trained) doctors and nurses and highlighting the trends over time, and 2) depicting the overall geography of mobility of doctors and nurses between 2010 and 2022, by highlighting key geographical patterns and the magnitude of intended mobility flows of doctors and nurses between subregions and countries. The report also reflects on key gaps in and limitations of the data available for health worker mobility across the EU and neighbouring countries.

Key findings

The findings of this secondary data analysis underscore the **increasingly blurred dichotomy** between sending and receiving countries in the EU and neighbouring countries. The findings highlight the persistent popularity of high resource EU countries (e.g. Germany) and high resource neighbouring countries (e.g. the United Kingdom (UK), Switzerland, Norway) as receiving countries. OECD data illustrate an increasing dependency on foreign-trained doctors and nurses across these countries, and RPD data reveals these countries were also the most popular receiving countries in which medical doctors and nurses sought to get their qualification

recognised over the past decade. Importantly, the report pinpoints **two compounding geographical patterns of mobility across the EU and neighbouring countries**. These include 1) one-way cross-regional mobility typically *from* Eastern and Southern European regions towards Western and Northern European countries, and 2) subregional mobility *within* Western and Northern European regions via subregional mobility 'hubs'.

To better understand these two compounding patterns, we must consider that mobility between different European subregions might include different types of mobility as compared to mobility within European subregions. In addition, insights into the type of health workers that choose to migrate as well as insight into the realities of health worker mobility are important considerations for understanding mobility patterns. However, the quantification and understanding of health worker mobility within the EU and neighbouring countries is hampered by **key gaps and limitations in available data**:

- This report has used publicly available OECD and RPD data and thereby the countries included in this report are limited to OECD countries and countries included in the RPD.
- Health worker mobility data is collected irregularly (i.e. missing data for certain years or for certain indicators) for some countries, may be limited to certain professions (i.e. only doctors and nurses included in OECD) and differences in methods of data collection and indicator definitions exist between countries.
- The data available to quantify health worker mobility flows is limited to 'intention to leave' data. Intended mobility flow from and towards countries is quantified by using 'recognition of qualification' in receiving countries as indicator. This means that the actual number of health workers migrating in reality remains unidentified. The RPD does not indicate whether, after a recognised qualification, the health professional actually migrates to the respective country.
- In relation to the point above, there is a lack of insight in the reality of and after migration. Such as whether health workers are in employment or unemployment, whether they experience deskilling or move to work in a different sector.
- Data on available indicators in both databases are not disaggregated for, for example, sex, gender, ethnicity, specialties within health professions or other social and economic dimensions.

The above gaps and limitations undermine the ability to conclusively draw comparisons between countries, and identify trends over time. These gaps and limitations frustrate efforts to gain insight into the diversity among mobile health workers and who mobile health workers are (e.g. in terms

of their socio-economic profiles, their reasons for leaving and entering a country, their motivations or career plans).

Unfinished business

Based on the key findings of the secondary data analysis, some key points of 'unfinished business' have been identified. These points - further elaborated on throughout the report - can inform **advocacy and efforts for improving health worker mobility and migration data** in the EU and neighbouring countries:

- There is a need for reliable and comprehensive data. For this, improving the quality and availability of data (i.e. disaggregation, registration and integration of different types of health worker mobility data) is key.

- There is a need to closely monitor gradual changes in mobility over time, as well as to monitor and capture the type of mobility and geographical mobility routes between subregions, neighbouring countries and between European countries in the free-movement area.

- Health worker mobility can impact health care services and delivery, health systems and labour markets in various ways. In order to understand and ensure a coordinated response to health worker mobility on the level of health facilities as well as on national and international level, multi-sectoral responses are critical.

To improve the quality and availability of health worker mobility data, we need **institutional strengthening for coordinated data collection, registration and integration** at health facility, national and international levels. Moreover, coordinated approaches to improve health worker mobility data could facilitate the development of new indicators needed to capture and monitor different mobility types and routes within the EU and neighbouring countries.

1. Introduction

The international **migration and mobility of skilled workers, including health professionals**, is increasing. This is also the case within the European Union (EU) and neighbouring countries. Medical doctors, nurses and other health workers have increasingly sought opportunities abroad[i,ii]. Moreover, skilled migration appears to have increased more rapidly as compared to overall migration over the past 15 years[iii], and is growing in its complexity[iv,v]. When large numbers of medical doctors and nurses emigrate following labour market demands, apparent trade-offs may emerge between tackling staff shortages and improving health service provision in receiving countries, while weakening the capacity for service delivery in sending countries. Specifically, while mobility of health workers presents solutions for staff shortages in some countries and may offer career opportunities and better working conditions to health workers, the freedom of movement within EU and neighbouring countries has also resulted in an unidirectional flow of health workers between European sending and receiving countries and regions. This hampers sending states' ability to provide essential health services and achieve Universal Health Coverage (UHC).

Previous European research provides evidence for predominantly unidirectional flows from Eastern and Southern regions towards Western and Northern European regions for skilled migrants[vi] and more specifically, for health professionals[vii]. However, significant subregional mobility adds complexity to such patterns and established dichotomies between 'source' and 'destination' countries (in this report referred to as 'sending' and 'receiving' countries) are thereby becoming increasingly opaque[viii]. **Predominantly one-way migration between European countries and subregions can lead to shortage of health workers and loss of investments in sending countries and thereby lower the quality of care, undermine equal access to health services, and create inequitable distribution of resources in sending countries**.

In 2010, the World Health Assembly adopted the World Health Organization's (WHO) Global Code of Practice for the International Recruitment of Health Personnel, to respond to the challenges mentioned above. For the EU specifically, the European Federation of Public Service Unions (EPSU) and the European Hospital and Healthcare Employers' Association (HOSPEEM) signed a code of conduct on ethical cross-border recruitment and retention in 2008.

This report provides a cross-country analysis of health worker mobility data within the EU and neighbouring countries[1] of the past decade. This is to capture the mobility trends within the EU and neighbouring countries from 2010 – 2022, after adoption of the WHO Global Code of Practice for International Recruitment of Health Personnel and the HOSPEEM-EPSU code of conduct. The analysis focuses on medical doctors and nurses in specific, by 1) illustrating the current reliance on foreign(-trained) doctors and nurses and highlighting the trends over time and, 2) depicting the overall geography of mobility of doctors and nurses between 2010 and 2022, by highlighting key geographical patterns and the magnitude of mobility flows of doctors and nurses between subregions and countries.

A key footnote to this analysis is that European countries also receive a significant number of health workers from outside of Europe. The inflows and outflows from and towards other continents have not been included in this analysis. Including these data might paint a different picture of countries in terms of reliance on foreign health workforce and geography of mobility between countries. This report focuses on mobility patterns *within* the EU and neighbouring countries specifically, and will not draw comparisons with mobility of health workers from other continents. This analysis did include the EU, European Economic Area (EEA), Switzerland and the UK to illustrate complex mobility and migration patterns between the EU single market and neighbouring countries due to their proximity to the EU and close connections between the labour markets as well as cultural and linguistic ties.

1.1. Methodology

This cross-country analysis is based upon desk research and on secondary and publicly available data retrieved from the Organization for Economic Co-operation and Development (OECD) database and the European Commission Regulated Professions Database (RPD) retrieved in September 2022. The European countries included in this analysis are therefore limited to the countries for which data is available within these databases. Each database provides data for a distinct selection of European countries. However, the sample of countries is diverse covering all regions of Europe, including smaller and larger countries, and countries part of the EU and EEA, as well as the UK and Switzerland. The visuals throughout this report are created using Excel and Microsoft PowerBI software packages. The maps of Europe included in chapter 2 are created with mapchart.net.

[1] For this analysis, 'EU and neighbouring countries' refers to the EU, the European Economic Area (EEA), Switzerland and the United Kingdom (UK).

1.2. Defining key concepts

1.2.1. International migrant workers, migration for employment and labour mobility

Various definitions of labour migration exist and there is no international consensus on how to define labour migration. The International Labour Organization (ILO) defines **international migrant workers** as:

> *"Migrants of working age, who during a specified reference period, were in the labour force of the country of their usual residence, either in employment or in unemployment"*[ix].

'**Migration for employment**' includes:

> *"A person who migrates from one country to another with a view to being employed otherwise than on his own account and includes any person regularly admitted as a migrant for employment"*[x].

'**Labour mobility'** has been previously defined as:

> *"Temporary or short-term movements of persons for employment-related purposes"*[xi].

1.2.2. Foreign migrant workers and international migrants

Importantly, foreign migrant workers are often international migrants as well. This is however not the case for all migrant workers. There is a difference between foreign migrant workers and international migrants as **international migrant workers** are persons who change their country of usual residence[xii]. A **foreign migrant worker** is defined by the UN as:

> "*Foreigners admitted by the receiving State for the specific purpose of exercising an economic activity remunerated from within the receiving country. Their length of stay is usually restricted as is the type of employment they can hold. Their dependents, if admitted, are also included in this category"*[xiii].

Foreign migrant workers can thus differ from international migrants, in that they move in search of work, do not have citizenship in the receiving country, and also include border workers (those who reside in one country but work in another), consular officials or military personnel[xiv]. Resulting from this, when collecting data on migrant workers, emphasis is placed on a person's citizenship rather than their country of birth[xv].

1.2.3. Health worker mobility

Health worker mobility is multidimensional and has been previously defined by OECD, the WHO and ILO, referencing:

> *"The movement of health workers, permanent and temporary, that **crosses national and regional jurisdictions**, with recognition that this is itself closely tied to intra-national movement, as well as occupational movements within and outside the health labour market"*[xvi].

As used, the definition of health worker mobility relates to that of international health worker migration and to that of labour mobility. It is broader in scope as it includes more types of mobility (i.e. temporary and permanent). Health worker mobility includes, by definition, migration or mobility of health professionals in search of work, either in employment or unemployment, and includes health professionals as (temporary) foreign migrant workers, border workers (e.g. a German doctor that lives near to the border and works in Switzerland), or health professionals as international migrant workers (e.g. a Romanian nurse who moves to Italy in search of work and changes their country of residence)[xvii]. The differentiation between types of health worker mobility should be taken into account in the interpretation of health worker mobility and migration data as well as the interpretation of data presented in this report, as it can have various implications on both policy and health system level in terms of workforce planning and strategies.

Box 1. **Health worker mobility data** can provide insight into **different types of mobility and migration** as it is based on the (requests for) recognition of qualification in receiving countries. It thus may include health professionals who permanently migrate to another country and change their country of usual residence, but can also include temporary health workers or border workers that may live in one country and work as a medical doctor or nurse in a neighbouring country.

1.2.4. Health professionals

It is important to highlight what it means to be recognised as a 'health professional' (i.e. medical doctor or nurse) in a certain country, and thus under which circumstances they are included in databases. Health professionals are considered a health professional when they have received an official qualification. Thus, when medical doctors and nurses cross national borders, they will first need to have their qualification recognised and receive a positive confirmation, *before* they are perceived and counted as health professionals in the receiving country. Those who do not obtain recognition of their qualification or whose requests are denied could be working in the health or care sector with lesser status (deskilling) than their educational level in their country of origin would allow, in an entirely different sector or could be unemployed. **People who do not**

seek recognition of their qualification or migrate illegally are thus not included in the data and analysis of this report, and their contribution to the magnitude of mobility flows thus remains invisible.

