OASES

Promoting evidence-based reforms on medical deserts

D5.3 Report of the state of art of desertification in Europe and ways to mitigate desertification

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1. Executive summary

This report of medical desertification and ways to mitigate medical desertification (Deliverable 5.3.) is based on the previously delivered framework of medical desertification (Deliverable 5.1). The purpose of this document is to 1) describe the state of the art of medical desertification in Europe; 2) to describe the determinants and ways to mitigate medical desertification in OASES participating countries (Cyprus, France, Finland, Hungary, Italy, Moldova, and Romania) and; 3) to describe organizational factors of the antecedents, outcomes and effective measures to mitigate desertification based on the results of a literature review. Based on the results, there is a lack of indicators providing information for Europe-wide comparison. The identified information is related to a number of healthcare professionals, waiting times and unmet care needs. Based on the results of the literature review, the organizational factors determining medical desertification are related to work organization and stress, competence requirements, professional support and limited possibilities for providing adequate care. Identified ways to mitigate medical desertification were professional support and changing the way the care is delivered.

2. Introduction

This draft of the report of medical desertification and ways to mitigate medical desertification (Deliverable 5.3.) is based on the previously delivered framework of medical desertification (Deliverable 5.1). The framework outlined the definition for medical desertification and described the implementation of this review.

It becomes more than urgent to promote evidence-based reforms to address the challenges that the European health workforce is facing. For this purpose, it is necessary to analyse the current situation, to provide a common framework and a common understanding of this phenomenon knowing the specificities of each country, including a definition and taxonomy of the concept of medical desert and a measurement methodology.

As defined in the framework of medical desertification (Deliverable 5.1), the expression “medical desert” refers to several situations or areas where people have difficulties in accessing care (e.g. waiting time, doctor’s registration difficulties or long distances to hospital). A distinction is made between the concepts of medical desert and medical desertification: medical desertification is a process towards medical deserts. The expression can signify the lack of health professionals in a given territory, the difficulties in attracting new ones, the fact that retiring professionals are not replaced, or lengthy waiting times and long distances when accessing health care. Although healthcare facilities would be available, there may be a lack of health professionals to deliver adequate care. Lack of professionals can appear in low professional-patient ratio or lack of appropriate expertise in relation to patient´s needs (e.g. mental health). The medical desert is often associated with medically underserved areas or shortage areas in the international literature. In a wider sense, it includes not only geographical areas in which there is a lack of health services or poor quality of assistance, but also those situations in which subgroups of the population are not able to have access to health programs or services, due to their socio-economic conditions or to any

other factor (e.g. linguistic, cultural, legal, bureaucratic) that acts as a systematic barrier to healthcare utilization.

A widely used intervention for increasing the number of healthcare professionals tends to evolve around increasing the number of education positions for healthcare professionals (Asghari et al. 2019). However, organizational factors are essential considering healthcare professionals´ intentions to stay at work. Cutchin (1997) has stated that "the decision to locate in a rural practice setting occurs largely from outside that setting … the decision to remain takes place within the practice setting and arises from the stream of experience there". Previous literature reviews conducted on medical desertification are related to, for example, the shortage of healthcare professionals and access to care (e.g. Chan et al. 2013, Chapman et al. 2004). However, they have examined various factors related to medical desertification, and thus the results lack a more in-depth description of how organizational factors can affect and reduce medical desertification. Problems in the recruitment of healthcare professionals differ between urban and rural locations to some extent. In rural areas, there are problems in getting healthcare professionals to fill the positions in the first place. Remote areas do not provide as comprehensive possibilities as urban areas. Instead, in urban areas, the problems are often related to retaining competent healthcare professionals.

2.1 Purpose and scope of the document

In relation to the main mission of the OASES project, the aim of this document is to link key actions – focusing on skill mix, task shifting, use of e-health, recruitment and retention management and policies in order to guarantee universal coverage also in rural and medically underserved areas – to mitigation of medical deserts.

The purpose of this document is two-fold. First (section 7), the state of the art of medical desertification in Europe is described: what the situation is in the countries in Europe. Also, an analysis is provided of the main antecedents and outcomes of medical desertification in European countries and what the differences among countries, areas and service systems are. Section 8 presents a more detailed description of medical desertification and ways to mitigate medical desertification in OASES participating countries (Cyprus, France, Finland, Hungary, Italy, Moldova, and Romania). Second (section 9), results of a literature review focusing on the organizational factors of the antecedents, outcomes and effective measures to mitigate desertification are presented. The focus of the literature review is on organizational factors, because the organizational factors affect medical desertification in both rural and urban areas and can often be improved through measures implemented by healthcare organizations and through ways of delivering.

2.2 Structure of the document

This report is organised as follows:

- **Sections 2–5** provide an overview of the key concepts related to medical desertification and the determinants and ways to mitigate medical desertification.

- **Section 6** describes the methodology of the literature review.
- **Section 7** describes the state of the art of medical desertification in Europe: what the situation in the countries in Europe is, where and in which client groups the medical deserts located in Europe and inside the countries are. An analysis is provided of the main antecedents and outcomes of medical desertification in European countries and what the differences are among countries, areas and service systems.
- **Section 8** describes medical desertification in OASES participating countries and what kind ways the countries have used to mitigate medical desertification.
- **Section 9** describes the results of a literature review, which identifies the antecedents, outcomes and effective measures to mitigate desertification.
- **Section 10** summarises the conclusions of medical desertification identified based on the literature review.

2.3 Relation to other work in the project

The OASES project aims to represent a source of knowledge on European medical deserts, reinforcing the capacity of health authorities of EU Member States to reform their health systems and address all the important aspects to successfully tackle the challenges that the medical desert is posing, with specific regard to actions focusing on skill mix, task shifting, use of e-health and IT systems, recruitment and retention management and policies, in order to guarantee universal coverage also in rural and medically underserved areas.
OASES project bases its approach on a stepwise methodology:

a) analysis of the determinants of medical deserts as well as the ways to mitigate the situation of medical deserts through a literature review;
b) definition of measurement methodologies and tools applicable in different contexts (minimal, intermediate, advanced dataset);
c) implementation of the measurement methods and tools in selected pilot sites of 7 European countries;
d) assessment, policy actions analysis and sustainability in each pilot site;
e) impact evaluation in each pilot site and updating the measurement methods and tools according to the pilot study results;
f) scaling up of the methods and the policy actions at the EU level.

This document contributes to the aims of the OASES project by describing the state of art of medical desertification in Europe and presenting the results of the literature review which identified organizational antecedents and outcomes of medical desertification and the ways to mitigate medical desertification.

2.4 Glossary of acronyms

Acronym	Description
AAAQ	Availability, accessibility, acceptability and quality
EU	European Union
GP	General practitioner
HWF	Health workforce
OASES	Promoting evidence-based reforms on medical deserts
WHO	World Health Organization

Table 1: Glossary of acronyms

3. Availability and accessibility of the health workforce

The WHO AAAQ framework, first developed for the concept of "effective coverage" then adopted for the health workforce, is a reference for the "D5.1 Framework for the data collection" on the medical desert for the OASES project. By effective coverage we mean the proportion of people who have received satisfactory health services relative to the number needing such services.

Human resources in health care are moving from considering not only the quantity but also the availability, accessibility, acceptability, and quality of the healthcare workforce (WHO 2021). Availability of the healthcare workforce covers the adequate amount of health workers and their competence in relation to the population´s needs. Health workforce (HWF) availability is measurable as the gap between the current HWF supply and the HWF demand, both concerning the uncovered population (A) and the unmet needs (B) (Malgieri et al., 2015). Available HWF is defined here as current HWF "active" stock and current HWF "potentially active" stock (i.e. HWF already trained, not currently active but willing to become active). Accessibility means that the healthcare workforce is equally distributed geographically, demographically and in different social and healthcare sectors. Accessibility is understood as spatial (and temporal) accessibility based on different types of accessibility measures (depending on the available data). Accessibility has different requirements according to the health sector considered. Primary care usually has to be delivered "at the nearest point". Acceptability refers to health workers´ abilities and characteristics (for example, language and age) which enable trustful relationships and treating patients with dignity. Quality refers to health workers´ competence and skills (WHO 2016, WHO 2021). These factors are taken into account in health workforce planning and policy, which aims at ensuring an adequate health workforce in relation to healthcare needs.

Quality of care and acceptability does not become present until the interaction between patients and healthcare professionals occurs. Thus, these dimensions are excluded from the aspects considered in this review. The dimensions considered, accessibility and availability, are the ones to be targeted by policies and organizational aspects in order to improve access to care.

4. Determinants of medical desertification

Several classifications of the determinants of medical desertification have been identified previously. Most reviews have been done using concepts relating to physicians' shortage, recruitment or retention of physicians or health care personnel in rural areas, or concepts relating to accessibility of care or services or medically underserved areas. In the framework of medical desertification (Deliverable 5.1), five domains of the determinants of medical desertification or coverage of health workforce were identified (Asghari et al 2020, Danish et al 2019, WHO 2018): personal-related factors of health workforce; characteristics of the practice/organization; service system; workforce planning and monitoring; training/supply of health workforce.

1. Health worker personal-related factors.
   - Attitude of the workers to and experiences of certain areas (rural vs cities).
   - Family-related factors (workplace of the spouse and location of the family).
   - Interests/hobbies of the person and the family vs. possibilities, such as culture, sports, schools.
   - Health-related factors.
   - Other environmental factors, such as climate, sparsely populated areas, infrastructures and proximity of services.

2. Characteristics of the practice /organization
   - Scope of practice, size of the practice.
   - Work organization (service model: single practice, team model, task shifting, integration).
   - Workload and work environment (call schedule, flexibility, management, training, social support, autonomy).
   - Career possibilities.
   - Pay systems.
   - E-health, digital services.

3. Service system
   - Coordination of care between primary and social care and between primary and hospital care.
   - Low resources in primary care.
   - Parallel service systems (private services, occupational health care).

4. Workforce planning and monitoring.
   - Presence of a HWF planning system that includes one or more forecasting method(s) to estimate the supply (in- and outflows) and demand (main future driver) in the long run.
   - Presence of a HWF monitoring system, including a national/regional HWF register, and data on health professional mobility.

5. Training/supply of health workforce.
   - Investment, how many professionals are trained.
   - Rural rotations (internships).
   - Migration vs. immigration of health workforce.

As outlined in the previously delivered framework of medical desertification (Deliverable 5.1), the focus is on the characteristics of the practice or organization and the service system (i.e. dimensions 2 and 3). Also, because the fourth dimension, workforce planning and monitoring, is affected by dimensions 2 and 3, it will be analysed from the viewpoint of changes in the service system and the ways to provide services in the practices.

In the light of the adopted AAAQ framework (availability, accessibility, acceptability, quality), determinants could be classified with reference to the partition adopted:

1. Health worker personal-related factors are related to HWF accessibility.
2. Characteristics of the practice /organization factors are related both to HWF accessibility, acceptability and quality.
3. Service system factors are related to HWF availability, accessibility and quality.
4. Workforce planning and monitoring are linked to HWF availability and accessibility.
5. Finally, training/supply of the health workforce is clearly related to HWF availability.

5. Ways to mitigate medical deserts

As identified in the framework of medical desertification (Deliverable 5.1), there are several ways to respond to the shortage of the health workforce. Danish et al 2019 have divided the interventions to mitigate the shortage of health workforce to:

1. regulatory, such as increasing the supply of physicians, compulsory service in rural regions;
2. financial, such as scholarships, loans, pay increases, guaranteed minimum income, higher capitation payments, hiring nurses or physician assistants;
3. educational, such as selective admission to education, certain programs, curriculum, medical schools in rural areas;
4. and tailored approaches:
   - activities to engage physicians in the community;
   - professional support;
   - developing new models for practices (multidisciplinary teams, flexible work conditions, improving practice infrastructure);
   - mobile clinics, e-health (virtual visits, tele-/digital services).

In many articles, such as the above-described review of Danish et al (2019), determinants as well as interventions to decrease the shortage or to cope with the shortage, are seen as professionals' choice in regard to the workplace. Rather little attention has been paid to

factors relating to the service system and the organization of services, such as developing a more resilient health system.

Regarding these service system–related or organizational solutions, in addition to the models of the practices and digital solutions, at least the following factors have been discussed (Danish et al 2019, European Commission 2020a, b, WHO 2018):

- to create strong interconnections between primary and social care and between primary and hospital care;
- to increase investment in primary care of health care expenditure;
- improved links between primary care and public health;
- electronic health records being integrated with public health systems to enable a "community diagnosis";
- e-health;
- task shifting and competency sharing are essential;
- integrating and coordinating primary care, hospital care and social services.

There are several case studies, country reports and examples of organizational solutions or changes in the service system (European Commission 2015). In the Commission report, there were recruitment campaigns, measures to attract and retain GPs to remain in underserved areas and measures relating to training. There were also several attempts to develop the workplaces to be more attractive: moving to a nurse-oriented care model, developing nurses' roles, developing self-managing teams and developing working environments and telemedicine. There are three recent reviews on the antecedents of the medical deserts (shortage or recruitment of medical personnel) (Asghari et al 2020, Danish et al 2019, 2020). As these reviews review all the domains relating to medical deserts, the results are rather thin, especially relating to service systems.