1.2.5. Sending and receiving countries

For the purpose of this report and due to the increasingly blurred dichotomy between 'source' and 'destination' countries, 'source' and 'destination' countries are in this report referred to as 'sending' and 'receiving' countries. Definitions used in this report are based on the International Organization for Migration (IOM) Glossary on Migration and IOM report on 'Mobility of health professionals to, from and within the EU'. A **receiving country** is defined as a country that is the destination of health worker migration flow[xviii] and thus where *'a migrant wishes to practice in line with their professional qualifications"*[xix]. A **sending country** is a broader concept, in that is can refer to either the nationality or country of citizenship of the health worker seeking to migrate, the health professional's country of birth, or the country where the health professional obtained their qualification as a health professional and thereby serves as country of origin[xx].

2. Foreign(-trained) doctor and nurse dependency

2.1. Introduction

The availability of sufficient numbers of qualified and motivated healthcare workers is critical to the efficiency of any healthcare system. The recent Covid-19 crisis has not only put the spotlight on the vital role and commitment of frontline health workers, but it has also highlighted the deep-rooted challenges of staff shortages in many (European) OECD countries[xxi,xxii].

During the Covid-19 pandemic, many OECD countries have recognised migrant health workers as an important asset and introduced policies to support their arrival and recognition of their qualifications[xxiii]. While the number of medical and nursing graduates has increased significantly in most OECD countries over the past two decades, the proportion of foreign-educated or foreign-born doctors and nurses has also continued to rise[xxiv,xxv]. Many countries have succeeded in strengthening the capacity of the health workforce by redeploying, mobilizing and recruiting health workers from other countries[xxvi].

This section illustrates the increasing dependency on foreign-trained doctors and nurses across European OECD countries. The share of foreign-trained doctors across the EU and neighbouring countries varies widely, from 1% to 42% of total doctor stock within countries. In the case of foreign-trained nurses the number varies from 1% to 26% of total nurse stock within countries. The current analysis is based upon secondary OECD data on Health Workforce Migration and focuses on the period of 2010 until 2021.

This section addresses two research questions:

1) What is the current reliance on foreign trained medical doctors and nurses across the EU and neighbouring countries?
2) How has this reliance changed over the past decade (2010 – 2021)?

2.2. Reliance on foreign(-trained) doctors and nurses

Reliance on foreign health professionals can be defined as the share of foreign(-trained) health professionals within a country's health workforce in a specific year, calculated as a percentage of the total workforce (i.e. doctors and nurses) stock within a specific country. Important to note is that **such numbers do not differentiate between foreign health professionals who moved a long time ago or those who moved recently**. Such reliance can only be understood to change gradually over a longer period of time. The OECD database does provide data on annual inflow of foreign-trained doctors and nurses for some countries (see chapter 4, section 4.2.3).

The OECD provides an overview of country definitions, sources, and methods of data collection to establish the overview of data. OECD notes that for foreign-trained doctors and nurses, the data should refer to practising physicians and nurses where possible. When this was not possible, the reported data can include professionally active physicians and nurses, or physicians and nurses licensed to practice. A foreign-trained doctor was defined by the OECD as *"doctors who have obtained their first medical qualification (degree) in another country and are entitled to practice in the receiving country"* [xxvii]. A foreign-trained nurse was defined by the OECD as *"nurses who have obtained a recognised qualification in nursing in another country and are working as a nurse in the receiving country"* [xxviii].

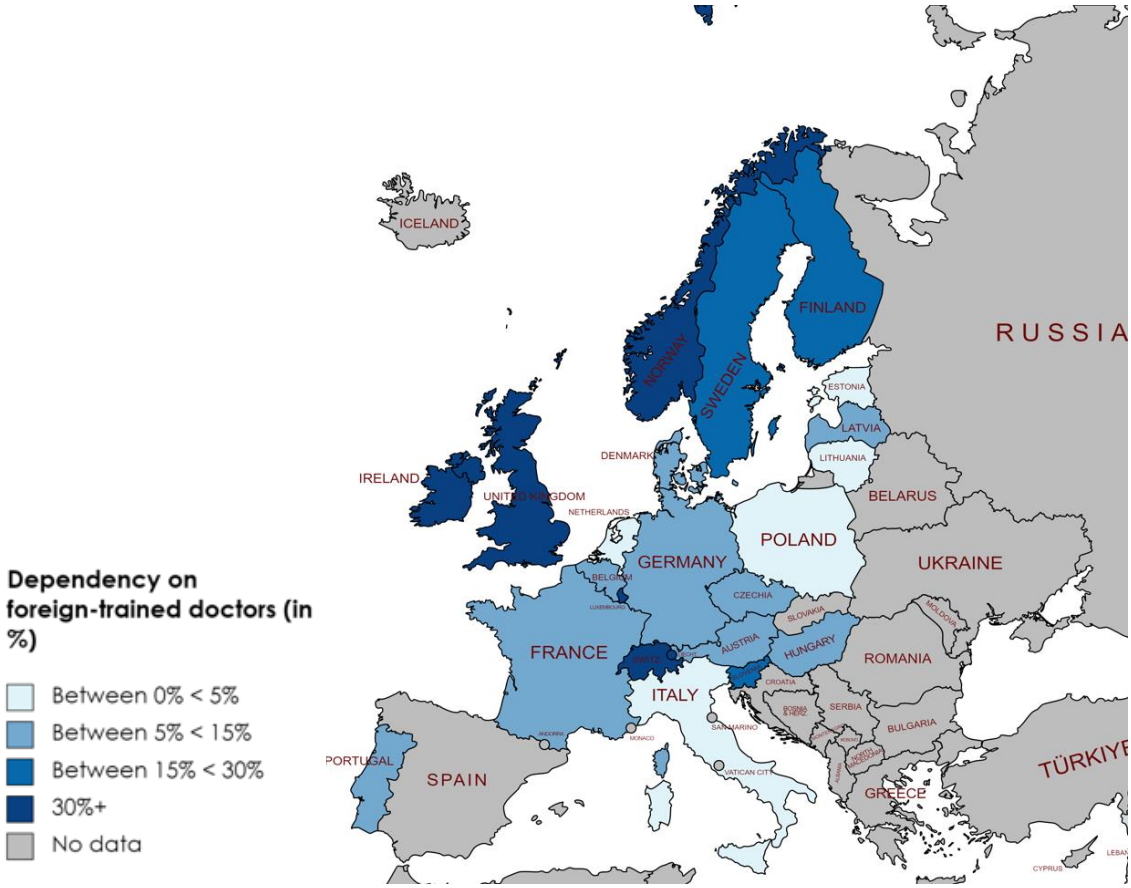
2.2.1. Reliance on foreign-trained doctors in 2021, or latest year

Figure 1 and *Figure 2* show the reliance on foreign-trained doctors and nurses working for countries for which data was available. The maps are colour coded based on dependency on foreign-trained doctors and nurses in 2021, or latest year available, indicated via a percentage of the total doctor and nurse stock of each country. The maps were created using 2021 data or latest available data for each OECD country retrieved from the OECD Health Workforce Migration Statistics database[xxix]. Countries coloured in grey include countries for which no data was available. This label could be due to either missing data in the OECD database or because the country is not an OECD member.

As depicted in *Figure 1*, Italy, Poland, the Netherlands, Italy, Poland, Lithuania and Estonia have lowest dependency on foreign-trained doctors with respect to their total doctor stock (between 1 and 5% foreign-trained doctors), as compared to other included countries. Between 5% and 15% of doctors in Austria, Belgium, Czech Republic, Denmark, France, Germany, Hungary, Latvia and Portugal were trained in another country. The dependency on foreign-trained doctors of Finland, Slovenia, and Sweden lies between 15% and 30%. The countries that indicate highest

dependency (30%+) as compared to other included countries, are **Ireland (40.5%), Norway (42.1%), Switzerland (37.4%) and the UK (31.9%)**.

Figure 1. A colour coded map of the EU and neighbouring countries based on their dependency on foreign-trained doctors (in percentages) using OECD.stat, 2021 data or latest available data[2].



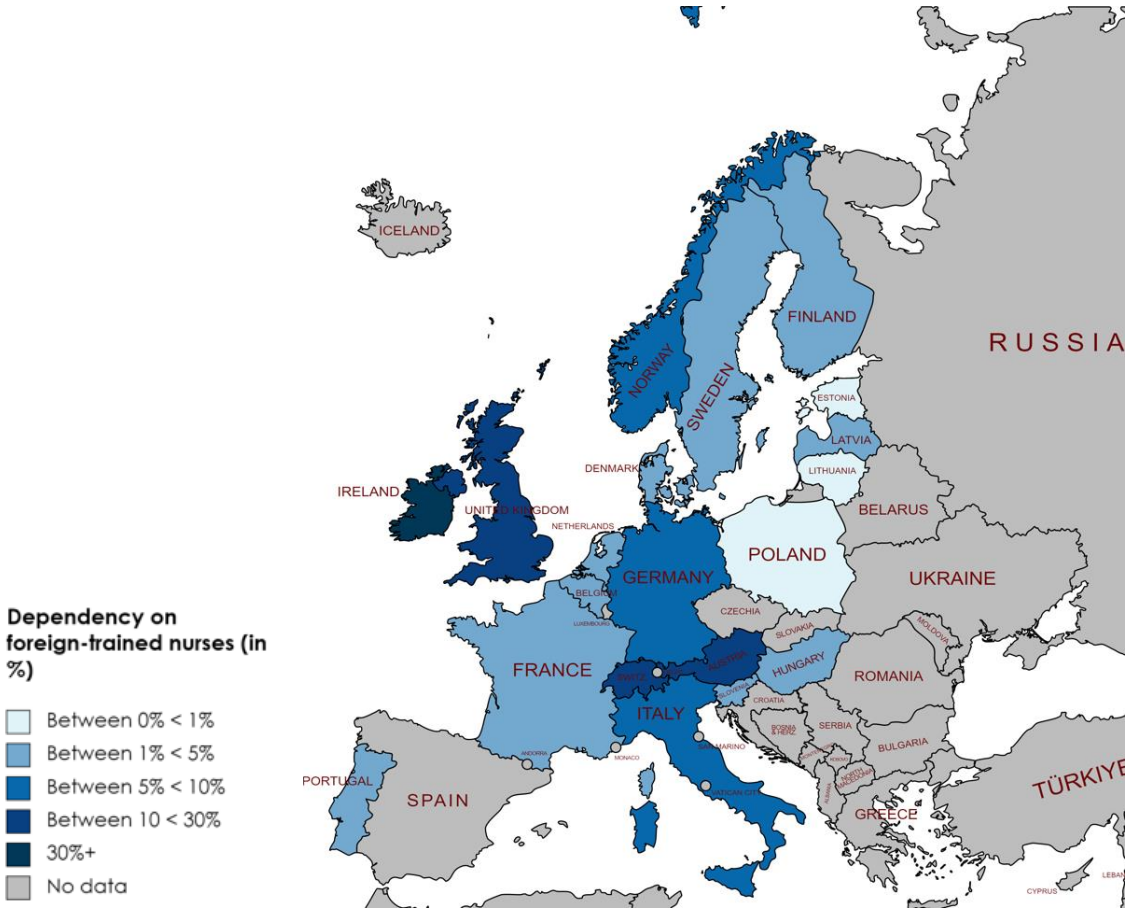
2.2.2. Reliance on foreign-trained nurses in 2021, or latest year

Figure 2 depicts the dependency of EU and neighbouring countries on foreign-trained nurses, with respect to their total nurse stock. Countries with lowest dependency on foreign-trained nurses, as compared to other included countries, include Poland (0.2%), Lithuania (0.4%) and Estonia (0.2%). In Belgium, Denmark, Finland, France, Hungary, Latvia, Netherlands, Portugal, Slovenia, and Sweden the percentages lies between 1 and 5% of nurses who trained in another country. Countries with higher dependency on foreign-trained nurses include Italy (5.2%), Norway (6.2%) and Germany (9.2%). Lastly, **Ireland (46.6%), Switzerland (26%), the UK (17.9%) and**

[2] Latest available data for Portugal (2017), Denmark and Sweden (2019), and Finland, France, Germany, Hungary, Latvia, the Netherlands and Switzerland (2020).

Austria (12.5%) show highest dependency on foreign-trained nurses, as compared to other included countries.

Figure 2. A colour coded map of the EU and neighbouring countries based on dependency of foreign-trained nurses in percentages using OECD.stat, 2021 or latest available data[3].



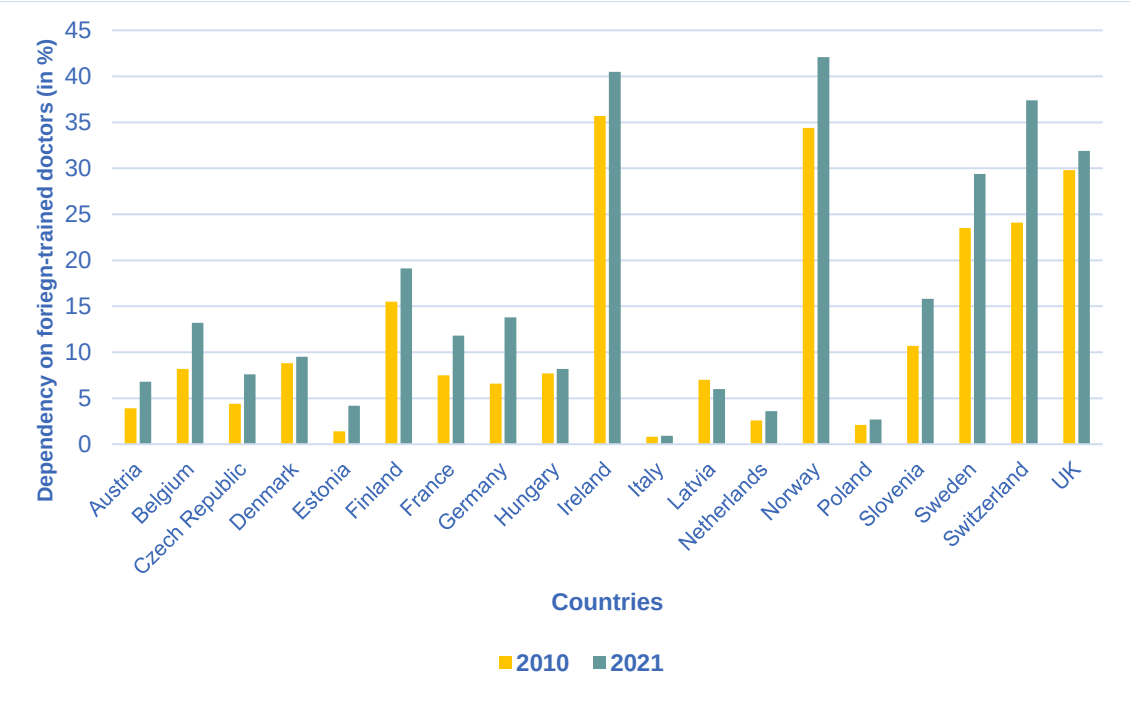
2.2.3. Change in reliance on foreign-trained personnel over time

Between 2010 and 2021, the European region became increasingly dependent on foreign-trained doctors and nurses to staff and sustain its health systems. *Figures 3 and 4* show the changes in foreign-trained doctors and nurses over time, during a period of between 10 or 11 years. The figures include data from 2010 and 2021 or latest year available. In all countries, the dependency on foreign-trained doctors increased between 2010 and 2021. The absolute increase in reliance

[3] Latest data available for Portugal (2017), Denmark and Sweden (2019) and Finland, France, Germany, Hungary, Latvia, the Netherlands and Switzerland (2020).

was highest in **Germany (from 6,6% to 13,8%), Norway (from 34,4% to 42,1%), and Switzerland (from 24,1% to 37,4%)**. Other countries who had relatively large increases on foreign-trained doctor reliance included Estonia (from 1.4% to 4.2%), Czech Republic (from 4.4% to 7.6%), France (from 7.5% to 11.8%) and Belgium (from 8.2% to 13.2%).

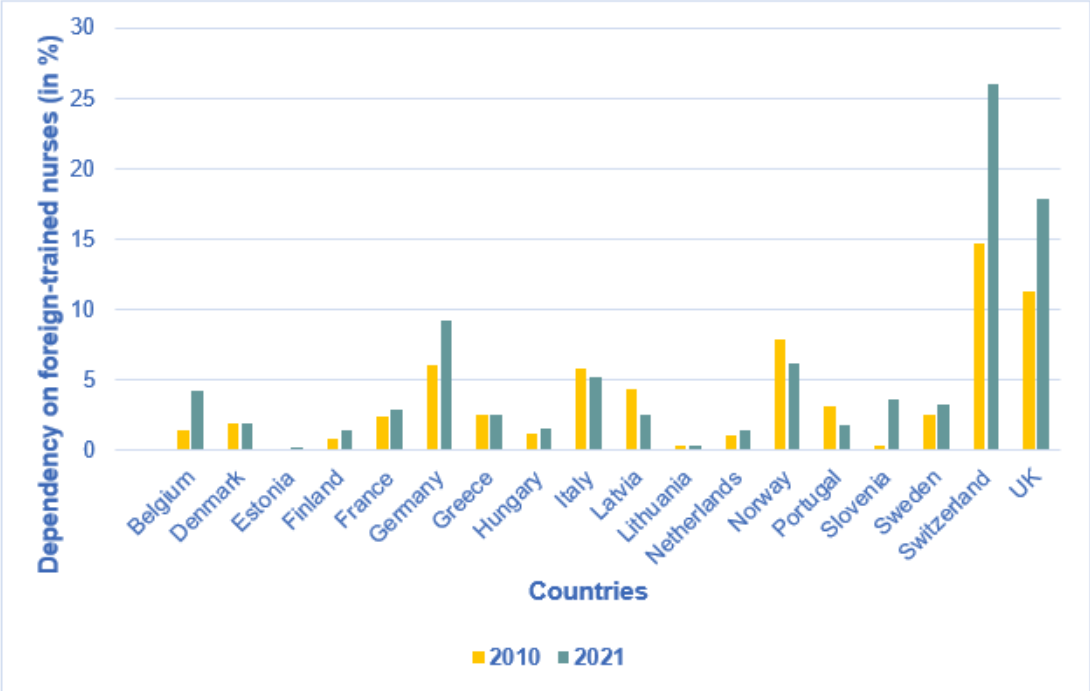
Figure 3. Foreign-trained doctors dependency in 2010 and 2021 (or latest year available) using OECD.stat[4].



Similar to *Figure 3*, almost all countries show an increasing percentage of foreign-trained nurses between 2010 and 2021 or latest year available (see *figure 4*), except in Latvia (from 4,4% in 2010 to 2,6% 2020) and Norway (from 7,9% in 2010 to 6,2% in 2021). **Belgium (from 1,5% to 4,3%), Germany (from 6,1% to 9,2%), Slovenia (from 0.4% to 3,7%) and Switzerland (from 15% to 26%)** show an increasing dependency on foreign-trained nurses over time, with respect to their total nurses stock.

[4] Earliest data available for Finland and Ireland from 2011. Latest data available for Portugal from 2017, for Denmark and Sweden from 2019, and for Finland, France, Germany, Hungary, Latvia, the Netherlands, and Switzerland from 2020.

Figure 4. Foreign-trained nurses dependency in 2010 and 2021 (or latest year available) using OECD.stat[5].



The OECD data only include data for some countries on the proportion of **native-born but foreign-trained health workforce**. For the majority of EU and neighbouring countries within the OECD database, this data is lacking. For the countries for which OECD data on 'native-born but foreign- trained' were available, the proportions of native-born among the foreign-trained doctors in 2021 or latest year available was between 0 – 10 % in France, Norway and the UK, between 10 - 20% in Austria, Hungary, Slovenia and Sweden, and the highest proportions were observed in **Finland (37.4%), Greece (74.2%), Italy (46.4%) and the Netherlands (42.9%)**. For other countries, this data was not available. In terms of nurses, the proportion of native-born nurses among the foreign-trained nurses stock in 2021 was between 0 – 10% in Hungary, Italy, Sweden and Switzerland, and was 18.2% in Norway. In addition, the observed proportion was relatively high in **Finland (31.5%), Ireland (26.7%) and the Netherlands (33.8%)**. **Greece** observed the highest proportion of **92.2% native-born nurses** among their foreign trained nursing personnel. This data shows that for some countries their foreign-trained staff comprises a large number of native health professionals who were educated abroad (i.e. Finland, Greece and the

[5] Earliest data available for Germany in 2012, Hungary in 2013 and Lithuania in 2014. Latest data available for Portugal from 2014, Greece from 2015, for Denmark and Sweden from 2019, and Finland, France, Germany, Hungary, Latvia, the Netherlands, Slovenia and Switzerland from 2020.

Netherlands). For countries with high dependency on foreign-trained health workers, such as Switzerland, Norway and the UK, the data indicates these health professionals are often non-native born. Few countries provided this distinction within the OECD database for both doctors and nurses, and thus for many countries insight into the composition of their foreign-trained health workers, differentiated by native-born and foreign-born, remains limited.

2.3. Gaps in the data

- This secondary analysis of the data was limited by the country **availability of data per year** and **availability of data on certain indicators**.
    - For some OECD countries data was incomplete, which led to exclusion from this analysis. Specifically, some countries lack data on certain years and not all countries have updated data for 2021.
    - Not all countries include data on the share of foreign-trained health workers, or differentiation between native-born but foreign-trained doctors and nurses.
- The data presented include **differences in definitions of indicators** in terms of inclusion and exclusion criteria as well as **differences in methods for data collection** between countries.
    - Methods of data collection vary between countries. This makes it difficult to compare data between countries and over time.
- The OECD database includes country specific data on OECD countries only. Thereby other relevant countries in the context of health worker mobility and migration in the EU and neighbouring countries are not included in this analysis (e.g. Serbia, Bulgaria).
- Data in the OECD database is **not disaggregated for sex, gender, ethnicity, specialities within health professions or other social and economic dimensions**. Furthermore, the database only contains migration data for medical doctors and nurses and thus does not include other health occupations.