Environmental factors drive the need for constant adjustments to health-care service delivery and the health work force requirement. The aging population and urbanization create a challenge for the number of resources as well as qualitative challenges. In addition to increasing number of older clients in health care, there is an increase also in the number of multimorbid and clients who require multiple services and would benefit from the integration of primary care, specialized care and social services. It is supposed and partially shown that care integration may save resources and increase cost-efficiency (Goodwin ym. 2017; Nolte 2017). The different models of integration and changes in health systems may also have an impact on health workforce planning as it may change the skill mix in the future (WHO 2018). However, in most planning and forecasting systems, the demand of the workforce is rather mechanical and does not take into account the possible changes in service systems. For example, the Covid-pandemic has given a boost to develop e-health services and to use them.

In the two reports of resilience in health and social care (European Commission 2020a, b) several system-level factors are emphasized. In the opinion of the expert panel, strong

primary care and mental health services, coordination of activities and comprehensive health coverage are highlighted. Also, several factors relating to management and learning are seen as important: organizational learning culture, effective information systems and information flows across sectors. These factors relate to the resilience of the health and social systems, especially during a crisis, but they are in line with the development of the tendency towards better coordination, better co-operation between professionals and sectors and care integration.
In regard to the determinants of medical deserts, we will focus on organizational factors such as the service system and practice characteristics. In line with this, in regard to the ways to mitigate medical deserts we will focus on organizational solutions and new models for practices (such as care coordination, multiprofessional teams) and eHealth solutions. We aim at building a more comprehensive picture of the determinants of medical deserts and the ways to mitigate them.

6. Methods

6.1 Review of medical desertification in Europe and OASES participating countries

In order to identify grey literature and the situation of medical deserts in each European country, the search included screening European Observatory on Health Systems and Policies; OECDiLibrary; Health Systems in Transition reports; Health at Glance reports; WHO publications; Bulletin of the World Health Organization; and Eurostat. In data collection, reports, or ministry documents were included.

OASES participating countries were asked to compile country specific grey literature from reports written in local languages on medical desertification and ways to mitigate it. A structured information request was formed based on the results of the scientific literature review.

6.2 The scientific literature review

Scoping review method (see Arksey and O'Malley 2005) is followed in conducting the literature review. The review focuses on identifying organizational factors affecting medical desertification and ways to mitigate it. In the review we will limit the analysis to primary care and other first contact services, which will consist of ambulance services, emergency and acute care as well. The focus of this review is on primary care due to the shift in emphasizing primary care's role in preventive care (Peckham et al. 2017) and its universal accessibility (WHO 2018). Secondly, we aim to have a more comprehensive review on fewer topics. Focusing on primary care and other first-contact care, we will be able to analyse the domains of a service system as well as characteristics of the practice / organizations in primary care instead of rather cursory analysis of all sectors in health care. Thirdly, care integration and task shifting are largely focused on primary care services.

6.2.1 Inclusion and exclusion criteria

Inclusion criteria used in selecting the studies are: publication language is English; studies are published between 2000–2021; the study has been conducted in Europe, Australia,

Canada or the United States; rural and/or urban areas; first contact care; organizational factors are considered; original article. Regarding the health workforce, physicians and nurses are considered.

6.2.2 Database search

The following databases were used: Web of Science, PubMed, Scopus, Medline (Ovid), CINAHL (EBSCO). The search strategy is presented in the Table below. First, the search terms related to desertification and specifying terms to catch rural and urban areas (the first column in blue) are presented; next, the terms related to health services/health care related words (the second column in green); and finally, the terms related to countries under interest (the third column in orange) are searched separately using search operator ´OR´. Second, these three searches are combined using the search operator ´AND´. In reporting the results, PRISMA guidelines (PRISMA extension for scoping reviews) were used (Tricco et al. 2018).

<table>
<tr><th>Medical desertification related words</th><th>Specifying terms to catch rural and urban areas</th><th>AND Health Services/Health Care related words</th><th>AND Europe/ Canada/ Australia/ USA</th></tr>
<tr><td>medical desertification</td><td rowspan="4"></td><td>Primary Health Care (MeSH)</td><td>Europe (MeSH)</td></tr>
<tr><td>OR medical desert(s)</td><td>OR primary health care</td><td>OR Europe* OR EU-countries</td></tr>
<tr><td>OR care desertification</td><td>OR primary care</td><td>OR "Nordic countries" OR Scandinavia*</td></tr>
<tr><td>OR care desert(s)</td><td>OR first contact care</td><td rowspan="13">OR Austria* OR Bulgaria* OR Belgium* OR Belgian OR Croatia* OR Cyprus* OR Cypriot OR "Czech Republic" OR Czech OR Denmark* OR Danish OR Estonia* OR Finland* OR Finnish OR England* OR France* OR French OR German* OR Great-Britain* OR Britain* OR British OR "United Kingdom" OR Greece* OR Greek OR Hungary* OR Hungarian OR Iceland* OR Ireland* OR Irish OR Italy* OR Italian OR Latvia* OR Lithuania* OR Luxembourg* OR Malta* OR Maltese OR Netherlands* OR Holland* OR Dutch OR Liechtenstein* OR Norway* OR Norwegian OR Poland* OR Polish OR Portugal* OR Portuguese OR Romania* OR Scotland* OR Scottish OR</td></tr>
<tr><td>OR Health Services Accessibility (MeSH)***</td><td>Rural Health Services (MeSH)***</td><td>OR Ambulatory Care Facilities (MeSH)</td></tr>
<tr><td>Medically Underserved Area</td><td rowspan="2"></td><td>OR Ambulatory Care (MeSH)</td></tr>
<tr><td>OR Medically Underserved Area (MeSH)***</td><td>OR ambulatory services/care</td></tr>
<tr><td>R underserved area**</td><td rowspan="6">**) area* or district* or geographic* or location* or region* or urban* or un-urban* or non-urban* or rural* or distant* or distance* or remote* or place*</td><td>OR outpatient services/care</td></tr>
<tr><td>Health workforce shortages, areal **</td><td>OR General Practice (MeSH)</td></tr>
<tr><td>OR health manpower shortage</td><td>OR Family Practice (MeSH)</td></tr>
<tr><td>OR health workforce shortage</td><td>OR general practice</td></tr>
<tr><td>OR health professional(s) shortage</td><td>OR family practice</td></tr>
</table>

OR healthcare staff shortage		OR After-Hours Care (MeSH)	Slovakia* OR Slovenia* OR Spain* OR Spanish OR Sweden* OR Swedish OR Switzerland* OR Swiss OR Wales OR Welch
OR physician shortage		OR after-hours care	
OR general practitioner shortage		OR out-of-hours care	
OR nurse shortage		OR Emergency Medical Services (MeSH)	
Health services accessibility, areal**		OR "emergency medical services" OR "emergency health services" OR "emergency care"	
OR health services accessibility			
OR health services availability			OR OECD- countries* OR “Organisation for Economic Cooperation and Development countries”
OR health care accessibility		OR Ambulances (MeSH)	
OR health care availability		OR Transportation of Patients [MeSH)	
Health services disparities, areal**		OR medical transportation	
OR health services disparities/gaps/shortages/inequities/inequalities		OR transportation of a patient	OR Australia* OR Canada* OR Canadian OR “New Zealand” OR “United States" OR USA OR American
OR health care disparities/gaps/shortages/inequities/inequalities		OR ambulance	
		OR mobile unit(s)	

* Extension of the search term.
** The words related to shortages, health services accessibility and care disparities are combined with/adjacent the area related words. In order to catch both urban and rural areas, certain specifying terms are needed.
*** Subheadings (Legislation & Jurisprudence, Organization & Administration, Standards, Trends) may be used when MeSH-terms are used in certain databases.

Table 2: Search terms, health care sectors and countries covered in the review.

7. Medical desertification in Europe

This section describes the state of the art of medical desertification in Europe: what the situation in the countries in Europe is, where and in which client groups the medical deserts are located in Europe and inside the countries. An analysis is provided of the main antecedents and outcomes of medical desertification in European countries and what the differences among countries, areas and service systems are.

In this section, medical deserts are covered through health workforce availability and accessibility focusing on first contact care, e.g., primary care, emergency care or acute care. Health workforce availability can be measured as the ratio of health workforce supply and the health workforce demand, where also uncovered population, unmet care needs (Malgieri et al., 2015) and health workforce competencies (WHO 2016, WHO 2021) can be considered. Health workforce accessibility means that the health workforce is equally distributed geographically, demographically and in different social and healthcare sectors (WHO 2016, WHO 2021). Accessibility has different requirements according to the health sector considered. Primary care usually has to be delivered “at the nearest point”, while secondary care can be provided at a greater distance. There can be great disparities among urban and rural areas.

There is a limited amount of data that recognizes aspects of medical desertification and would enable comparison between European countries. The compilation of statistics varies between countries. European countries vary greatly as for the number and density of population, and territorial composition. In addition to comparisons between countries based on national level statistics, regional differences within countries are ought to be considered. For regional level statistics, the Nomenclature of Territorial Units of Statistics (NUTS) has been developed. The latest revision for NUTS regions was made in 2021. The NUTS provides regional level statistics, which enables comparisons between regions and for example socio-economic situations. Regions are divided into three levels: NUTS 1, NUTS 2, and NUTS 3. In the classification, the administrative units already applied in the countries are considered. In addition, the maximum and minimum population thresholds are considered in the classification. The classification aims at dividing comparable regions at same level in the NUTS classification. (Eurostat 2021.) Figure 1 illustrates the number of medical doctors in European countries by NUTS 2 regions in 2019 (Eurostat 2022). While information related to aspects of medical desertification exists, there is no distinct information on which areas in different countries are considered as medical deserts or which indicators are included when defining medical deserts. For example, number of health workforce in relation to the number of population or populations´ care needs, or the availability of needed services.

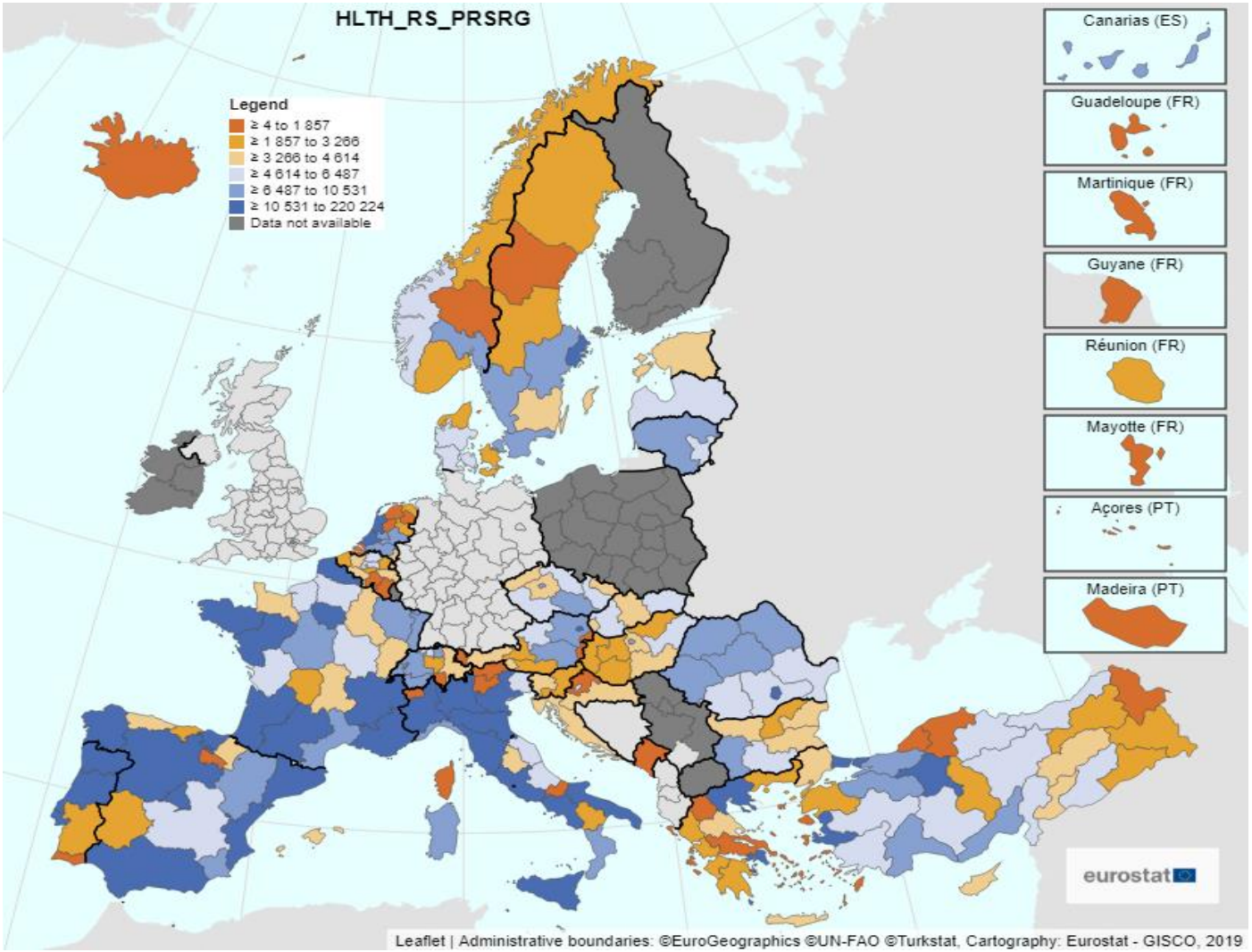

Figure 1. Number of medical doctors in Europe by NUTS 2 regions in 2019. Source: Eurostat (2022).

Health workforce

The COVID-19 pandemic reinforced the issues of lacking health workforce across Europe. While the number of health professionals has increased, simultaneously have healthcare needs increased as a result of population aging. In the EU, there was an average of 4.0 physicians per 1 000 population in 2020. Greece had the highest number of physicians: 6.2 per 1 000 inhabitants (OECD/European Union 2022) across several regions (European Union 2022). (It should be noted that in statistics of Greece, all physicians licenced to practice are considered in the statistics, instead of only practicing physicians). In France, Belgium, Hungary, and Luxembourg, the number of physicians was the lowest, with approximately 3 physicians per 1 000 inhabitants. (OECD/European Union 2022.) The ratio of physicians per inhabitants is high in some areas with high population intensity, e.g., capital areas (500 physicians / 100,000 inhabitants), such as Lisbon, Prague, Wien, Berlin, Budapest, and Madrid (European Union 2022).

The average number of nurses was 8.3 per 1 000 inhabitants in 2020. In Germany, Ireland and Finland, the number of nurses was the highest (12.1–13.6 nurses per 1 000 inhabitants), while e.g., Spain, Italy and Greece have the lowest number of nurses (6.1; 6.3; 3.4 per 1 000 inhabitants, respectively). On average in the EU, the ratio of nurses to physicians was 2.2 in 2020. The ratio was the highest in Luxembourg (3.9), Finland (3.9), and Belgium (3.5), and the lowest in Bulgaria (1.0), Spain, Portugal, Cyprus, and Latvia (1.3). (OECD/European Union 2022.) Within EU-28 Member States, there is a shortage of general practitioners and nurses especially in rural areas (European Commission 2021).

High number of nurses can be explained by the fact that in some countries, nurses have more responsibilities in patient care. Nurses can for example, provide immunizations, make routine checks for chronically ill patients, make diagnoses, provide prescriptions and treatment. Task-shifting from physicians to nurses is extensively in use in Finland, the United Kingdom, Ireland, and the Netherlands. For example, in the Netherlands, nurses can provide all the aforementioned tasks. Limited task-shifting is used in Sweden, Denmark, the Baltic countries, Iceland, Belgium, Hungary, Slovenia, Croatia, Italy, Malta, Portugal, Cyprus, and Spain. In other European countries nurses do not provide any of the above-mentioned tasks. (Maier & Aiken 2016, OECD 2020).

Access to care

In general, average travel time to the nearest health facility is shorter in areas where population density is high, while in rural areas the travel time may be several hours. In the EU, 82.5% of the population lives within 15 minutes driving distance from the nearest hospital. In countries such as Spain, Portugal, Sweden, Romania, Slovenia, and Hungary, there are rural regions where less than 50% of the population can access a hospital by car within 15 minutes. (European Union 2022.)

In the EU in 2019, the total number of hospital beds was 2.38 million, i.e., 532 beds per 100,000 inhabitants. The number covers beds in specialized and general hospitals. (European Union 2022.) The way how healthcare is organized reflects the differences in the number of

hospital beds between countries. For example, while primary healthcare provides first contact and preventive care, more severe health conditions are treated in inpatient care provided in hospitals, and there are differences between countries in the length of stay in hospitals. High number of hospital beds are reported in Germany (1.300 per 100.000 inhabitants), Austria, Poland, Germany Hungary, and Romania (over 1.000 per 100.000 inhabitants). However, the number of hospital beds has decreased by 3.1% in the EU between years 2015 and 2019. Decrease has been most significant in Sweden, Finland, the Netherlands, and Luxembourg. Instead, the number of beds has increased in Bulgaria and Romania. (European Union 2022.)

Health System Reviews (HiT series) provide information on access to care. There is also information on coverage of health care services, waiting times in primary care and unmet care needs. This information is, however, reported as national information, not in smaller areas. There are also comparisons of accessibility to services in different socio-economic groups (Keskimäki et al. 2019). In countries such as Spain, Netherlands and Austria, the socio-economic differences in the levels of unmet care needs are very small (in addition to the fact that unmet care needs are very rare in total). In Estonia, Greece and Latvia, the unmet care needs are at high levels in total, but especially in Greece and Latvia the differences between socio-economic groups are high. Unmet care needs for medical examination because of waiting times, financial or geographic reasons are on average below 5% for total population in the EU in 2020. However, there seems to be disparities between countries, and between low and high-income population. The poorest unmet needs were reported in Estonia, where 13.0% of the whole population reported unmet needs because of long waiting times. In Greece, there seems to be greatest variation in unmet care needs – resulting from service costs – between high and low-income population (1.2% vs 17.2%, respectively). Norway, Switzerland, Luxembourg, Spain, the Netherlands, Austria, Malta, Germany, Cyprus, Hungary, and Czech Republic, are countries with lowest variation between income groups and lowest reported unmet care needs. During the COVID-19 pandemic in spring 2023, highest unmet care needs were reported by Latvia, Poland and Lithuania. (OECD/European Union 2022.)

In Europe, most of the countries have universal coverage of costs for core health services, such as physician consultation, hospitalizations and laboratory tests. However, universal coverage of core services is lacking in some countries, e.g., in Ireland. In Romania and Bulgaria, people who are not covered for healthcare costs (i.e., lacking insurance) do not own an identity card, have not paid for health insurance, are long-term unemployed or are living abroad. Free access to certain services, such as emergency care, is guaranteed also for those without an insurance but the costs are covered out of-pocket. While in most of the countries the population do not have additional health coverage (e.g., private insurance) to increase access to care, in Slovenia, France, the Netherlands, Belgium and Luxembourg more than 60% of the population have a private insurance. (OECD/European Union 2022.) Regarding healthcare coverage (i.e., the proportion of the population entitled to healthcare services, the range of services covered, and the share of covered costs), the extent of coverage varies between countries. While approximately 75% of healthcare costs are covered by compulsory health insurance or by the government in EU countries, there is variation in financial

protection between countries and depending on the type of healthcare service. Approximately 15% of healthcare expenditures is covered by out-of-pocket payments across the EU. (OECD/European Union 2022.)

According to a study by Kringos et al. (2013), primary healthcare seems to be most comprehensive in the United Kingdom, Sweden, Spain, Portugal, Norway, Lithuania, France, Finland, Bulgaria, and Belgium. They evaluated the strength of primary care in European countries based on primary care structure (workforce development, economic conditions, and governance), and service delivery process (continuity and coordination, comprehensiveness, and accessibility). They concluded that countries with strongest primary care in Europe are the United Kingdom, Spain, Slovenia, Portugal, the Netherlands, Lithuania, Finland, Estonia, and Denmark. Common features of primary care among these countries were the gatekeeping role (i.e., first-contact care) of primary healthcare; having an advocacy role in patients´ care (e.g., follow-up care and diagnosing); and care coordination role within primary care and with other healthcare settings. (Kringos et al. 2013.)

8. Medical desertification in OASES participating countries

8.1 Cyprus

Determinants of medical desertification

In Cyprus, the density of physicians is 4 / 1 000 inhabitants (the average in OECD countries is 3.5) and 6 / 1 000 for nurses (the average number in OECD countries is 8.8 (OECD 2019a, OECD 2021)). The Organization of State Health Services (Greek: ΟΚΥΠΥ) has 9 hospitals and 37 health centers in all cities and provinces, with the Directorate of Mental Health and the Ambulance Service. A list of personal doctors contracted by the NHS is published on an electronic system, from which citizens may select a personal physician (Philenews 2019). The maximum number of patients that the personal physician can register in his/her list is 2,500 (based on the NHS-GeSY Law). If there is no paediatrician contracted with the NHS in the area where someone lives or at a manageable distance for them, they can register their child in a list of personal doctors for adults (Health Insurance Organization 2022). The official webpage of the Ministry of Health has not been updated with recent internal or external reports. Internal reports are only available for 2012 and 2014, with the most recent external reports being from 2015. The main topic under discussion in these reports is the Health Reform Programme of Cyprus Government. Therefore, according to the annual report of 2014, the national strategies include strategies related to cancer prevention and treatment, tobacco control and strategy for antimicrobial resistance. (Ministry of Health, Cyprus 2014).

Ways to mitigate medical desertification

In 2019, Cyprus launched its own National Health Care System (NHS) (Lourenço 2015, WHO 2015). The NHS in Cyprus may be seen as an attempt to address issues related to medical desertification, as the NHS provides universal health coverage. Services are provided by both public and private providers and the NHS ensures access to a mix of high-quality public and private care, including hospital care, specialized ambulatory care, primary care and public health services. The intention of the establishment of the NHS was to reduce excessive

reliance on out-of-pocket payments, as well as to provide equal access to care. The first implementation phase of the NHS (June 2019) included coverage of outpatient healthcare services for the entire population and access, with relatively small user charges, to family physicians, outpatient specialists, pharmaceuticals, and laboratory services. The second implementation phase (June-December 2020) extended the coverage, with the inclusion of hospital care and specialty pharmaceuticals. Several reforms took place alongside the introduction of the NHS aim to improve health system performance through the introduction of information systems, greater autonomy for- and better management of- public hospitals, more effective provider payment mechanisms and stronger primary care (Lourenço 2015, WHO 2015).

8.2 Finland

Determinants of medical desertification

The number of physicians is 3.2 / 1 000 inhabitants, i.e., lower than the average in OECD countries (3,5) (OECD 2019a). In 2017, Finland had 14.3 nurses per 1 000 inhabitants, while the average number in OECD countries is 8.8 (OECD 2019a). The number of nurses includes both registered nurses (higher education) and practical nurses (vocational education). About two-thirds of the abovementioned number of nurses are registered nurses. (OECD 2019b, 14.) This means, that Finland has rather large number of nurses, but less physicians, which suggests a rather broad task division. The numbers, however, do not take into account that Finnish population is one of the oldest in Europe.

Since 2000, the number of workforce in social and healthcare has increased by third (Hetemaa et al. 2022). However, it has been predicted that by the year 2030, 20% of the health workforce will retire (Hetemaa et al. 2022) and within the next 15 years, approximately 200 000 new professionals are needed to social and healthcare services (Tevameri 2021). One main challenge is the fact that although competent health workforce might be available, there are difficulties in retaining existing workforce (Hetemaa et al. 2022). Unemployment rate is only 4.5% (Larja & Peltonen 2023). Of registered nurses, approximately 85% work as a nurse. Most of the outflow from the nursing profession is due to retirement and other reasons, and 4.3% of nurses have changed to another industry. (Finnish Nurses Association 2023.) There is a shortage of 16600 registered nurses in 2023 and the shortage has doubled in two years. Of practical nurses, the shortage is 8800 (a total of 80000 employees) in municipal sector. As a large number of practical nurses work in private sector, the shortage is larger. Increased outflow of nurses has been detected since 2015, and it is directed mostly towards Sweden and Norway. During 2015–2017, a total of 140 nurses immigrated to Finland, while approximately 200 nurses leaved abroad. (Statistics Finland 2020.) In comparison to other Nordic countries, in Finland nurses earn the least. Even though Finnish nurses gain work experience, their salaries remain lower than nurses in other Nordic countries. (Finnish Nurses Association 2019.) Outflow of nurses is often temporary, as approximately 25% of nurses returned back to Finland within the first year and 46% within four years (2006–2010) (Statistics Finland 2020).

The number of physicians who are in an employment relationship in public primary healthcare centres has decreased during past years. Between 2019 and 2022, the number of physicians working permanently in public primary healthcare centres has decreased from 59% to 48.9%, while the number of substitutes has decreased from 19.6% to 25%. At the end of 2022, a total of 325 vacancies were open for physicians in public primary healthcare centres (of the 4500 vacancies), but the vacancies were not filled (8% of all physician vacancies). In addition, although there was a need for physicians in approximately 100 vacancies, recruitment for these positions was not even opened. (The Finnish Medical Association 2023.) There is significant percentual variation in the shortage of physicians between regions (hospital districts). Figure 1 illustrates percentual deficit of physicians within each hospital district in 2022. In eight hospital districts, the deficit was over 10%. The shortage is worst in eastern sparsely populated regions, but inside the regions there is also large variation between health centres.

Finnish health system has also some equity issues as there are three systems for primary health care: public health centres, occupational health care for employees and some (small) subsidies for private doctors' appointments. In occupational health care the waiting times are very short, but in public health centres even weeks in non-urgent matters. This means that employees and more wealthy people have better access to care than people in lower socio-economic positions, who usually have more care needs. Occupational health care and private care also compete of the professionals, especially physicians. (Koponen & Tynkkynen 2023).

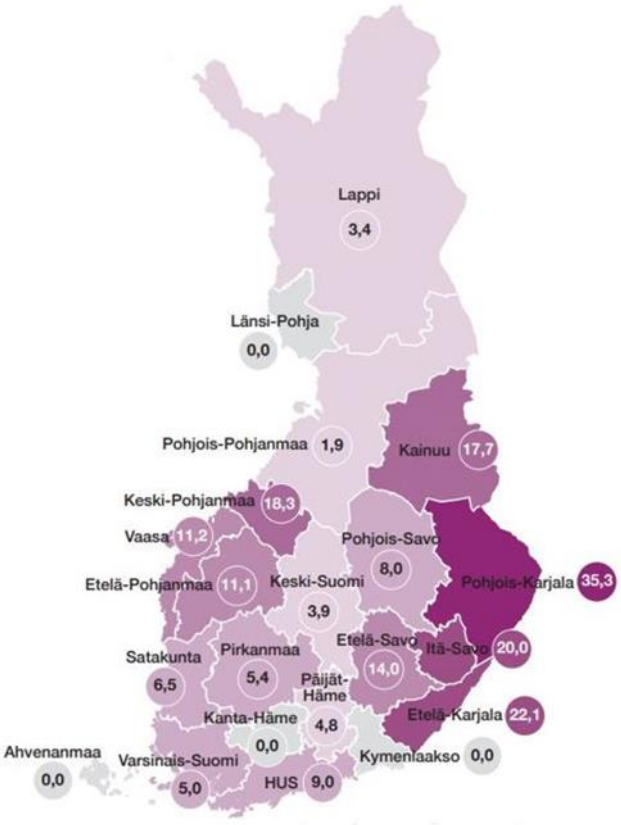

Figure 2. Deficit of physicians within each hospital district (%) in 2022. Notes: Deficit of physicians means the percentual share of all physician vacancies which are not filled. Vacancies have been open, but a physician was not found for the position. From outsourcings, the total number of physician vacancies is reported. From units, which have outsourced services, more specific information is not available. In calculations the vacancies are presumed to be managed fully. Outsourcing means municipalities do not fill vacancies themselves, instead they outsource physician vacancies or service producing to private companies or independent professionals. Peppiina Saastamoinen. The Finnish Medical Association.