Box 2. Key messages

- In the majority of EU and neighbouring countries included in the OECD database, there is an **increasing dependency on foreign-trained doctors as well as on foreign-trained nurses,** with respect to total doctor and nurse stock, over the past decade.
- The **UK, Norway and Switzerland** have the highest dependency on both foreign-trained doctors and nurses. Few of these doctors and nurses are native-born and foreign-trained.
- The countries in which their foreign-trained health workers mostly consists of native-born doctors and nurses include Finland, Greece and the Netherlands. In Italy this was the case only for doctors. In Ireland this was the case only for nurses.
- Increase in reliance on foreign-trained doctors was highest in terms of percentage points among Norway and Switzerland, with an increase of **7.7% and 13.2%** points between 2010 and 2020, respectively.
- Increase in reliance on foreign-trained nurses was highest in terms of percentage points among the UK and Switzerland, with an increase of **6,7% and 11.3%** points between 2010 and 2020, respectively.
- Most of the receiving countries with a higher dependency on foreign-trained doctors and nurses are high resource countries.

3. Geography of doctor and nurse mobility

3.1. Introduction

The previous section quantified the reliance on foreign-trained doctors and nurses across the European region and illustrated the trends over time over the past decade, building on OECD data of 2021 or from the latest year available. Geography of health worker mobility as a dynamic process can be captured better by a flow analysis. A flow analysis of medical doctors and nurses quantifies the dynamic of doctor and nurse mobility across the region by indicating the total number of doctors and nurses leaving certain countries and entering other countries over a specified period of time. This analysis builds on data from the European Commission RPD (for the geography of mobility) and OECD Health Workforce Migration data (for annual inflow). Data from 2010 until 2022 are included, or until the latest year available.

The RPD includes national data on the number of medical doctors and nurses who tried to get their qualification recognised obtained in another country (country of qualification) to practice **on a permanent basis** in a receiving country. The total of decisions by receiving countries thus quantifies **intended mobility flow** of doctors and nurses. Importantly, the decision made by a receiving country does *not* necessarily reflect the reality of migration since this data does not uncover whether the health worker actually migrates to the receiving country. The database differentiates between negative (refusal), neutral (pending) and positive (agreement) decisions taken by receiving countries[xxx]. Decisions marked as 'neutral' include those that are either undergoing an adaptation period, are being examined or are under appeal. In this analysis, the 'intended mobility flow' includes the total of *all* decisions taken by receiving countries, including positive, neutral and negative decisions.

This section addresses two research questions:

1) What are the current patterns of flow of medical doctors and nurses between specified European countries and regions?
2) What is the magnitude of medical doctor and nurse mobility flows between specified European countries and regions?

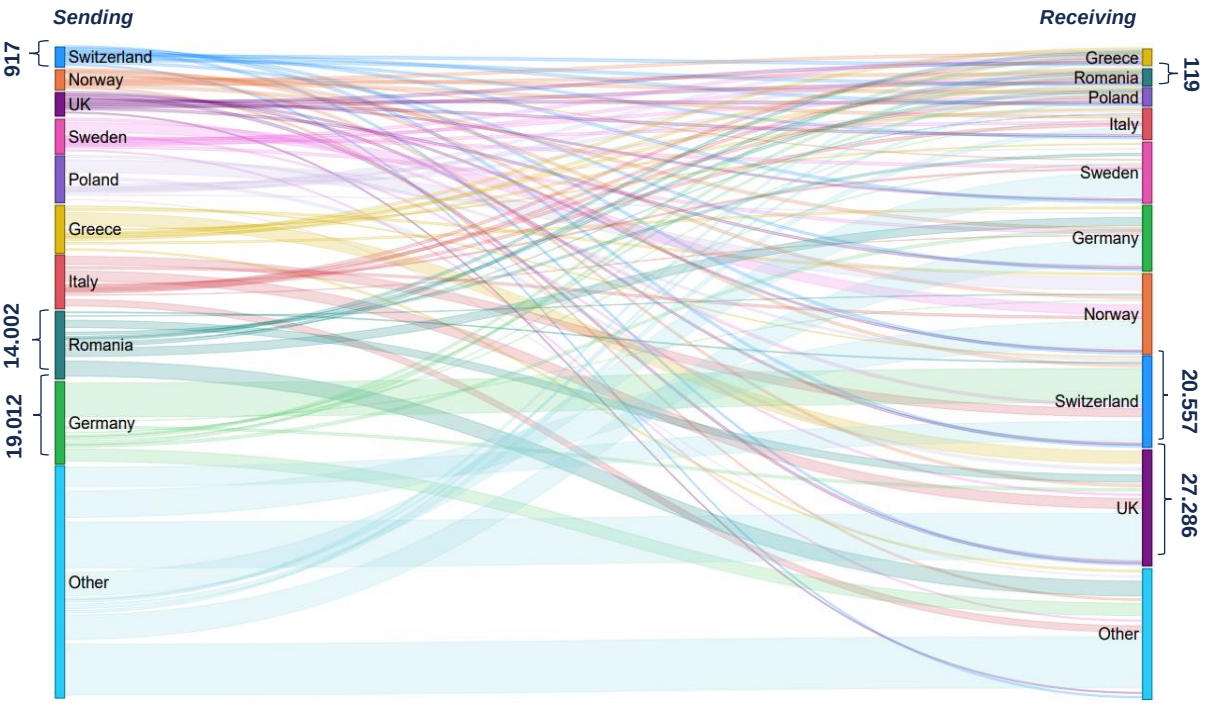
In addressing these questions, three different patterns of mobility within the European region are distinguished[xxxi], including i) the mobility pattern within and from the European free-movement

area, ii) mobility patterns between neighbouring countries and iii), mobility patterns across United Nations (UN) defined European subregions.

3.2. Flow analysis

Figures 5 and 6 include Sankey diagrams with the total number of medical doctors and nurses who sought to practice abroad on a permanent basis, between 2010 and 2022. Diagrams include data of countries included in the European Commission's RPD[6,7]. The flows between sending (left) and receiving (right) countries include the total of positive, negative and neutral decisions taken by receiving countries. *Figures 5 and 6* show the total number of doctors and nurses who have *the intention to leave* their country of qualification for the top 5 sending and receiving countries in the EU and neighbouring countries between 2010 and 2022.

Figure 5. Total applications for recognition of qualifications of medical doctors from 2010 – 2022, including the top 5 sending and top 5 receiving countries[8].

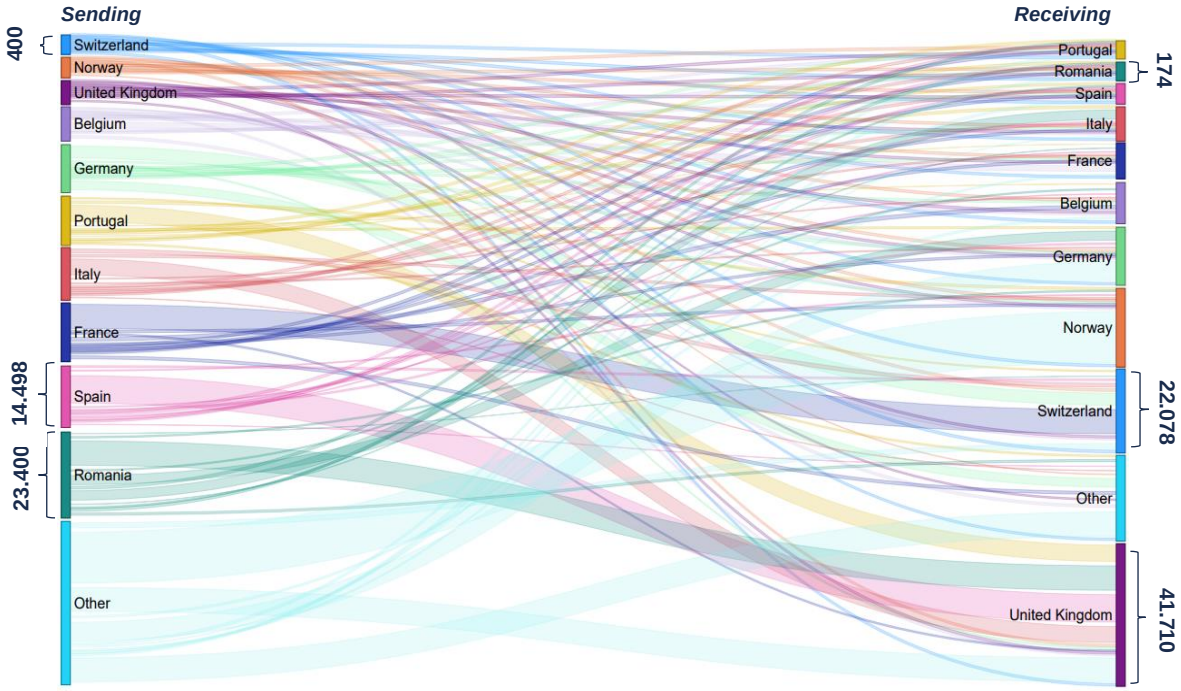


[6] Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom, Iceland, Norway and Switzerland (32 countries)

[7] Resulting from the UK's decision to leave the EU, the data of the UK is not updated per 1/1/2021. All data presented includes archived data as was available in the database per 31/12/2020.

[8] Top 5 sending: Germany, Romania, Italy, Greece and Poland. Top 5 receiving: UK, Switzerland, Norway, Germany and Sweden

Figure 6. Total applications for recognition of qualifications of nurses from 2010 – 2022, Figure includes the top 5 sending and top 5 receiving countries[9].



The RPD data on type of decisions made by receiving countries indicates that for medical doctors, **93.8%** of the total of these decisions between 2010 and 2022 were positive and the remainder either negative (1.3%) or neutral (4.9%). For nurses[10], **89.7%** of the total of these decisions were positive. The remainder was negative (1.5%) or neutral (8.8%). Relative percentages of positive and negative/neutral decisions differed between countries.

3.2.1. Mobility patterns in the European region

The data shows that clear distinctions can be made between some key countries in which doctors and nurses from abroad seek to get their qualification recognised (the UK, Switzerland and Norway) and other countries in which professionals obtain professional qualifications and then seek to get this qualification recognised abroad (Romania and Spain). At the same time, Romania and Spain do not receive many applications for recognition of qualifications from other European countries, whether through mobility from neighbouring countries or mobility within the European free-movement area (see *figure 5 and 6).*

[9] Top 5 sending: Romania, Spain, France, Italy and Portugal. Top 5 receiving: UK, Switzerland, Norway, Germany and Belgium
[10] The category of 'nurse' includes nursing personnel but excludes midwives, dental nurses, nursery nurses, veterinary nurses, paramedics, aged care nurses, nursing assistants, and nursery school teachers.

More medical doctors from **Romania, Greece, Poland, Italy and Germany** sought to move abroad as compared to the number of doctors who sought to enter these countries in that time period. At the same time, **Sweden, Norway, Switzerland and the UK** received more applications than the number of doctors that applied in another country. Switzerland and the UK appear to be the most popular receiving countries for doctors in this time period.

More nurses from **Romania, Spain, Portugal, Italy and France** sought to move abroad as compared to the number of nurses who sought to enter these countries in that time period, whereas **Belgium, Germany, Norway, Switzerland and the UK** received most applications for recognition. In these receiving countries, few nurses seek to move abroad after receiving a qualification in these countries.

Receiving countries

The UK remains the most popular receiving country for both doctors and nurses within the European free-movement area between 2010 and 2022. *Figure 5 and 6* show that the UK receives the most applications for recognition from doctors and nurses, as compared to the other countries included in the RPD. For nurses specifically, *figure 6* shows that the UK received more nurses between 2010 and 2022 than all the countries categorized under 'other' combined. A total of 40.008 nurses and 24.428 medical doctors got their qualification recognised in the UK (n=64.436). In that same period, only 1816 nurses and 1794 medical doctors sought to practice in another country (n=3610). Inflow of nurses within the UK was mainly from Spain (25.0% of total inflow), Portugal (15.8%) and Italy (15%), while inflow of doctors was mainly from Greece (15.4% of total inflow), Italy (13.0%) and Romania (10.2%).

Switzerland appears to be the third biggest receiver of both nurses and medical doctors from abroad between 2010 and 2022, as compared to the other countries included in the database. In that same period, few nurses and doctors sought to get their Swiss qualification recognised elsewhere (see *figure 5 and 6)*. Specifically, Switzerland received many doctors and nurses who obtained their qualification in Germany or France, followed by Italy and Portugal. It appears that Switzerland benefited mainly from doctor and nurse mobility from neighbouring and Western European countries. Specifically, 84.6% of the total inflow of medical doctors included mobility from Austria, Germany, France and Italy. A total of 83.6% of the total inflow of nurses included mobility from France, Germany, Italy and Portugal.

Norway is identified as one of the key receivers of health workforce recognition applications from abroad, in comparison to other countries included in the database. Norway appears to receive most of their migrant health workers via mobility through neighbouring countries and some via the

European free-movement area. Specifically, 39.5% of their migrant nurse workforce came from Sweden, 28.7% from Denmark, and 4.9% from Finland (n=20.877, 73.1% of total migrant nurses). In addition, Norway received nurses from Spain, Lithuania and Poland. Doctors migrated mainly from Poland (24.6%), Denmark (19.4%) and Sweden (19.3%) (n=18.087, 63.3% of total migrant doctors). Norway also received doctors from Hungary and Slovakia. Few doctors and nurses qualified in Norway seek to practice abroad and the ones who do, mainly seek to practice in Germany or Sweden.

Germany is both a sending and receiving country for medical doctors and nurses from within the European free-movement area. It is a receiving country particularly for health workers from Romania, Italy, Hungary and Croatia (for nurses) and Romania, Hungary and Greece (for medical doctors). Germany recognised a total of 10.476 and 12.782 internationally obtained qualifications for nurses and medical doctors (n=23.258), respectively. However, 9693 nurses and 18.361 medical doctors that have German qualifications were recognised to practice abroad in that same time period (n=28.054), in for example Austria, Luxembourg, the UK and Norway. Importantly, over half of all doctors seeking to practice abroad (n= 10.087 doctors, 54.9%) and almost half of all nurses (n= 4464 nurses, 46.1%) decided to seek recognition of their qualification in Switzerland. Germany thus appears to be a sending country for medical doctors towards neighbouring countries and within the region. More medical doctors from Germany intend to work abroad in a neighbouring country or a country within the region, as compared to those that sought work abroad via mobility within the European free-movement area. The German situation offers a good example of the increasingly blurred dichotomy between sending and receiving countries.

Sending countries

Romania is a sending country for both medical doctors and nurses. Most of the doctors and nurses who obtained their qualification in Romania appear to seek recognition of their qualification mostly in Germany, Italy or the UK. According to the RPD, a total of 13.225 medical doctors and 19.414 nurses got their qualification recognised in another country from 2010 until 2022 (n=32.639). Most of these doctors and nurses went to the UK, Germany, Belgium, Italy and Sweden. Simultaneously, Romania received only 119 doctors and 147 nurses (n=266) from other European countries, mainly from Italy and Hungary.

Spain is a sending country, particularly in the context of nurse mobility. The vast majority of nurses obtaining qualifications in Spain and seeking to practice abroad, decide to go to the UK (70.9%), Norway (9.3%) and France (4.3%). Importantly, nurses migrating from Spain account for 25% (n=10.130 nurses) of UK's total migrant nurse workforce seeking to practice. While Spain

is not in the top 5 of biggest sending countries for medical doctors, most of their doctors who seek to practice abroad migrate to the UK, France and Sweden. Similar to Spain, **Portugal** is a key sending country for nurses specifically. Most of the nurses from Portugal seek recognition of their qualification in the UK (59.8%) and Switzerland (13.0%).

Greece is a sending country and most of Greece's health workers who seek to work abroad intends to move to the UK (32.8%), Switzerland (27.6%) and Belgium (10.7%) (in case of medical doctors) and to the UK (54.3%), Germany (18.0%) and Sweden (7.7%) (in case of nurses). In comparison, significantly more doctors qualified from Greece seek to work abroad (n=8689) as compared to nurses qualified in Greece (n=1990). Doctors from Greece make up 14.9% of the total of internationally qualified medical doctors who sought to get their qualification recognised in the UK.

Poland is a sending country and medical doctors and nurses move mainly via the European free-movement area. Most doctors intend to move towards Norway (52.7%), the UK (17.1%), Sweden (8.4%) and Germany (7.8%), while most nurses intend to move towards the UK (30.5%), Germany (28.9%) and Norway (12.7%).

France is both a sending and receiving country. France is outsourcing more doctors and nurses than the country receives via international mobility. Doctors and nurses from France typically seek different countries to get their qualification recognised. For medical doctors, the majority sought to practice in neighbouring countries such as Switzerland and Belgium (total of 75,4%), followed by the UK. Nurses mainly chose to practice in the Switzerland, Belgium and Luxembourg (total of 95.1%). On the other hand, France receives doctors via the European free-movement area mainly from Romania (35.3%), and nurses via neighbouring countries mainly from Belgium (45.8%).

Similar to France, **Italy** is both a sending and receiving country and outsources more doctors and nurses than the country receives through international mobility. Italy receives a large proportion of their international nurses from Romania (75.4%), followed by Germany (3.9%) and Hungary (3.1%). Italy also receives most of their international doctors from Romania (17.9%), Germany (17.6%) and Austria (17.32%).

Geographical sources and destinations of health workforce

The above indicates that geographical sources and destinations of mobility differs between countries and between mobility flows of medical doctors and nurses. *Table 1* illustrates the geographical routes through which countries mainly receive (*column A and B)* and/or send (*column C and D*) health workers. Countries included in the table are included in the RPD and

received and/or sent a minimum of 1000 medical doctors or nurses between 2010 and 2022. For example, looking at routes via which countries *receive* health workers (*table 1, A and B*), the RPD data indicates that the UK mainly receives doctors and nurses via the free-movement area while Switzerland mainly receives doctors and nurses via neighbouring countries. When looking at routes via which countries *send* health workers (*table 1, C and D*), data shows that, for example, Romania and Italy mainly sent doctors and nurses via the free-movement area, while Germany sent doctors and nurses mainly via neighbouring countries.

Table 1. Geographical mobility routes for countries receiving (A and B) and sending (C and D) health workforce (>1000 people) distinguished between European free-movement area and subregional mobility (between 2010 and 2022).

A. Countries receiving doctors and/or nurses mainly via mobility in European free-movement area	B. Countries receiving doctors and/or nurses mainly (>60%) via neighbouring countries	C. Countries sending doctors and/or nurses mainly via mobility in European free-movement area	C. Countries sending doctors and/or nurses mainly (>60%) via neighbouring countries
The UK	Switzerland	Romania	Germany
Germany	Norway	Italy	Denmark
Spain	Finland	Poland	Ireland
Ireland	Austria	Greece	Austria
Italy	Hungary	Portugal	Belgium
Belgium	Netherlands	Spain	Finland
Sweden	Czech Republic	Hungary	Sweden
Denmark	Luxembourg	Bulgaria	France
France	France	Croatia	Norway
Netherlands		Netherlands	Switzerland
		The UK	Czech Republic
		Switzerland	Slovakia
		Lithuania	Lithuania
		Slovakia	
		Latvia	
		Czech Republic	
		Estonia	

= medical doctors

= nurses

3.2.2. Magnitude of intended outflow of health workers

The magnitude of outflow refers to the magnitude of the outflow relative to the sending country's national health workforce and can thus highlight the potential impact on the health system or on the sustainability of the health workforce in the sending country. The magnitude of intended outflows can be calculated by taking the total number of doctors and nurses of whom their qualification was recognised to practice abroad between 2010 and 2022 ('all positive decisions for recognition of qualification by receiving countries') and divide this number by the average total of medical doctor and nursing personnel stocks in respective countries within that same time period (see *table 3 and 4*). The latter statistic was retrieved from the WHO Global Health Workforce statistics database (data not updated for 2021/'22 with 2019/'20 latest available)[xxxii].

Table 2. Proportion of intended outflow per country (all positives decisions) relative to the average total of domestic doctors between 2010 – 2020, or latest year available.

Countries	Total outflow/ average total medical doctors	Total outflows as % of average total domestic medical doctors
Estonia	N=1445 / 4466	**32.4%**
Denmark	N=6087 / 22.217	**27.4%**
Romania	N= 13.225 / 51.729	**25.6%**
Slovakia	N= 3747 / 18.590	**20.2%**
Hungary	N=6594 / 33.973	**19.4%**
Greece	N=8114 / 64.631	**12.5%**
Lithuania	N=1658 / 12.754	**13.0%**
Sweden	N=5021 / 42.987	**11.7%**
Poland	N=8268 / 76.231	**10.8%**
Austria	N=4684 / 44.066	**10.6%**
Bulgaria	N=2926 / 28.763	**10.2%***
Slovenia	N= 588 / 5831	**10.1%**
Czech Republic	N=3647 / 41.232	9.2%
Croatia	N=1042 / 13.298	7.8%
Netherlands	N= 3219 / 58.929	5.5%
Germany	N=18.361 / 338.046	5.4%
Italy	N=10.051 / 235.862	4.3%
Norway	N= 961 / 23.503	4.1%
Portugal	N=1625 / 48.724	3.3%
Finland	N= 609 / 20.384	3.0%
France	N= 5637 / 206.939	2.7%
Switzerland	N=912 / 34.249	2.7%
Spain	N=4619 / 182.015	2.5%
UK	N=1794 / 181.695	1%

** Bulgarian data available from 2010 – 2015 & 2018*

Table 3. Proportion of intended outflow (all positives decisions) relative to the average total of domestic nursing personnel between 2010 – 2020, or latest year available.