Ways to mitigate medical desertification

Organizational measures

In order to increase the attractiveness of physicians´ work in public primary healthcare centres, recruitment and permanence, healthcare centres have implemented several measures. The most common measures taken were offering a possibility for part-time work; adjusting salary; increasing guidance and mentoring support for young physicians; investing in the possibility to consult a specialist physician; increasing possibilities for continuous education; adjusting work distribution, the content of work, and decreasing workload; improving leadership and management; offering a possibility for remote work. Also, employee benefits such as assisting in seeking an apartment. (The Finnish Medical Association 2022.) Based on perceptions of leading physicians in public primary healthcare centres, the most important ways to increase the attractiveness of a healthcare centre physician job are increasing guidance and mentoring support for young physicians; offering a possibility for part-time work; and adjusting work distribution and the content of work (The Finnish Medical Association 2022).

Task-shifting, multi-professional collaboration and integration

The high number of nurses in relation to physicians evens out due to registered nurses´ significant role especially in primary healthcare, i.e. task-shifting. Of all of the visits made to public primary healthcare centres in 2019, 54% of visits were made to nurses office (registered nurses, midwives, public health nurses, paramedics) and 31.5% to physicians. Nurses are also in charge of the majority (over 70%) of phone consultations. Approximately half of the consultations made digitally are taken care by nurses, while other half is somewhat equally distributed between registered nurses and physicians. (Finnish Nurses Association 2023.) Registered nurses have authority to provide first point of contact care and provide treatment. They have a limited authority to make referrals, make diagnoses, order tests and prescribe medicine. (Maier & Aiken 2016.) The legislation for registered nurses´ authority to prescribe medicine came into force in 2010 (Finlex 2010/1088). Registered nurses must complete a separate training to receive the rights to prescribe medicines. In 2020, approximately 500 nurses had the authority to prescribe medicine. (Yle 2020.) The benefits of registered nurses´ authority to prescribe medicine are increased access to care for patients, care can be started sooner, and tasks can be more equally distributed between professionals (consulting a physician is not necessary in order to receive a prescription) (the Finnish Government 2019). Especially in rural areas with a lack of physicians, nurses´ authority to prescribe is most often used (Yle 2020).

Finnish health centres have been rather integrated and consisted of a large number of different professionals. Still, the coordination of work of the professionals has been weak in many cases. The outpatient care has been developed for many years. There are different multiprofessional team models, doctor-nurse working couple models and models based on segmentation of clients (to chronic and non-chronic patients). In the past couple of years, also professionals of social services as well as service guidance have been integrated to health centres, now into health and social service centres.

Despite the differences between local models, the role of nurses has been increased. Nurses typically do the assessment of the need for treatment (in phone or in walk-in appointments). They also start the care process by guiding the clients to laboratory or some other professional (physiotherapist, psychiatric nurse, social worker), with the help of consulting physicians. The model has smoothened out the service process and shortened the waiting times. There are some positive experiences of these kind of team models (Jokelin et al 2022, Sinervo et al 2016), but so far the evidence on client and worker outcomes is scarce. There are also some doubts of these models as care continuity may be impaired. In other models the work is more based on GP's appointment, but the nurse prepares the client (for example interviews the patient or takes the measurements in advance). Bringing the social workers or bachelors of social work into health and social services centres makes it easier for other professionals to consult them. Service guidance is also a typical function brought into the centres.

Health workforce immigration

Due to declined dependency ratio, work-related immigration is considered as one of the solutions to the shortage of health workforce. A total of 3.7% of nurses and 7.6% of medical doctors had foreign origins in 2020 (THL2019). Finnish National Agency for Education funded a project Deploying competence in Finland, which aimed at promoting integration of educated immigrants for example through educational paths for completion of competence and enabling fast transition to work life (Metropolia 2023a). Universities of Applied Sciences provide separate nursing education aimed at immigrants. If a person has a previous nurse education completed in an EU/ETA country, they can complete competence through further education and qualify as a nurse in Finland (Metropolia 2023b). Some regions aim at recruiting caring and nursing professionals from abroad through a foreign company specialized in employment exchange. Before employment, the professionals are provided with additional training. (Wellbeing services county of Pirkanmaa 2022.)

Digitalization

The eHealth and eSocial Strategy 2020 aimed at ensuring equal access to care in remote areas and for vulnerable patient groups through digital service solutions (Seppälä & Puranen 2019). Along with the COVID-19 pandemic there has been a significant increase in the use of digital healthcare services. Between 2019 and 2021, the number of remote consultations has increased by almost 25% (6.4 million to 8.4 million). Before COVID-19, share of remote consultations of outpatient primary care visits was 40%, and the share of remote consultations increased to 60% in April 2020. At the end of 2021 almost half of the outpatient

primary care visits were still made remotely, although the number of face-to-face consultations had returned to same level than it was before COVID-19. (Hetemaa et al. 2022.) Digital healthcare service use seems to be more common in urban than remote areas: among working-age population, 39% of urban inhabitants and 25% of remote inhabitants had used digital services. In remote areas, 75% of remote and 86% of urban inhabitants reported that at least one face-to-face consultation was replaced with remote consultation. (Vehko et al. 2022). Digitalization in healthcare services has also enabled electronic prescribing (Act of Electronic Prescribing); a medicine prescription can be saved electronically to a national prescription center and a patient can get the prescribed medicine from a pharmacy of their choice (Finlex 2007).

National measures

With lead of the Ministry of Social Affairs and Health, the Finnish Government designated a cross-administrative working group for securing the sufficiency and availability of social and healthcare workforce for the period November 2021 – March 2023. In February 2023, the working group launched the strategic roadmap for 2022–2027 describing the sufficiency and availability of social and health workforce. The proposal includes the following major measures: sufficient intake of social and healthcare students; reforming the division of responsibilities between professionals; organizing work in workplaces. The number of assisting workforce and supporting services will be increased. For example, in elderly care practical nurses often do tasks which do not correspond to their education. Thus, more medical assistants are recruited so that practical nurses can focus on tasks which belong to their primary job description. In addition, administrative and supportive tasks are reassigned to supporting workforce such as secretaries, so that nurses as well as medical doctors can focus on their primary nursing tasks. Sustainable work-based immigration is supported; wellbeing at work and work ability is improved; digital solutions are utilized. (Kirkonpelto & Mäntyranta 2023.)

Social and health services reform

Health and social services reform was launched in the beginning of 2023. Responsibility to arrange all health and social services was moved from around 150 municipalities and joint authorities of municipalities to 21 Health and welfare counties and the city of Helsinki as one entity (in capital area the hospital district organizes specialized health care). The counties provide large part of services by themselves. One aim was to centralize services in order to get stronger and bigger service organizers. In regard to personnel outcomes, it was supposed that employees will have better work environment and opportunity for career development. Other major aims were to increase access to services and to integrate services more efficiently.

The Future Health and Social Service Centers program is a part of Finnish reform of Health and Social services. A major problem in Finnish health and social care has been the availability of primary care services, especially GP's appointment, where waiting times have been long. In the program, the first goal was to increase the equity of availability of services in a timely manner and to develop care continuity. A special emphasis was put on developing the service

for those who need multiple and special services. Secondly, the goal was to move the focus from heavy services to preventive and proactive work, from specialized care to primary services. Thirdly, the goal was to increase quality and efficacy of services. And fourthly, the goal was to increase care integration, both vertically and horizontally. Health and social service centers are developed to work as integrated first contact point for clients. (Finnish Institute for Health and Welfare 2022.)

8.3 France

Determinants of medical desertification

In France, the number of physicians is 3.2 doctors per 1 000 population in 2019, compared with 3.9 across the EU. France has a relatively high number of nurses in relation to physicians. In 2019, there were 11 practicing nurses per 1000 inhabitants. The number of nurses per capita is higher than the EU average (8.4 per 1000). While the number of specialized physicians is increasing, the number of general practitioners is decreasing: of physicians, 44% are general practitioners and the remaining 56% are physicians "outside general practice" (OECD 2020.) Every other appointment with a general practitioner is arranged in less than two days, while waiting times for specialized physicians exceed two months. (Millien et al. 2018.)

Concerning the primary care field, shortage of health workforce mainly concerns general practitioners. This is linked to the decrease in the number of physicians trained between 1970–2000, which means that currently several areas are concerned by the lack of supply of general practitioners, although especially in rural areas the concern is even more crucial. Inequalities are increasing between the least and most affluent municipalities for general practitioners. There are regional differences in the accessibility to physicians, nurses and midwives (see Anguis et al. 2021, 16-18, Chevillard et al. 2018, Legendre 2021). In relation to other health professionals, general practitioners are better distributed among regions. Nevertheless, they are concentrated locally around urban centres like other professionals (strong infra-regional inequalities for physicians (Lucas-Gabrielli & Mangeney 2019), and paramedic professions). Among other health professionals, there are significant inequalities in access to primary care professionals such as nurses, physiotherapists and midwives (Legendre 2021), despite of strong growth in their numbers. Unlike general practitioners, the professions of midwives, nurses and masseurs-physiotherapists are following a growing demographic dynamic that results in an increase in accessibility, particularly marked in the case of midwives (The Republic of France 2023). For specialized doctors, the disparities are very significant (CNOM 2022), with particularly long waiting times for certain medical specialties (for example, ophthalmologists and dermatologists) (Millien 2018). Figure 2 illustrates the number of accessible consultations per year per capita for general practitioners and Figure 3 the number of accessible FTE (full-time equivalent) per 100 000 population.

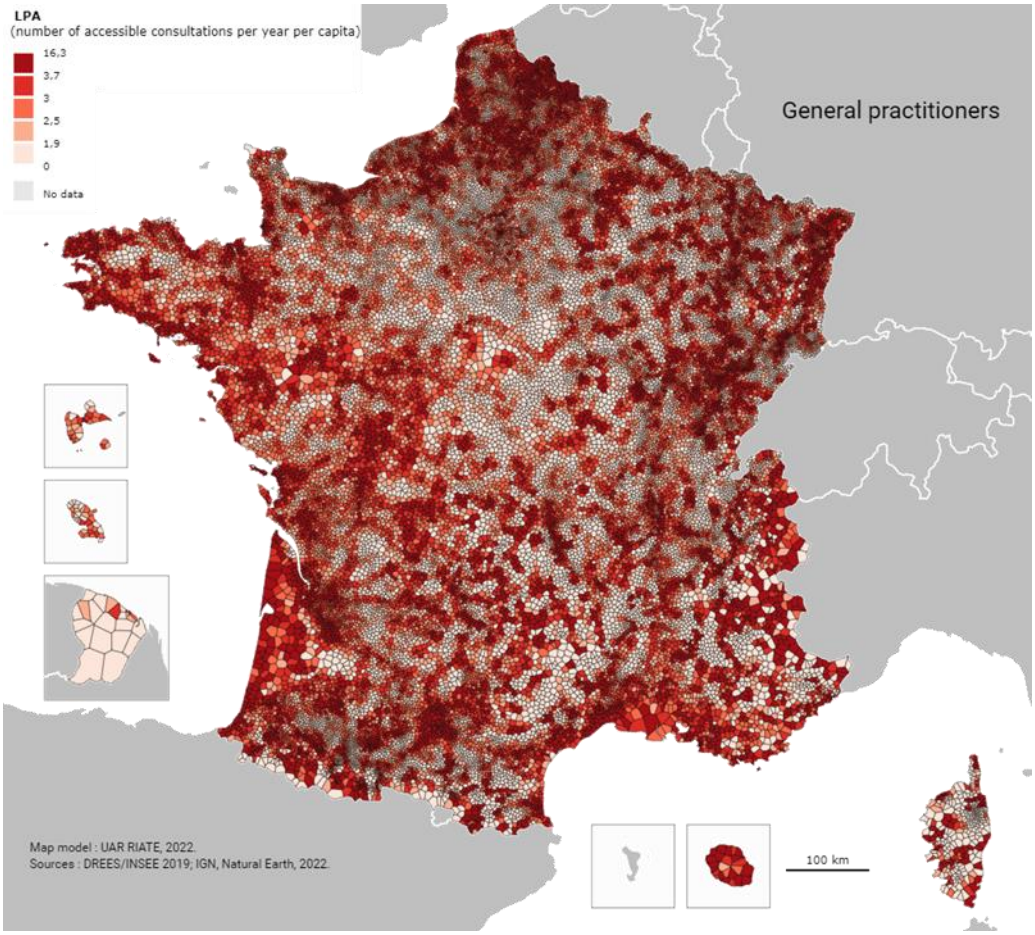

Figure 3. The number of accessible consultations per year per capita for general practitioners. In the indicator, only health professionals practicing outside of hospitals are taken into account (either as private practitioners or as employees of a health center).