Countries	Total intended outflow/ average total nursing personnel	Intended outflows as % of average total domestic nursing personnel
Romania	N= 19.414 / 120979	**16.0%***
Portugal	N= 10.123 / 65.655	**15.4%**
Denmark	N= 6672 / 56.313	**11.8%**
Estonia	N=730 / 8026	9.1%
Slovakia	N=2629 / 31.375	8.4%
Sweden	N=8777 / 106.203	8.3%
Hungary	N=4265 / 63.361	6.7%
Lithuania	N= 1486 / 22.623	6.6%
Croatia	N= 1634 / 25.671	6.4%**
Spain	N= 14.138 / 252.963	5.6%
Greece	N= 1.742 / 36.286	4.8%
Bulgaria	N= 1309 / 31.527	4.2%
Slovenia	N= 770 / 18.651	4.1%
Italy	N= 10.898 / 331.472	3.3%
Finland	N= 2715 / 92.571	2.9%
Poland	N= 5.284 / 200.068	2.6%
Austria	N= 1197 / 61.205	2.0%
France	N= 12.525 / 647.600	1.9%
Czech Republic	N = 1115 / 77.154	1.4%
Germany	N= 9.693 / 1.034.600	0.9%
Netherlands	N= 1375 / 191.079	0.7%
Norway	N= 752 / 88.706	0.8%
Switzerland	N= 359 / 134.933	0.3%
UK	N= 1816 / 525.222	0.3%

** Romanian data available from 2010 – 2013, 2016 & 2017.*
*** Croatian data available until 2016.*

Table 3 shows that Estonia, Denmark, Romania, Hungary and Slovakia observed relatively high intended outflows relative to their total national stock of medical doctors **(>15%** from 2010 – 2022). *Table 4* shows that for nurses, the percentage of intended outflow is lower, on average, as compared to that of doctors. For nursing personnel, Romania, Portugal and Denmark have observed the highest percentage of intended outflow (**>10%** from 2010 – 2022). Overall, average annual intended outflow did not exceed the **2.5-3%** of the total doctor and nursing stocks of each included country, except in the case of medical doctors from Estonia.

Intended mobility over time (2010 – 2015 vs. 2016 – 2022)

An important note to the analysis above is that the biggest proportions of these total intended mobility flows occurred between 2010 and 2015, for the majority of included countries, as compared to the period of 2016 – 2022. For some countries (e.g. Denmark and Italy) outflow remained relatively similar across the two periods. The minority of countries, including Belgium, Croatia, Finland, France, Portugal, Spain, Romania and the UK, observed more intended outflow in the period of 2016 until 2022, as compared to that between 2010 and 2015.

3.2.3. Annual inflow of health workers

OECD provides annual data on inflow of doctors and nurses in OECD countries in the European region for which information on the annual inflow of foreign-trained doctors and nurses was available[11]. Annual inflow of nurses is defined as *"the number of nurses who have obtained a recognised qualification in nursing in another country and are receiving a new authorisation in a given year to practice in the receiving country"*[xxxiii]. Annual inflow of doctors is defined as '*the number of doctors who have obtained their first medical qualification (degree) in another country and are receiving a new authorisation in a given year to practice in the receiving country"*.[xxxiv] The OECD database illustrates the amount of new positive recognition decisions made by receiving countries per year. This enables the visualisation of the change in inflow over time (2010 – 2022).

Figures 7, 8 , 9 and 10 indicate the annual inflow from 2010 – 2021 for doctors and nurses. Such inflows can assist countries to sustain and replenish their workforce. The graphs indicate a clear distinction between countries that receive a relative high number of international doctors and nurses, and countries that receive a low number of doctors and nurses. Countries with higher inflows are often Western and Northern European countries such as Switzerland, Norway, Sweden, the UK and Ireland, while low inflows are observed in Eastern European countries such as Lithuania, Hungary, Estonia and Latvia.

The figures also indicate that the annual inflow of countries receiving >1000 doctors and/or nurses has remained relatively stable or increased in the past decade. At the same time, the annual inflow of countries receiving <100 doctors and/or nurses fluctuates more and appears for all countries to remain somewhat stable or decrease over the past decade. This with the exception of Hungary, as Hungary observed an increase in inflow.

[11] Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Sweden, Switzerland and the UK.

Figure 7. Annual inflow in countries receiving >1000 medical doctors in 2021 (OECD.stat, 2022).

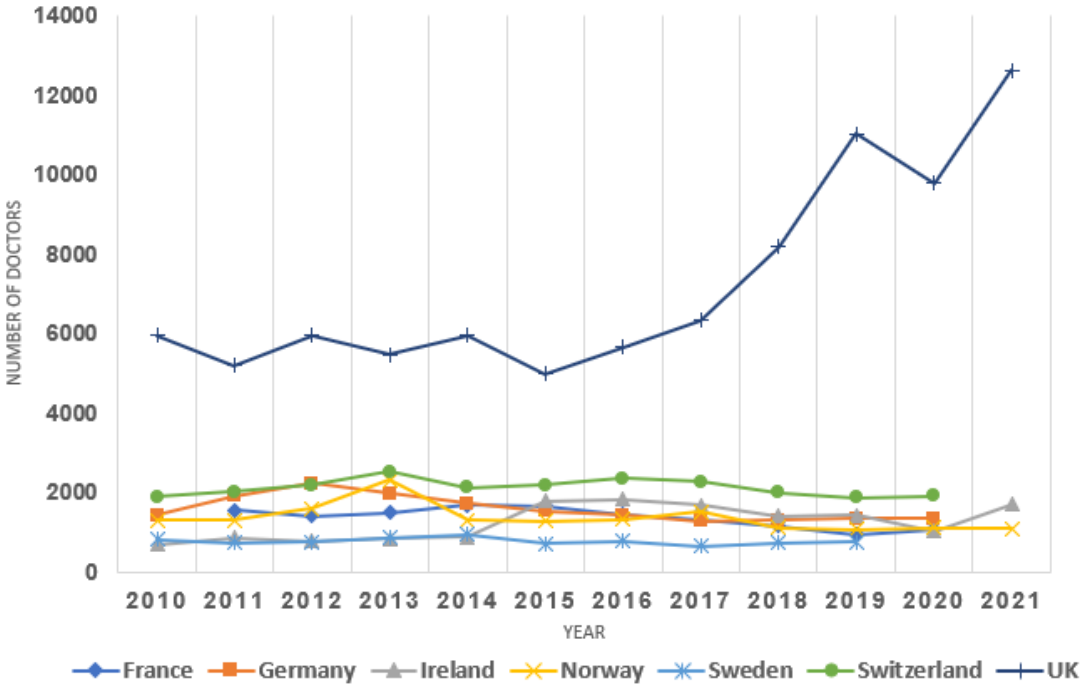


Figure 8. Annual inflow of countries receiving <100 medical doctors in 2021 (OECD.stat, 2022).

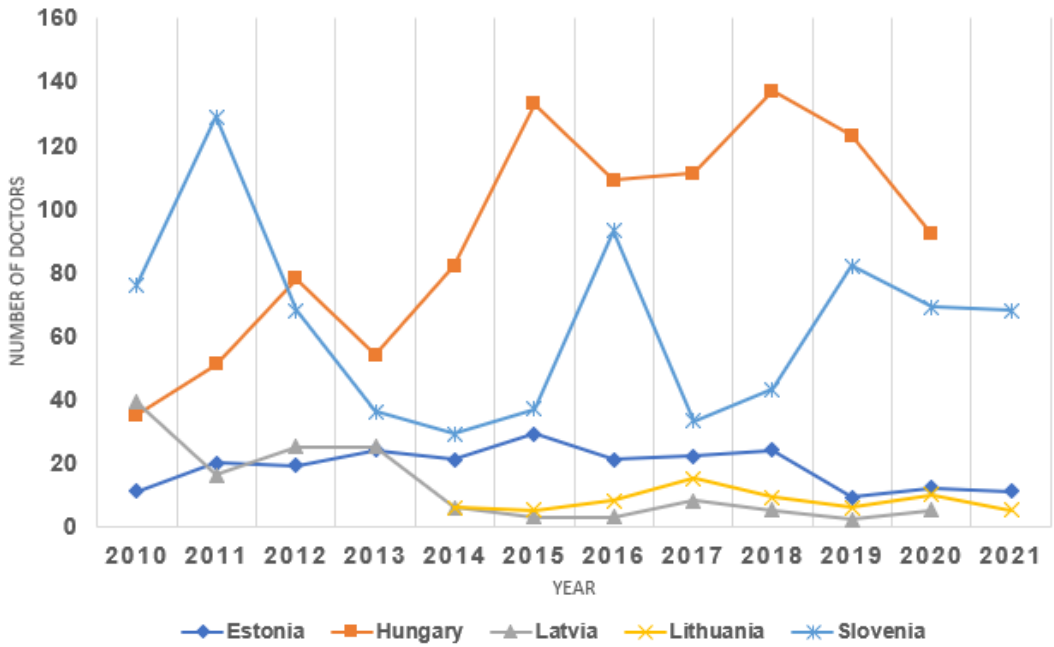


Figure 9. Annual inflow in countries receiving >1000 nurses in 2021 (OECD.stat, 2022).

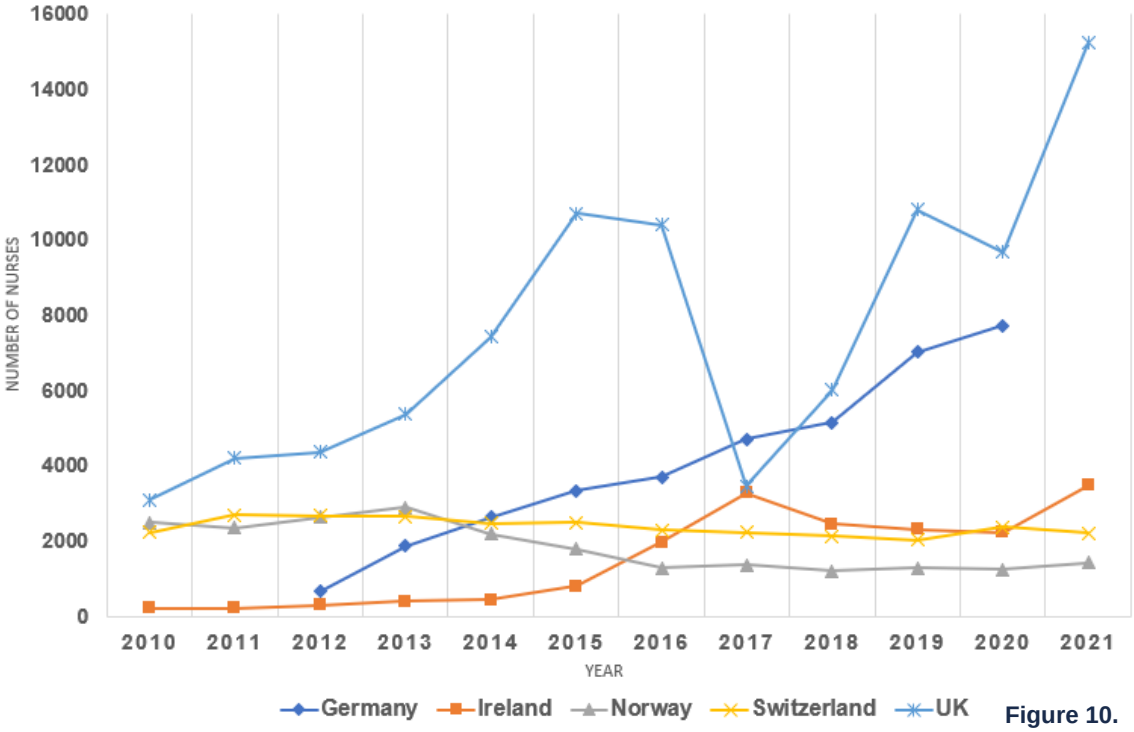
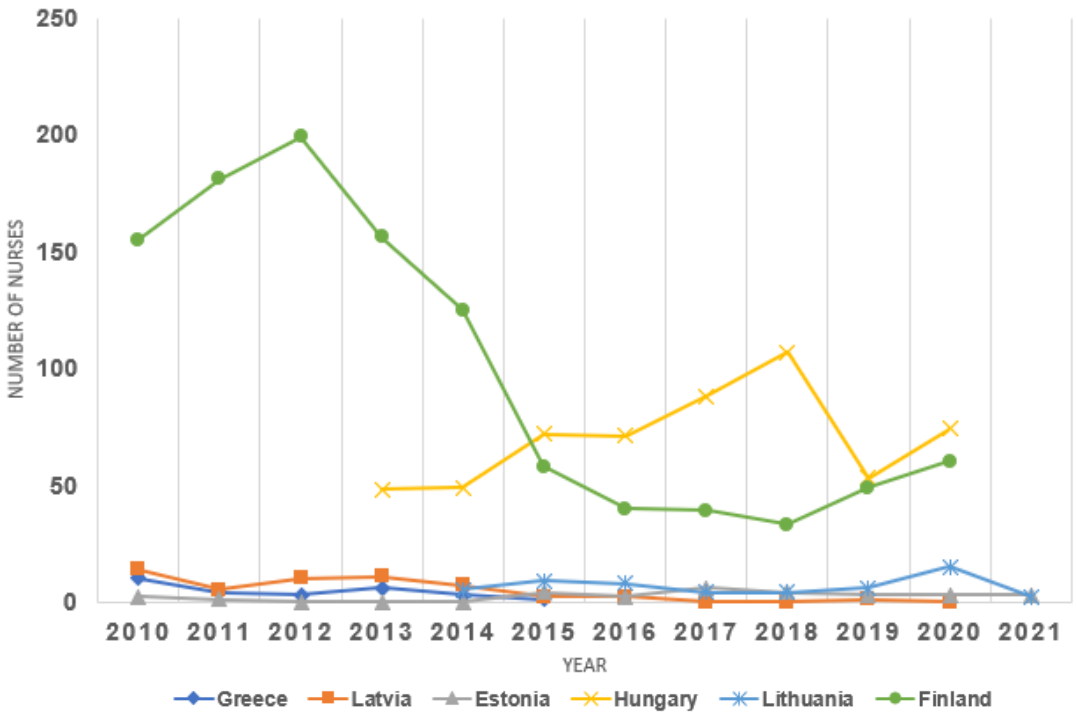


Figure 10.

Figure 10. Annual inflow of countries receiving <100 nurses in 2021 (OECD.stat, 2022).



3.2.4. Mobility 'hubs' between neighbouring countries

Both intentions of unidirectional and bidirectional mobility can be identified between neighbouring countries. Mobility between Austria-Germany; the Netherlands – Belgium; Belgium – France; Switzerland – France – Germany – Italy and Denmark – Sweden – Norway – Poland - Estonia, are some examples. Links between these countries were established by, for each country, differentiating their 1st, 2nd and 3rd biggest sending country. This was inspired by a similar methodology applied by Maier et al. (2011).[xxxv]

- **The Netherlands – Belgium – France**: A two way intended flow can be observed between The Netherlands and Belgium, and between Belgium and France. Importantly, flows between the Netherlands and France remain limited.
- **Austria and neighbouring countries**: A moderately balanced bidirectional intended flow can be observed between Germany and Austria, for doctors specifically. However, Germany receives relatively more health workers from other countries, such as from Romania. Germany also receives nurses from Poland and Croatia. Simultaneously, Austria receives inflows, mainly unidirectional, from other (neighbouring) countries such as Slovakia, Slovenia, Hungary and Romania.
- **Switzerland – France – Italy – Germany**: Between these countries a unidirectional flow can be observed towards Switzerland from all the other countries. At the same time, a moderately balanced flow can be observed between France, Italy and Germany. Important to note is that, Italy, France and Germany all appear to depend much on Romania as one of their key international sending countries for both doctors and nurses.
- **Norway – Sweden - Denmark – Poland - Estonia**: A unidirectional flow can be observed between Poland and Norway, with Poland being one of Norway's key sending countries for medical doctors. In addition, unbalanced bidirectional flows are identified between Denmark, Sweden and Norway. Denmark is mainly a sending country for both Norway and Sweden, while Norway receives the highest number of doctors and nurses from both Denmark and Sweden and some from other Northern European countries such as Finland, Latvia and Lithuania. Inflow from other countries remains limited. Flows between Poland and Denmark remain very limited. A unidirectional flow between Estonia and Finland and Norway can be observed. With a 75.5% of Estonian nurses seeking to practice in Finland and Norway, and just over 1/3 of Estonian doctors seeking to practice in either Finland, Norway or Sweden.

The observed regional mobility between neighbouring countries may be due to similarity in languages and cultures as well as densely populated border areas. Important to note is that some of the mobility between neighbouring countries might include border workers and foreign workers

who do not change their country of usual residence. While not possible to conclude from the data, such types of mobility might compound inequitable workforce distribution across the EU and neighbouring countries. This because countries that receive health workers from the free-movement area simultaneously appear to lose other health workers to neighbouring countries (in some cases with higher numbers, e.g. Germany). This may contribute to a continuous demand for international health workforce in these countries.

3.2.5. Mobility patterns across UN geoscheme of Europe

The UN has defined European subregions, creating a geoscheme of Europe (*table 4*)[12]. Not all of the countries part of the European subregions, and included in *table 4*, are included in the RPD. This analysis is limited to the countries included in the RPD. The countries in *italics* are not included in the analysis of this section. This section highlights the patterns of mobility and migration across European subregions using data from 2010 – 2022.

Table 4. European subregions as defined by the UN.

Regions	Countries
Northern Europe	*Iceland, Ireland,* UK, Denmark, Norway, Sweden, Finland, Estonia, Latvia, Lithuania
Eastern Europe	Poland, *Belarus, Ukraine, Moldova*, Romania, Bulgaria, Hungary, Slovakia, Czech Republic, *Russian Federation*
Western Europe	The Netherlands, Germany, Belgium, Luxembourg, France, Austria, Switzerland, *Liechtenstein, Monaco*
Southern Europe	Portugal, Spain, Italy, *Bosnia and Herzegovina, Montenegro, Serbia, North Macedonia, Albania,* Greece, Slovenia, *Malta,* Croatia, *San Marino*

Figures 11 and 12 include Sankey diagrams that visualise mobility flows of both medical doctors (*figure 11*) and nurses (*figure 12*) between European subregions. Overall, after grouping country data from the RPD in respective subregions, the **highest number of doctors intend to migrate from Eastern and Western European subregions, a total of 40.981 and 38.717 doctors**, respectively. Southern and Northern subregions follow with a respective total of 29.112 and 23.444 doctors with the intention to migrate. For nurses, the **highest number of nurses intend to migrate from Southern and Eastern European subregions, a total of 42.709 and 40.284 nurses**, respectively. From Western and Northern Europe, a total of 33.330 and 28.275 nurses intend to migrate, respectively.

[12] The geographic subregions of Europe are as defined by the UN Statistics Division and used as such in all UN databases

These figures illustrate **two key patterns of intended mobility across the UN European regions**. The first pattern that can be identified is health workforce moving mainly from the Eastern (in case of medical doctors) and Southern European region (in case of nursing personnel) towards the Northern and Western European region. Simultaneously, the intended mobility flow *towards* the Eastern and Southern European region remains low. The second pattern that can be identified is intended mobility *within* European sub regions. Intended mobility *within* the Eastern and Southern region contributes only to a limited extent to inflow and outflow. At the same time, intended mobility *within* the Northern and Western region appears to be a key contributor to inflow and outflow within these regions. For example, Western Europe is the second biggest 'sender' of medical doctors according to *figure 11,* as compared to other regions. However, most of these doctors appear to migrate to other countries within the Western European region, or towards Northern Europe. This figure indicates that from 2010 – 2022, **Western to Western total intended mobility is comparable in size with the inflow from Eastern and Southern regions combined**.

The two concurring patterns highlighted above contribute to the **increasing complexity of inequitable distribution of health workforce** across the EU and neighbouring countries. One can assume that health worker mobility from Eastern towards Northern or Western European regions often involves international health worker migration, in which the health worker changes their country of usual residence and settles in the receiving country on a permanent basis. The migration *within* Western and Northern European subregions, including the mobility and migration between neighbouring countries, might also include cross-border workers who seek to permanently work in one country but live in a neighbouring country (e.g. flow between Germany – Switzerland – France). In these cases, these health workers exit the health system of their country of residence, while they still remain citizens in their country of origin and/or residence. **The two patterns of health worker mobility within the European regions may require different responses at regional, international, national and health sector level**.

Figure 11. Sankey diagram of intended mobility flows of doctors between subregions.