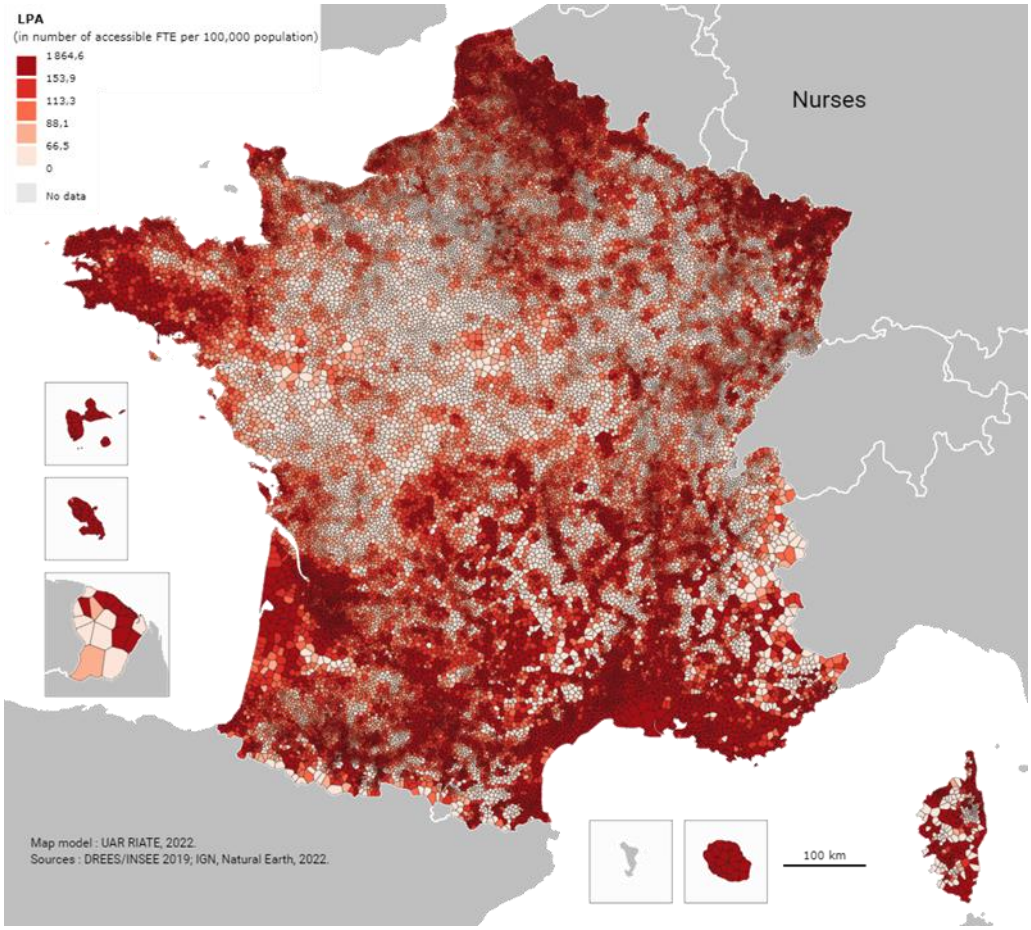

Figure 4. The number of accessible FTE (full-time equivalent) for nurses per 100 000 population.

Ways to mitigate medical desertification

Financial incentives

Public authorities (State, National health insurance and local authorities) deployed since 2005 several financial incentives in order to attract and retain GPs in medically underserved areas: fees increase, tax exemption, scholarship against years of installation in underserved areas etc. There are no systematic evaluations of such policies, but some studies show mixed results such as windfall effects or high cost regarding the moderate impact in terms of improved location (Cardoux et Daudigny, 2017; Trésor, 2019).

Team-based model

Primary care teams have been found as an effective way in reducing geographical inequalities when it comes to the distribution of general practitioners, and to attract and retain general practitioners especially among young general practitioners in suburban areas (Chevillard & Mousquès 2021) and urban areas (Chevillard et al. 2019, Chevillard et al. 2021). Of general practitioners, 61% practice in a group but less than half of them with paramedics including nurses (Chaput et al., 2019). More than 7 out of 10 general practitioners had opted for a group practice in 2022 (Bergeat et al., 2022). The proportion of GPs, nurses, midwives, physiotherapist working in Primary Care teams has drastically increased with more than 1,900

PCTs in 2021 compared to fewer than 20 in 2008 (Chevillard et al., 2019 and 2021). The average composition of PCTs is close to 10 full-time equivalent nonmedical health care professionals (9.9, essentially nurses but also physiotherapists), 4.8 GPs, 1.1 pharmacists, 0.5 midwives, 0.5 dental surgeons, 0.3 specialists and 0.6 other care professionals (Chevillard et al. 2019, Chevillard et al. 2021). This group practice, most often in single-discipline practices, is also increasingly taking place in multi-professional structures (40% of GPS) such as primary care teams where, at a minimum, two GPs and one paramedical staff as well as other health professions are grouped together. In order to improve access to care and social support, participatory health centers and homes have been piloted for populations in disadvantaged areas. The aim is to increase the number of the centers to 60, by year 2024. (The French Government 2022.)

Task-shifting

The roles and responsibilities of allied health professionals are increasingly being developed to meet the changing needs of ageing population in the healthcare system that has historically been physician-centered. Professional boundaries are strong, but task shifting between professionals has been encouraged since 2009, with cooperation protocols between physicians and other health professionals (HAS, 2012). Related to task-shifting, medical assistants work with physicians, who can choose what kind of tasks to assign for the medical assistant. The tasks can be, for example, administrative tasks (l´Assurance Maladie 2023.)

Teamwork between general practitioners and nurses has been encouraged by the Government and through pilot programs (Fournier et al., 2018). Nurses with advanced or extended role enrolled in this pilot program were trained, hired and paid by a nonprofit organization. Pilot program funding covered investment and operating costs, the wages of advanced practice nurses and pay-for-coordination for the GPs. The pilot program allowed the GPs to cooperate with advanced practice nurses, who carried out activities that are usually, but not systematically, undertaken by GPs (screening, health education, technical procedures). The pilot demonstrates its ability to generate productive efficiency gains from the GPs´ perspective thanks to substitution (Loussarn et al., 2020). Also an advanced practice nurse statutory order was passed with the healthcare law in 2018 (Debout, 2018) and less than 2000 advanced practice nurses were already trained but the aim was to train around 5000 advanced practice nurses, and agreement with NHI was concluded in 2020 and renewed in 2022 to finance their activity in ambulatory care.

Education

The number of admitted medical students has increased significantly during 1992–2020, from 3 500 students to 9 300 students (Anguis et al. 2021) and especially in medically underserved regions. Territorial professional health communities encourage health professionals to organize a practice themselves at the level of their territory to respond to care needs (Ministére de la santé et de la prevention 2023). Since the start of the 2020 academic year, the numerus clausus no longer exists and the number of doctors trained now depends on the training capacities of the faculties and the needs for doctors identified locally in conjunction with the regional health agencies. (Déplaude 2015.) Regarding the content of education,

mandatory internships are provided for physicians in medically underserved areas (Ministère de la Santé et de la Prevention 2022). Students are eligible for local and national scholarships, if they commit to moving to a medically underserved area in the future.

Regulation of installation

In order to improve the geographical distribution of nurses, the National health insurance and the nurses unions signed an agreement in 2012 to regulate the installation of nurses. It consists of limiting the number of installations in "overserved-areas", i.e. there are no installations possible except in the event of departure. In underserved areas, settling nurses receive financial incentives. Between 2006 and 2016, this policy led to a decrease in the density of nurses and in the number of installation of nurses in overserved areas, when during the same time there was an increase of the same nurse density indicators in underserved and intermediate areas (i.e. areas without limitation or financial incentives) (Duchaine et al., 2022). All in all, it led to reducing geographical imbalances of nurses in France.

Immigration

France is a net receiving country for foreign-trained health professionals and emigration of French-trained professionals to other countries is limited. In 2017, 10% of the physician workforce are foreign-trained doctors, which is lower than the average for OECD countries. They represent 14% of specialists and 5% of general practitioners. Their numbers have risen sharply since 2007. They currently represent around 25% of new registrants. (OECD 2019.) The low number of foreign-trained physicians can be explained by the fact that some health professional qualifications gained abroad are not recognized in France before the 2000s (Moullan 2015). However, two contextual elements have changed the trend. First, the European directive of 2005 instituted automatic recognition of European diplomas and thus allows doctors with a European diploma to have free movement of workers and to settle wherever they wish. Then, the gradual enlargement of Europe led to an increase in these flows.

8.4 Hungary

Determinants of medical desertification

The number of health professionals in general has grown in Hungary during last decade, but their distribution is unequal in the country and in specific specialisations (WHO, 2022). Shortage in specialized medical training exists in the following fields: anaesthesiologists, vascular surgery, forensic medicine, nephrology, nuclear medicine, medical microbiologist, toxicology and emergency care, psychiatry, radiology, transfusiology, pulmonology (ÁEEK, 2018). Those resident doctors who specialise in these professions get higher scholarships. Shortage of physicians is also present in primary care: 11% of the GP practices (687) are vacant or permanently vacant (GKI, 2022). There is regional variation in the accessibility of health care professionals, and issues with medical desertification are mainly identified in the north-eastern parts of the country. However, the health workforce shortages in Hungary cannot be confirmed properly because of the challenges in quantification of the exact (unmet) needs. The prevalence of shortages can be inferred from the vacant positions and practices. The mapping of areas lacking essential health care services is currently ongoing.

Shortage of health care staff is a prominent problem in Hungary due to free mobility within the EU. An outflow of health professionals has been detected for a long time, and is mostly directed towards Germany, UK, Austria, Italy and Switzerland. Significant cross border mobility is detected at the Austrian border region, due to accessibility and the higher salaries in Austria. Described reasons behind the migration of doctors include higher salaries and better career development opportunities, higher prestige, better working conditions and quality of living, professional development opportunities, training opportunities, opportunities for participation in research, predictability (in private life and in career as well), well-equipped workplaces, better working environment and condition of workplace, and a general better work-life balance (Hárs–Simon, 2015).

Ways to mitigate medical desertification

The government has introduced several measures to tackle the emigration of health care professionals. In 2020, the parliament approved the law (2020, C.) and the government implemented a large-scale pay rise for medical doctors in public health (step by step from 2021 to 2023). Scholarship programmes were introduced for resident doctors and other health care staff (Eke et al., 2016). These scholarship programmes offer resident doctors entering postgraduate training the opportunity to obtain their first specialisation and a tax-free net sum for the period of the training. In return, the recipients provide an equal number of years doing service in a specified health care setting, usually amounting to five years of service (Eke et al., 2016). The inflow of foreign health professionals to Hungary is rather limited, due to language barriers. Most immigrated health care professionals are of Hungarian nationality, Hungarian/Romanian double nationality, or Slovakian nationality, and have received their training in Romania, Ukraine, Slovakia or Serbia.

8.5 Italy

Determinants of medical desertification

In comparison to the EU average, Italy has 25% fewer nurses and the number of graduating nurses has decreased since 2014. However, Italy has a higher number of physicians per 1 000 inhabitants than EU average (4.1 vs. 3.9). (OECD 2021.) During the past 20 years, the number of physicians has increased from 3.44 to 4.0 / 1 000 Italians. Despite of the high number of physicians, based on statistics from 2019, 56% of them were over the age of 55, 20% were over 65 years old, and only 9% under the age of 35 (OECD 2023). Over the past 10 years, the number of students admitted to medical school has increased to keep up with the pace of the number of retiring physicians. Education positions for nurses have been added for years 2022–2027, which should compensate the forthcoming retirement of nurses (AGENAS 2022). In 2022, 14 740 new students will be admitted. (Ministero dell´Universitá e della Ricerca 2022.)

The number of educated nurses has been low compared to population care demand. The number of graduated nurses was 6 700–8 900 in 2004, and 13 000–17 000 nurses were estimated to leave the profession annually. The nursing shortage was addressed by increasing

the number of education positions in nursing school. In 2006, admittance was 13 000 and 9 200 graduated. (Chaloff 2008.)

There is an uneven distribution of patients per general practice physician between urban and rural areas, rural areas having less physicians compared to inhabitants´ needs. The expression ´internal areas´ refers to areas significantly distant from e.g. health services, and municipalities are classified into suburban areas, intermediate areas, peripheral areas and ultra-peripheral areas (OpenCoesione 2023). The national average is 1 224 patients per one physician. The number is the highest in the North (1 326 patients per a physician) compared to the Center (1 159) and Southern Italy (1 102). In Trentino-Alto Adige there is the highest number of patients per general practice physician (1 454) and in Umbria the lowest (1 049). (AGENAS 2022.) Similarly, there are regional discrepancies among health professionals employed in the public health system (see Ministry of Health 2019, 83–88).

Ways to mitigate medical desertification

Recruiting professionals from external agencies

During the past two years, there have been difficulties in recruiting physicians in the public healthcare sector, above all because of the COVID-19 pandemic, presumably because of the deterioration of the working conditions. To overcome the criticalities, public health sector providers recruit temporary health professionals from external agencies because of the difficulties in recruiting staff to more permanent positions. The working conditions offered by those agencies seem to be preferred to the ones guaranteed by the public health sector. Even higher salaries are offered for temporary substitutes than what is paid for public health professionals. In order to recruit health professionals, recruitment companies offer, along with high salaries, flexibility in shifts and working locations. (Petretto 2022.) The problem with recruiting health professionals through recruitment agencies is that the professionals may be recently graduated and with a lack of work experience, not specialized, immigrants with insufficient language skills or nurses without professional education (Como 2021). Permanent positions would maintain and reinforce health professionals´ competence, the continuity of employment relationships (Como 2021) and the quality of care (Giannattasio 2022).

Task shifting

Task shifting has been used for transferring tasks from more highly educated professionals to less formally educated in order to use resources more efficiently (Federazione Nazionale 2018). Task shifting has been used, for example, in promoting multi-professional diabetes management (CCM 2018). Lack of personnel has resulted in ambulances delivering care without a physician onboard and lack of physicians in emergency care (Giannattasio 2022). Nurses with qualification to practice in an emergency situation can operate in ambulance services without the presence of a physician (Federazione Nazionale 2018). They can carry out procedures aimed at safeguarding the vital functions of a patient (SNAMI Bologna 2021).

8.6 Moldova

Determinants of medical desertification

Primary health care is the cornerstone of the health system in the Republic of Moldova, and it is mainly provided using a Family Doctor and Nurses model. On the national level, the numbers of family doctors and nurses are below national recommendations. The number of family doctors and nurses has decreased slightly in the last five years, but at the same time, the population of the Republic of Moldova has also declined steadily. However, a bigger concern regarding medical desertification is the uneven geographical distribution of these professionals across the country. Rural areas have insufficient number of primary health care workers, while major cities and other urban areas have a relative excess of health workforce. Medical desertification is mainly identified in the eastern and south-eastern parts of the country. In addition, the frozen ongoing conflict between Moldova and the unrecognized state of Transnistria causes country-specific problems. The Transnistrian region may be one potential medical desert area, but there is lack of data regarding the number of healthcare workers and population's access to health services within the region.

Distance, densities and travel time have been identified as the main causes of medical desertification in the Republic of Moldova. Access to healthcare professionals is difficult in rural areas, mainly due to insufficient infrastructure, such as poor road network and bad condition of the roads. Thereby, the travel time can be long regardless of the distance. In addition, the lack of doctors in rural areas has led to the situation that a doctor is available only on 1 to 2 days per week and waiting time is long. One concern is the average age of family doctors, which is increasing. Currently, most (30%) family doctors are within the 55-64 age range and 10% are even older than 65 years. Due to aging, there will be major challenges in the near future to ensure proper health care services for the entire population. This affects rural areas the most.

Shortage of health care professionals is partly due to general outmigration of the working-age population. Outmigration to OECD countries has increased and the most frequent destination countries for Moldovans are Germany, Turkey, the United States and Italy. In addition, the intention of healthcare professionals to leave the healthcare system for other sectors within the country or to other countries has increased. Described reasons for the workforce shortage in the health care sector include the lack of strategic policies in managing human resources in health, very low levels of incentives, inadequate working conditions, poor infrastructure in rural areas and no targeted incentives towards assuring the young professional with a permanent place to live in a rural area.

Ways to mitigate medical desertification

Mitigating medical desertification requires improving the economic, social and political situation. Action for Health and Equity - Addressing Medical Deserts (AHEAD) EU-cofunded project identified several potential solutions for mitigating medical desertification, including: a mix of financial interventions, institutional arrangements, and arguments with respect to health workforce. Four specific policy implications were identified:

1. Recruit more graduates to pursue a professional path in family doctor's field;

2. Increase the amount of financial incentives and non-monetary bonuses to family doctors who decide to work in areas identified as Medical deserts, in rural and other underserved areas;
3. Build more bridges and better connect between sectors, fortify the cooperation dialogue and assure the capacity building processes of national and local authorities;
4. Identify and mitigate the factors that lead to poor planning of the number of family doctors: entries to training programs versus overall graduates versus health system's short- and long-term needs.
Finally, one way to mitigate the medical desertification is to increase number and capacities of licenced nurses with higher education degree as an alternative to family doctors in rural areas.

8.7 Romania

Determinants of medical desertification

The number of both physicians and nurses is lower than average in the EU. The number of physicians was 3.2 per 1 000 in year 2019, compared to the EU average of 3.9. In 2019, the number of nurses was 7.5 per 1 000 (the average number in the EU is 8.4). (OECD 2021.) The aim of having universal health coverage is a common goal of the Romanian health system, but it is far from being achieved. In Romania, there is an imbalance of health workforce distribution, which results in unequal access to care especially in rural and underserved areas. Furthermore, physical accessibility is a challenge because of weak transport infrastructure. (OECD 2021.) Medical deserts are located throughout the country. There is great heterogeneity in access to care, but there is currently no statistical data to back this anecdotic knowledge. It is known that a shortage of health workforce in primary care (community health workers, nurses, doctors) exists at all levels in Romania. The shortage is noteworthy, but especially predominant in rural areas and in the southern areas of the country. About half of physicians are working in university areas (Mihai 2023). Based on statistics from 2021, 65% of 12,424 family physicians worked in urban areas (Chukwuma et al. 2021). In the South-East and South-Muntenia regions, the density of doctors is less than half the EU average, and the density of nurses is less than the European average with two to three nurses per 1 000 inhabitants. In urban areas there is a double the number of family doctors compared to rural areas; the capital city has on average 5,47 doctors per 1 .000 inhabitants while the South-Muntenia region has on average 1,.47 doctors per 1. 000 inhabitants. Figure X illustrates distribution of primary healthcare by population of children in Romania in 2019.

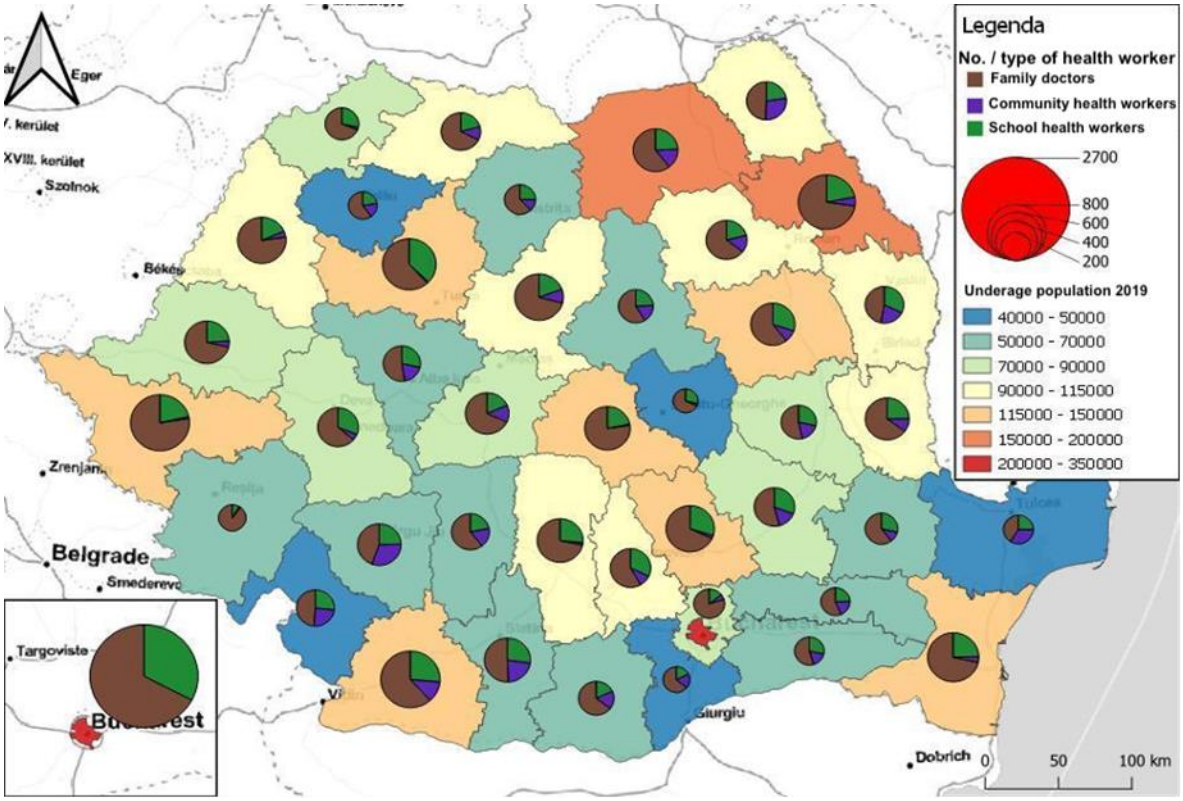

Figure 5. Distribution of primary healthcare by population of children in Romania in 2019.

The number of educated healthcare professionals would be sufficient to cover the healthcare needs of the Romanian population, but migration is causing a shortage of professionals in the healthcare fields. While a total of 4 967 medical, and 17 549 nursing students graduated in 2019, migration among health professionals is extensive, leading to problems in adequate number of health workforce (OECD 2021). After Romania joined the EU in 2007, the number of emigrating nurses and physicians increased. Labour emigration is directed to, for example, France, the United Kingdom, Italy and Spain. (Rohova 2011.) Based on a survey carried out for 957 medical students, 84,7% of them answered they have planned to work abroad after graduation (Suciu et al. 2017). Several issues have been reported as reasons behind the emigration of health care professionals. Possibilities for professional and career development, general living conditions, and salaries are considered to be better abroad compared to Romania (Rohova 2011). Other reasons include excessive workloads, long working hours, practices run with only one physician, insufficient funding, lack of equipment and de-professionalization. Administrative tasks are usually managed by doctors and nurses, and it has been reported that this takes up a large proportion of their time. (Bădileanu et al., 2022.)

The funding provided to Romania's primary healthcare support systems in rural areas is insufficient, and these medical facilities must deal with subpar medical equipment, commuting employees, and a hazy service delivery system. For instance, the South-West region of Oltenia's health system is infamous for its subpar hospital facilities and medical care.

The health system in rural South Muntenia is characterized by a low level of development in terms of the number of medical units. The medical professionals are traveling between towns, villages, or other locations to provide their services. Additionally, there is a shortage of medically qualified personnel, particularly those with advanced degrees, in some rural areas of the South-East region (Pirvu & Tenea, 2021).

Ways to mitigate medical desertification

In order to address the challenges of workforce shortage, the Government has implemented measures for better payment, opportunities for career development, improvements for working conditions, and adequate equipment of healthcare facilities (Naik 2023). At national level, Romania has set strategies for addressing health workforce issues. In 2023, plans for human resources for health development were approved by the Minister of Health for years 2023–2030. Objectives have been set for different healthcare sectors (including e.g., primary and inpatient care) improving health workforce evaluation and planning, education and management. They are continuum for the Multiannual Strategy for the Human Resources for Health Development for years 2022–2030, which focuses on recruiting health workforce to rural areas, and improving retention, recruitment and education of professionals. (European Observatory on Health Systems and Policies 2023).

Romania is experiencing a severe health crisis that was exacerbated by the COVID-19-pandemic as a result of the delay in a comprehensive health system reform. There is a greater demand for preventive medicine services, palliative care services, recovery services, etc., in addition to the urgent need to address the medical personnel shortfall in the existing structures. These parts of the health sector, when appropriately outfitted with well-developed logistics, such as digitizing operations, procedures, and services, can draw in new employees and reposition existing workers within the system, including by enhancing professional training and/or dual specialization (Apostu et al., 2022). (Apostu et al., 2022). Regarding primary care services for children, adolescent, mothers and families, it has been suggested that improving integrated care and interdisciplinary teams; adding supporting staff (e.g., administrative personnel); strengthening primary healthcare´s role as a gatekeeper; and increasing digitalization´s role in improving collaboration between different levels of healthcare, could be suitable solutions for improving the quality of care (Coman et al. 2022).

The majority of Romania's rural areas are currently experiencing a demographic catastrophe, which is manifested by an accelerated aging process and a significant depopulation. The quickest and most accessible way to address the chronic medical workforce shortage in these remote and rural areas is to implement a telemedicine system. With such a solution, patients would be able to access primary care services without having to physically travel to a family doctor or a medical facility that is often located outside of the city. The telemedicine solution enables integration of the entire flow of work of the medical processes, from diagnosis to treatment, optimizing resources available and raising the caliber of services provided (Marinescu, 2021). Use of teleconsultations is not as common in Romania as elsewhere in the EU. To improve access to care, mobile medical units were adopted in 2018. (OECD 2021.)

9. Literature review of the antecedents, outcomes and effective measures to mitigate desertification – focus on organizational factors

9.1 Characteristics of the included studies

The study selection process is described in Figure 1. A total of 77 studies were included in the review. A total of 76 studies were included in the review. 27 of the studies were literature reviews. 45 were original studies, of which 15 were quantitative, 19 qualitative and 11 mixed-methods. The original studies were conducted in Australia (n=19), the United States (n=8), Canada (n=7), Germany (n=3), France (n=2), Scotland (n=2), Austria (n=2), New Zealand (n=1), the Netherlands (n=1). Two of the studies were conducted in several countries; one study used data collected from Sweden, Norway, Canada and Iceland. The other used data collected from Europe and Asia. Four of the studies were commentaries. The included studies focus on remote healthcare settings. Also, there is an extensive number of research considering the retention of health workforce and their reasons to leave the profession in general. However, these studies are not considering the question of medical desertification.