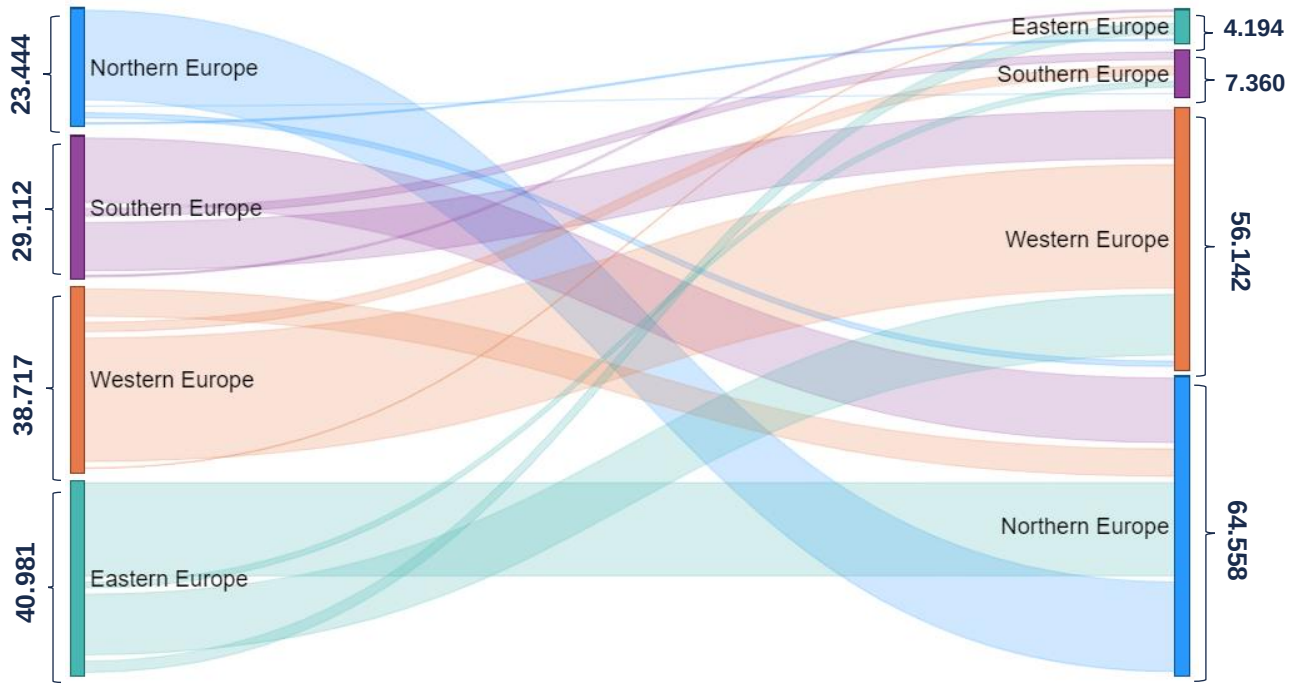
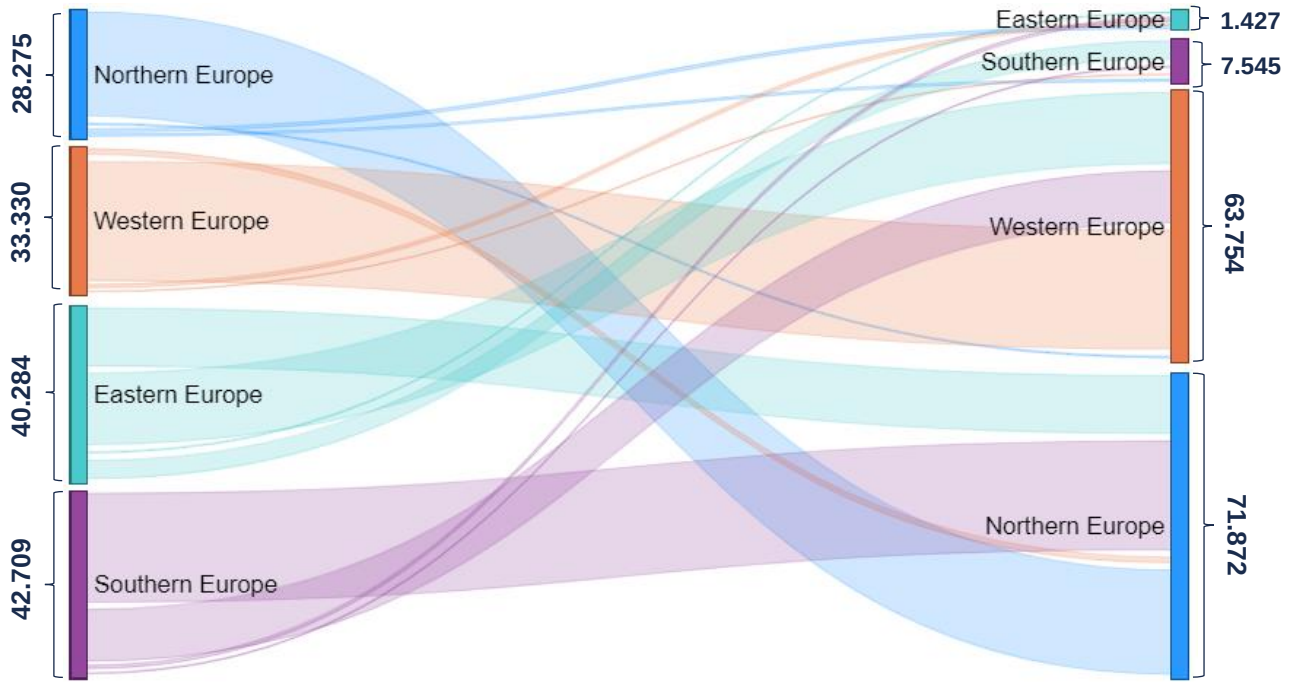


Figure 12. Sankey diagram of intended mobility flows of nurses between subregions.



Box 3. Key messages

- The **UK, Switzerland, Norway and Germany** were most popular receiving countries for both medical doctors and nurses.
- The geographical source of health workers differs between these receiving countries. The UK and Germany receive most international health workforce from the European free-movement area, while Switzerland and Norway receive most international health workforce from neighbouring countries or countries within their subregion.
- Countries sending the most nurses, as compared to other included countries, are Romania, Spain and France. Countries sending the most doctors, as compared to other included countries include Germany, Romania and Italy.
- There are key differences in the chosen destinations of these doctors and nurses. Doctors and nurses from Romania, Spain, Greece and Poland typically seek destinations within the European free-movement area. Medical doctors from Germany and France who seek to practice abroad, mainly aim to get their qualification recognised in neighbouring countries.
- The doctor and nurse intended outflow as percentage of national doctor and nurse stock was highest in Denmark, Romania, Estonia, Slovakia and Portugal. The inflow of foreign-trained health workforce did not make up for this intended outflow and these countries may therefore observe an ongoing drain of health workforce. Overall, average annual intended outflow towards other countries in Europe stayed around **3% or less** of the total doctor and nursing stocks in included countries.
- Both unidirectional and bidirectional **mobility 'hubs'** can be identified in subregions and between neighbouring countries. Key examples are Austria-Germany; the Netherlands – Belgium; Belgium – France; Switzerland – France – Germany – Italy; and Norway – Sweden – Finland – Denmark – Poland – Estonia.
- **Doctor and nurse mobility appears to generally follow two patterns** across the European region; 1) one-way mobility *from* Eastern and Southern European regions towards Western and Northern European countries and 2), mobility *within* Western and Northern European regions. Therefore, many of these countries have become both sending and receiving countries. These two concurring patterns compound the inequitable distribution of health workforce across the EU and neighbouring countries, requiring different responses at regional, international, national and health sector level.

3.3. Gaps in the data

- This secondary data analysis of geographical mobility was limited by **availability of data on indicators** in public databases and the availability of **data on specific countries.**
    - Not all relevant European countries could be included in the analysis due to either a complete lack of data or lack of data on specific indicators such as national data on recognition of international doctor and nurse qualifications. In the latter case, inflow of nurses and doctors in these countries (e.g. Portugal, Iceland) could not be calculated. Mobility from these countries was only included via recognition in other countries.
- Geographical mobility from and to countries can only be quantified by **intention to leave data** (using the decision of receiving countries to recognise a foreign qualification as indicator). The RPD does not indicate whether, after a recognised qualification, the health professional actually migrates to the respective receiving country.
- For the health workers that do choose to migrate, the RPD data does not include indicators pertaining to the reality of migrant health workers in receiving countries. For example, whether they are **employed or unemployed**, experience **deskilling** after getting their qualification recognised or move to work in a different sector.
- Data in both the RPD and OECD database is not disaggregated for sex, gender, ethnicity, specialities within health professions or other socioeconomic dimensions. Data thus provides little information on who these migrating professionals are and provides limited insights into the key reasons for leaving a certain country and entering another.
- Relevant information and indicators of health worker mobility can be found across **various databases with limited connections and integration** between these different types of data and databases.

4. Appendix

Appendix Table 1. Data from 2010 and 2021(or latest available) on proportion of native-born docters among the foreign-trained docters stock (OECD.stat).

Doctors (foreign-trained stock/ native born)	2010*	2021, or latest available
Austria*	151 / 1372 = 11%*	503 / 2762 = 18.2%
Finland*	1264 / 3265 = 38.7%	1713 / 4576 = 37.4%
France	535 / 17625 =3%	796 / 26.989 = 2.9%
Greece*	7716 / 8005 = 96.4%	8424 / 11349 = 74.2%
Hungary*	391 / 2374 = 16.5%	305 / 2504 = 12.2%
Italy	1321 / 2985 = 44.3%	1875 / 4039 = 46.4%
Netherlands	408 / 1134 = 36%	1021 / 2380 = 42.9%
Norway	348 / 3319 = 10.5%	352 / 6480 = 5.4%
Slovenia	-	157 / 1081 = 14.5%
Sweden	891 / 8598 = 10.4%	2483 / 12934 = 19.2%
UK	-	816 / 66211 = 1.2%

** Different year used.*

Appendix Table 2. Data from 2010 and 2021(or latest available) on proportion of native-born nurses among the foreign-trained nurses stock (OECD.stat).

Nurses (foreign-trained stock/ native born)	2010*	2021, or latest available
Finland*	317 / 797 = 39.8%	503 / 1598 = 31.5%
Greece*	400 / 433 = 92.4%	416 / 451 = 92.2%
Hungary*	-	22 / 1035 = 2.1%
Ireland	-	7961 / 29834 = 26.7%
Italy	483 / 22774 = 2.1%	485 / 23712 = 2.0%
Netherlands*	22 / 63 = 34.9%	906 / 2681 = 33.8%
Norway	1037 / 6402 = 16.2%	1140 / 6275 = 18.2%
Portugal	29 / 1212 = 2.4%	-
Sweden	295 / 2734 = 10.8%	366 / 3700 = 9.9%
Switzerland	411 / 8618 = 4.8%	1846 / 19947 = 9.%

** Different year used.*

Appendix Table 3. Data from 2010 and 2021(or latest available) on percentage of foreign-trained doctors (OECD.stat).

Countries	2010	2021
Austria	3.9%	6.8%
Belgium	8.2%	13.2%
Czech Republic	4.4%	7.6%
Denmark	8.8%	9.5% (2019)
Estonia	1.4%	4.2%
Finland	15.4% (2011)	19.1% (2020)
France	7.5%	11.8% (2020)
Germany	6.6%	13.8% (2020)
Hungary	7.7%	8.2% (2020)
Ireland	35.7% (2011)	40.5%
Italy	0.8%	0.9%
Latvia	7.0%	6.0% (2020)
Lithuania	-	0.6%
Luxembourg	100%	100%
Netherlands	2.6%	3.6% (2020)
Norway	34.4%	42.1%
Poland	2.1%	2.7%
Portugal	-	12% (2017)
Slovak Republic	2.6%	-
Slovenia	10.7%	15.8%
Sweden	23.5%	29.4% (2019)
Switzerland	24.1%	37.4% (2020)
UK	29.8%	31.9%

Appendix Table 4. Data from 2010 and 2021(or latest available) on percentage of foreign-trained nurses (OECD.stat).

Countries	2010	2021
Austria	-	12.3% (2020)
Belgium	1.5%	4.3%
Denmark	2%	1.9% (2019)
Estonia	0.03%	0.2%
Finland	0.8%	1.4% (2020)
France	2.4%	2.9% (2020)
Germany	6.1% (2012)	9.2% (2020)
Greece	2.6%	2.5% (2015)
Hungary	1.2% (2013)	1.6% (2020)
Ireland	-	46.6%
Italy	5.8%	5.2%
Latvia	4.4%	2.6% (2020)
Lithuania	0.4% (2014)	0.4%
Netherlands	1.1%	1.4% (2020)
Norway	7.9%	6.2%
Poland	-	0.2%
Portugal	3.2%	1.8% (2014)
Slovenia	0.4%	3.7% (2020)
Sweden	2.6%	3.3% (2019)
Switzerland	14.7%	26% (2020)
UK	11.3%	17.9%

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