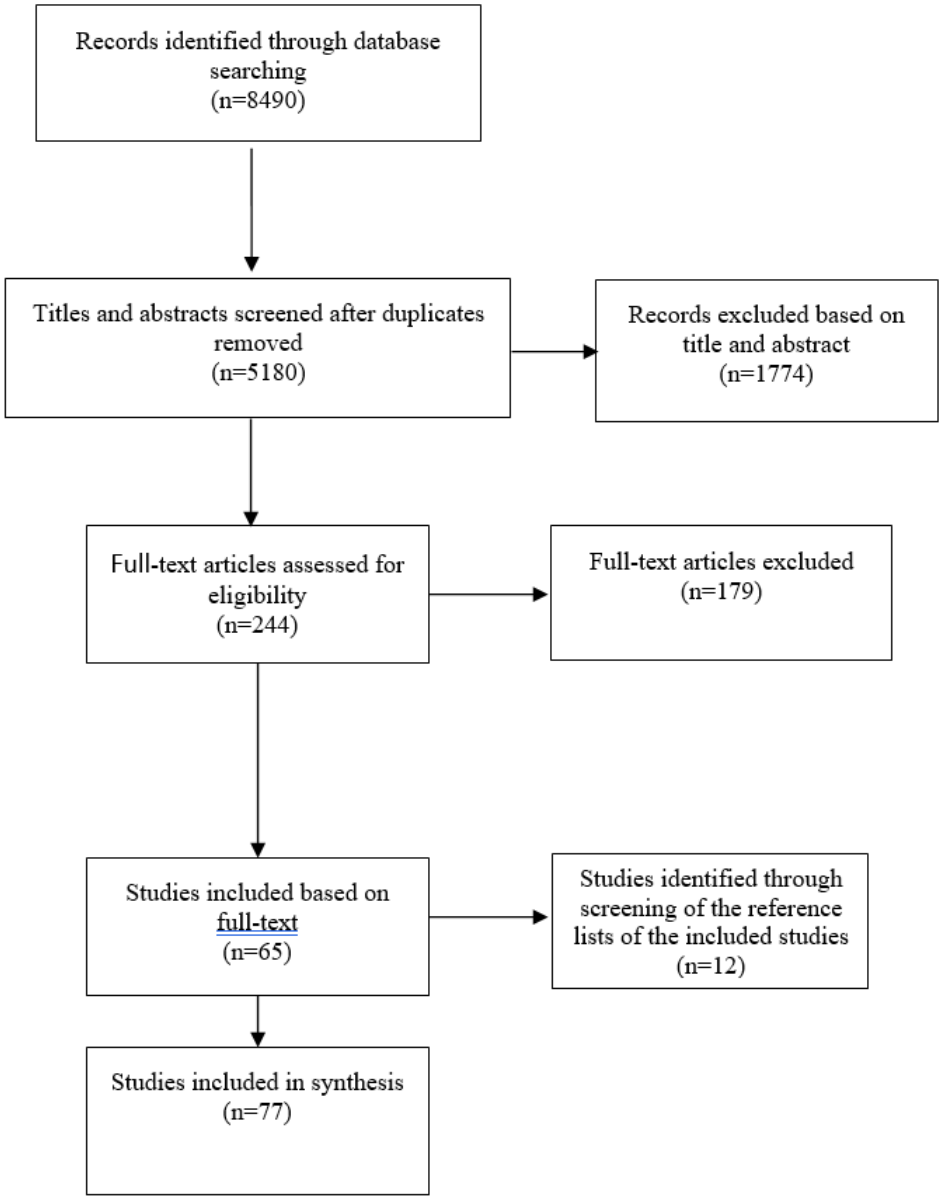

Figure 6. Study selection process

9.2 Determinants of medical desertification

The determinants of medical desertification related to organizational factors are presented in Table 3.

Category	Sub-category
Work organization and stress	Lack of healthcare professionals in rural care increases healthcare professionals´ workload
	Unclear professional roles
	Unpredictable work
Competence requirements	Wide competence requirements for healthcare professionals in rural care
	High autonomy requirement
Professional support	Lack of professional support from colleagues and mentoring opportunities
	Meeting the education needs
	Lack of professional development opportunities
Limited possibilities for providing adequate care	

Table 3: The determinants of medical desertification related to organizational factors

9.2.1 Work organization and stress

Lack of healthcare professionals in rural care increases healthcare professionals´ workload

Lack of permanent and substitute healthcare professionals affects negatively on workload in rural areas (Lenthall et al. 2018). Increased workloads often resulted from complex patient cases (Cosgrave et al. 2015), having to take care of responsibilities that were left after resignations or vacancies, and because of the difficulties in recruiting new staff (Cosgrave et al. 2018). In rural care, high workload appeared in long working hours, out-of-hours work, working overtime, on-call duties (Humhreys et al. 2002, Iversen et al. 2002) and too many patients in relation to working hours. High workload resulted in burnout and difficulties in coping with stress, which may even lead to resigning (Cosgrave et al. 2015). Unfavourable work shifts, such as night shifts and changes in rosters, increased stress and affected negatively on intention to leave (Halter et al. 2017).

Unclear professional roles

The unclarity of the professional roles was identified as problematic. Physicians need to take responsibility for the duties of lacking specialists or long waiting times for specialists (Pohontsch et al. 2018) and tasks outside of their profession, e.g. blood taking. Pohontsch et al. (2018) argued that a difference between a rural and urban physician is that while physicians in rural care are responsible for managing a range of health conditions independently, urban physicians provide medical services and refer patients to special care when wider competence is required.

Unpredictable work

In rural care, nurses in emergency care emphasized the unpredictability of the kind of patients and care needs and experienced a lack of confidence in facing such situations. Nurses experienced that not facing emergency presentations daily, led to reduced ability to deal with such situations (Burrows et al. 2019). Difficulties in maintaining and refining skills which are required only rarely may jeopardize patients' safety (Whiteing et al. 2021).

9.2.2 Competence requirements

Wide competence requirements for healthcare professionals in rural care

In rural healthcare, nurses face a wider range of patients, care needs and health conditions, while in urban care nurses often focus on certain specialities. Thus, for rural nurses, the competence needs are wider, which causes a challenge for maintaining this competence. (Burrows et al. 2019, Weinhold & Gurtner 2014.) Rural practices often require extensive know-how from both physicians and nurses. On the one hand, healthcare professionals considered the wide scope of practice as an attractive feature of working in rural areas. On the other hand, wide scope of practice was experienced as a too demanding work environment due to the fact that it requires extensive skills, experience (Cosgrave et al. 2015) and collegial support is not always available to support care decisions (Beks et al. 2018). Mental healthcare was reported as a central field where nurses and physicians lacked experience. Because of fewer services available in the rural regions, mental health patients are sometimes managed by physicians. Due to being in the frontline care, they had to make initial assessments on mental health presentations even without the experience of the field, and it was considered that knowledge of mental health is needed. (Beks et al. 2018.) In addition to the high workload, the complexity of patients and the fact that healthcare professional may not have experience of treating, for example, mental health issues cause challenges for workload management (Cosgrave et al. 2015).

High autonomy requirement

Increased autonomy in rural care was on the one hand experienced as positive, on the other hand, it indicated a lack of professional support. Nurses need to make independent decisions and have more responsibilities in rural healthcare compared to urban care. This was found to result from the lack of physicians; nurses in rural care must take tasks which in urban care are responsibilities of physicians, although they do not have adequate skills. A nurse may be the only available healthcare professional and needs to take greater responsibility for care (Whiteing et al. 2021). However, Neprash et al. (2020) found no statistically significant difference between rural and urban nurses in the complexity of provided care, although rural nurses were found to have greater autonomy. More specifically, in rural care nurses are more often independently responsible for a patient´s treatment compared to urban care (59% vs. 53%), and the presence of a physician is less often needed (28% vs. 20%) (Neprash et al. 2020). Experience of having low control over the job and the complexity of the job were negatively associated with turnover intentions (Nei et al. 2015).

9.2.3 Professional support

Lack of professional support from colleagues and mentoring opportunities

In rural care, a lack of opportunities for mentoring and networking opportunities was identified (Burrows et al. 2019). Overall lack of colleagues resulted in feelings of professional isolation and lack of networking opportunities (Cosgrave et al. 2015). Healthcare professionals experienced insufficient consultation opportunities and would have needed more opportunities for cooperation (Weinhold & Gurtner 2014): professional support was needed for decision-making, especially in cases where there was a need for specialist knowledge. Working alone despite a lack of experience in rural care was experienced as challenging. Especially at an early stage of the career, peer support was needed in order to exchange ideas and to network (Cosgrave et al. 2018). In their literature review, Lai et al. (2018) examined which factors support and hamper the retention of Indigenous healthcare professionals. Collegial support and mentoring opportunity were identified as the most significant factors for retaining professionals. Shortage of healthcare professionals and lack of expertise led to lack of receiving professional support for care decisions (Jones et al. 2019, Paliadelis et al. 2012).

Meeting the education needs

Regarding education needs, in rural care there was a lack of opportunity for continuing education due to a limited number of substitutes and shortage of staff to cover during education (Burrows et al. 2019). If lack of substitutes prevented nurses from participating in training, it was questioned whether the organization supported professional development (Whiteing et al. 2021). In general practices with one general practitioner there were more difficulties in accessing education (Iversen et al. 2002). Education is seldom provided locally (Jones et al. 2019) and is arranged in a way that requires travelling (Beks et al. 2018), funding and is time-consuming (Burrows et al. 2019). Continuing education is needed in order to ensure patient care safety, nurses´ confidence in their competence (Burrows et al 2019) and to deliver evidence-based care which is up-to-date (Jones et al. 2019). For some general practitioners, continuous education was achieved through different patient cases and keeping up with the current knowledge independently (e.g. journals) (Iversen et al. 2002). Lack of possibility for continuing education, i.e. lack of opportunity to keep up with current knowledge, was experienced as reducing interest in staying in rural practice (Jones et al. 2019). Lack of graduate training programs was considered to be a challenge in recruiting new healthcare professionals entering rural care (Burrows et al. 2019).

It was noted that education has to take into account special characteristics of rural healthcare, for example the fact that physician is not always available for a nurse to consult. Also, while for urban nurses the education needs often concern a specialization area, rural nurses need an education that takes into account wide competence requirements (Kidd et al. 2012). Specialization in medical education leads to maldistribution of healthcare professionals (Weinhold & Gurtner 2014). Continuing learning for nurses is achieved through work-based learning in rural care and through formal learning in trainings (McCullogh et al. 2020). Although the importance of formal education was valued, work-based learning was

considered as more important in getting to know rural care (Whiteing et al. 2021) and nurses favoured education which enables active participation (Burrows et al. 2019).

Lack of professional development opportunities

From the viewpoint of recruitment, graduating nursing students indicated that high workloads, staff shortage and resulting lack of time for supporting staff´s professional development were central reasons why rural healthcare was not considered as appealing as urban healthcare (Jones et al. 2019). In addition to difficulties in recruiting healthcare personnel to regular positions, remote areas have difficulties in recruiting substitute staff. Shortage of substitutes poses a challenge for taking time off for trainings, which hampers the possibility for continuing professional development (Cosgrave et al. 2018, Jones et al. 2019) and moreover reduces interest in working in remote areas because the possibilities for professional development are narrow (Jones et al. 2019). Rural care was considered to provide fewer opportunities for gaining experience or possibilities for promotion (Wieland et al. 2021). This may be due to the fact that healthcare is centralized to urban areas, which leads to polarization of urban and rural care competence, and rural healthcare is seen as less attractive.

9.2.4 Limited possibilities for providing adequate care

Green et al. (2013) noted that professional-patient ratios, which are often used to describe the number of healthcare professionals in relation to the number of patients in a certain area, do not acknowledge what kind of care needs the patients have (i.e. whether the patients have multimorbidity or lower care needs), if care is accessed in a timely manner, or what kind of care is delivered.

Considering impacts for patient care, shortage of staff impacted negatively on long waiting times and crowding (Hansen et al. 2017), providing long-term care (Goins et al. 2005), limited choice options for patients (Goins et al. 2005) and lack of specialists (Goins et al. 2005). In rural healthcare, care is often fragmented due to difficulties in providing coordinated care (Weinhold & Gurtner 2014). There was a lack of time for treating patients. Shortage of staff may appear in allocating patients in accordance with healthcare professionals´ caseloads instead of considering which one of the professionals would be the most suitable relative to a patient´s care needs (Cosgrave et al. 2018). Due to practice crowding, general practices may be unable to accept new patients (Hansen et al. 2017). Difficulties in accessing primary care providers resulted in visiting emergency care for routine care (Martin-Misener et al. 2010). Long-term care relationships were often established with physician assistants, which from patients´ point of view, was considered hampering the quality of care (Goins et al. 2005).

9.3 Ways to mitigate medical desertification with organizational measures

Ways to mitigate medical desertification are presented in Table 4.

Category	Sub-category
Professional support	Possibilities for education
	Adequate remuneration
	Autonomy is supported
	The feeling of the importance of the work and work variety
	Leadership support
	Receiving collegial support
Changing the way the care is delivered	Distributing responsibilities from physicians to nurses
	Multiprofessional care
	Extended opening hours and walk-in care
	E-health

Table 4: The ways to mitigate medical desertification

9.3.1 Professional support

Possibilities for education

Due to wide competence areas in rural care, continuing education, which recognizes the special characteristics of rural care and expanded roles for nurses is needed (Mitton et al. 2011). In order to respond to continuing education needs, relocations from rural to urban care have been made. However, the working environment in urban care was considered to differ too much from rural care and was not experienced as beneficial (Kidd et al. 2012). Instead, visits made to similar facilities were considered beneficial (McFarlane et al. 2018).

In order to meet education needs in rural care, digital education has been found to be useful. Through digital education, the competence of rural health professionals is maintained (Burrows et al. 2019). Digital education can be provided regardless of geographic location (Burrows et al. 2019) and can be carried out independently by the healthcare professional or interactively (Mitton et al. 2011). The simulated practice was experienced to be useful to maintain skills that are required only rarely (Whiteing et al. 2021). Also, education programs that have provided lectures remotely, and workshops and seminars locally, have been found to be not only cost-effective but also successful in healthcare professionals´ opinions (Mitton et al. 2011). Digital education provides continuing education despite remote locations (Dussault & Franceschini 2006) and the opportunity to access flexible education (Ramsden et al. 2021). Because digital education can be provided simultaneously for several healthcare professionals (Ramsden et al. 2021), it can facilitate professional collaboration (Dussault & Franceschini 2006), provide up-to-date evidence-based information, peer support and reduce feelings of isolation (Ramsden et al. 2021). If there are changes implemented in the practice and new knowledge and skills are required, digital education provides a way of keeping up with changing requirements (Ramsden et al. 2021). For example, regarding education in

mental health, Ramsden et al. (2021) found that healthcare professionals were more confident in their competence after they had carried out digital education. It should be noted that according to Jones et al. (2019) older nurses are not as comfortable with digital education as younger nurses.

Adequate remuneration

Adequate remuneration in relation to the workload was identified as essential in recruiting healthcare professionals (Asghari et al. 2020). The low salary was found as a discouraging factor for working in rural care (Dussault & Franceschini 2006) and resulted in relocating to facilities with better remuneration (Lai et al. 2018). However, it should be noted that remuneration issues are often related to a lack of resources in healthcare in general (Dussault & Franceschini 2006). Although low salary may cause dissatisfaction with the job, increased salary does not necessarily compensate sources of dissatisfaction, e.g. high workload (Marchand & Peckham 2017).

Autonomy is supported

Although high responsibilities in rural practice were considered challenging, autonomy in work was also valued, and influenced positively for retaining professionals in rural practice (Humphreys et al. 2001). Autonomy is associated with increased job satisfaction (Marchand & Peckham 2017). Autonomy appeared in work flexibility; healthcare professionals have an opportunity to affect, for example, working hours and call schedules (Asghari et al. 2020).

The feeling of the importance of the work and work variety

Feelings of making a difference, being excited about challenging cases (Wieland et al. 2021), work being rewarding (Cosgrave et al. 2015), feeling of doing significant work and variety of work (Humphreys et al. 2001) were one of the attributes of healthcare professionals who were keen on working in rural care. Recognition of accomplishments was associated with increased job satisfaction and improved retention of healthcare professionals (Lai et al. 2018).

Leadership support

The importance of leadership was emphasized in supporting healthcare professionals to retain them in rural care. Leadership has an important role in relation to whether nurses stay or leave their position. Trust in management and experience of leadership support, e.g. receiving recognition of one´s accomplishments and involving employees in decision-making, are positively associated with intention to stay at work. On the contrary, dissatisfaction with leadership support was associated with the intention to leave (Cowden et al. 2011). Appreciation from leaders was considered important (Dussault & Franceschini 2006). Jones et al. (2019) noted that if the practice was a part of a larger district, leaders did not necessarily understand specific features related to rural care, i.e. the decision making was too distant from the realities of rural context, which led to frustration among healthcare professionals. McCullogh et al. (2020) found similar results; leaders may have an unrealistic conception of what can be accomplished with the resources in rural practices. For example, a new model of care was introduced although there was a lack of adequate staff to implement new practices

or rural leaders were not consulted in the decision-making (Paliadelis et al. 2012). Some rural nurses had a feeling that, within the organization, there was a lack of support from leaders, and they did not have a proper understanding of the nursing role – this was especially the case for higher managers (Lenthall et al. 2018). Due to the high workload and resulting stress, healthcare professionals expected understanding from management (Cosgrave et al. 2015). Cosgrave et al. (2015) noted that it is leaders´ responsibility to support professional development and networking opportunities despite the rural environment.

Receiving collegial support

In order to manage high workloads, stress (Cosgrave et al. 2015) and emotional fatigue (Lai et al. 2018) collegial support was considered essential. Good team cohesion decreases nurses´ intention to leave work (Nei et al. 2015). Collegial support appeared in good orientation, peer support and support in decision-making (Wieland et al. 2021). Collegial support especially from more experienced professionals was valued (Jones et al. 2019). Having discipline-specific collegial support was considered important for mental health professionals, while it should be noted that arranging collegial support for specific disciplines is challenging due to the overall lack of healthcare professionals in rural practices (Cosgrave et al. 2015). Collegial support was also gained through education sessions (Burrows et al. 2019), which supports the need for continuous education.

9.3.2 Changing the way care is delivered

Distributing responsibilities from physicians to nurses

In many practices, care responsibilities have been transferred to nurses. Having a nurse available improves access to care (Haggerty et al. 2015) because more health services are available (Dussault & Franceschini 2006) and consulting a physician is not the only care option for patients (Burrows et al. 2019). Also, when nurses gain more autonomy, it increases the attractiveness of rural nursing (Burrows et al. 2019). It should be noted that increasing nurse autonomy may have some challenges: physicians' reluctance to transfer responsibilities from physicians to nurses and traditional view of a nurse´s role are in conflict with what physicians and patients think (Dussault & Franceschini 2006, Jones et al. 2019). Also, actually it is often nurses themselves who are resistant to the idea of reshaping nursing roles (Lauder et al. 2003). In the study of Whiteing et al. (2021), nurses indicated that some of the duties of rural nurses are in "grey areas" and should not be the responsibility of nurses. Nurses may not be willing to make treatment decisions and rely on consulting physicians. Physicians consider that they are sometimes consulted unnecessarily in cases where a nurse should have competence in managing care independently (Sullivan et al. 2008). Some patients experience that care cannot be provided by only physician assistants, instead physician care is also needed (Goins et al. 2005). Nurses have been given the responsibility of being the first point of contact, where physicians have more of a supporting role (Lauder et al. 2003). It has been found that care provided by nurses can have similar outcomes as care provided by physicians, and patient satisfaction can be increased (Lauder et al. 2003). Nurses can manage, for example, the following responsibilities: physical examinations, performing and interpreting tests, prescribing medication, managing and diagnosing chronic and acute health conditions, disease prevention, health promotion (Lauder et al. 2003), coordinating care for patients with

chronic conditions (Mitton et al. 2011) and social and mental health (Martin-Misener et al. 2010). MacLean et al. (2014) noted that in some states the regulations restrict which services can be provided by nurses and physician assistants considering their education. This challenges the redistribution of responsibilities, and hampers access to care where there is a lack of physicians available. If responsibilities are transferred to nurses, fewer physicians are required in rural areas. The role of nurses was considered to be in health prevention and promotion, while physicians were responsible for the treatment (Martin-Misener et al. 2010). McCullogh et al. (2020) note that sometimes nurses have to take on responsibilities of physicians due to lack of physicians, in spite of not having adequate competence. Sullivan et al. (2008) noted that the number of nurses does not decrease as much as the number of other healthcare professionals when moving from urban to rural care, which supports the possibility of increasing nurse responsibility.

Multiprofessional care

In rural care there may be a lack of healthcare professionals in the first place or a lack of variety in professionals (i.e. only nurses' services are available or there is a lack of mental health professionals). This causes difficulties in providing multi-professional care (Jones et al. 2019). Multiprofessional teams in primary care both attract and improve retention of general practitioners in rural areas, a finding which suggests that through providing multiprofessional care, geographical inequalities of physicians´ services can be reduced (Chevillard et al. 2019, Chevillard et al. 2021). When the delivery of care is shared, it may have a positive impact on the work flexibility in rural care (Danish et al. 2019). Multiprofessional care was considered important due to not only professional support but also positive outcomes for patient care and access to care (MacLean et al. 2014). When patient care is distributed to multiprofessional teams, this enables improvements in consultation practices, professional development, makes working conditions more flexible (Danish et al. 2019), e.g. there is time for education (Russell & Humphreys 2016), and increases effective use of resources (Fitzpatrick et al. 2018). Professional development was achieved, for example, when working in multiprofessional teams, physicians gained knowledge of mental illness and mental health professionals of physical health conditions (Fitzpatrick et al. 2018) and professionals got a better understanding of the content of other professionals´ work (MacLean et al. 2014). Through multiprofessional care, coordination of care improves when healthcare professionals make and carry through care plans together (Fitzpatrick et al. 2018). Multiprofessional care can also be improved by recruiting visiting professionals (Lenthal et al. 2018). Organizational barriers for multiprofessional working have been identified to originate from lack of time for discussing the patient cases collaboratively, lack of clarity of professional roles and ineffective communication (MacLean et al. 2014).

E-health

E-health services provide a more flexible way for patients to receive care. First-contact access can be improved by providing e-health services, which are accessible also out-of-hours (Haggerty et al. 2015). E-health reduces the need for face-to-face consultations and patients do not have to travel long distances (Mitton et al. 2011). In remote consultations, a patient can, for example, send information and pictures of symptoms and a healthcare professional

provides details of adequate treatment (MacLean et al. 2014). Patients can also access their care-related information (MacLean et al. 2014), use applications for communicating with a healthcare professional and receive patient education (Danish et al. 2017). For example, patients with diabetes have been found to benefit from e-health in managing diabetes. The use of self-tracking tools and virtual visits have been found to have similar or even more effective outcomes than traditional controls. (Barbosa et al. 2021.) For healthcare professionals, the use of e-health releases resources (Mitton et al. 2011). Electronic health records allow healthcare professionals to record information related to a patient´s care and the information is accessible for also other professionals participating in the care. Thus, through e-health, continuity of care can be improved. However, it should be noted that information sharing is possible only in cases where a common electronic health record is used in the practice. (Green et al. 2013.)

Extended opening hours and walk-in care

Access to care can be improved by providing walk-in care and extended opening hours. However, availability of walk-in care on weekends did not seem to have an effect on accessibility, while the association was found when walk-in care was available on evenings (Haggerty et al. 2015). Also, Haggerty et al. (2015) argued that statistically significant improvement in access to care was achieved for each additional opening hour if hours of opening were over 55 hours.

10. Conclusions

In this review, we have aimed at exploring the state of the art of medical deserts in Europe. Secondly, we have made a review from scientific journals of the determinants of medical deserts and ways to mitigate medical deserts with a focus on organizational factors.

In regard to medical desertification, the conclusion is that the present statistics or other comparable data do not support the analysis of desertification. So far, there are only rough indicators, showing the differences between countries, such as the number of medical doctors or nurses per inhabitant, level of unmet needs or waiting times to services. Also, there is some information on the socio-economic differences in unmet care needs. These indicators are able to give a picture of whole countries, but not to describe the different areas inside countries. Some countries, such as France, have developed indicators to describe medical deserts inside countries, but there are no Europe-wide comparisons available. Although indicators describing medical deserts exist, they are described in grey literature, or the studies are not in English. Also, there is no shared understanding among public health authorities and researchers of the definition for medically underserved areas. Thus, it is difficult to comprehensively identify work conducted regarding medical desertification.

In the review, in both the determinants and ways to mitigate medical deserts, we have focused on factors relating to the practice or organization (such as the size of practice, service models, stress, eHealth) and service systems. These include also work environment and care integration.

Most of the studies had an emphasis on rural areas, although medical deserts and the determinants may exist also in densely populated areas. Especially regarding organizational factors, issues of medical desertification often exist both in rural and urban areas. What was obvious is that the review could cover only a part of the studies. There is plenty of research relating to work organization, stress and turnover intentions, multi-professional care and care integration as well as eHealth. But this research has not been done from the point of view of medical desertification. For example, in developing care integration or eHealth, the focus is usually on the patient, such as care quality or waiting times. The studies analysing the effects of these factors on employees are rare. It was not, however, possible to cover all these articles in this review. It seems that through the used search strategy, it was not possible to identify as wide a range of studies pertaining to organizational factors as pursued. For example, in order to identify specifically how it is possible, through eHealth, to mitigate medical desertification, terms related to eHealth as part of the search strategy should have been included. However, a more comprehensive search strategy was used in line with scoping review methodology.

The determinants of medical desertification with organizational perspective were classified to factors relating to work organization and stress, competence requirements, professional support and limited possibilities for providing adequate care. Shortage of healthcare professionals appeared in high workloads and unclarity in professional roles for the existing staff, resulting in feelings of stress. Staff shortage resulted also in a lack of professionals' support and wide competence requirements, which was experienced on the one hand as problematic, but on the other as a motivating factor for rural working. The focus in studies on medical deserts has been in rural areas. In these areas, professional requirements and job demand in practices may significantly differ from those in cities. In rural areas both GPs and nurses have to work alone without possibilities to consult other professionals. Autonomy at work is traditionally considered as a resource in regard to work stress or job satisfaction. Still, without social support autonomy may turn into excessive responsibility. It was noted that a shortage of staff sometimes results in a lack of possibilities for taking part in training, although it would be important to provide continuing education in relation to the specific requirements of rural care. Lack of time for caring for patients was considered problematic.

The ways to mitigate medical desertification with organizational measures were classified as professional support and changing the way the care is delivered. Possibilities for education emphasized the importance of acknowledging the competence requirements or rural care, and trainings provided remotely were considered beneficial. Adequate remuneration, supporting professional autonomy and feeling of the importance of one´s work, were identified as important in retaining healthcare professionals in rural healthcare, which can be enhanced by the support received from managers and colleagues. The theme "changing the way care is delivered" is constituted of four sub-themes. Distributing responsibilities from physicians to nurses has been used for increasing nurse autonomy, and nurses can, for example, be in charge of the first point of contact care. Multiprofessionalism not only has benefits for patient care but also acts as a way of improving professional development. Multiprofessional teams are one of the developments originally aimed at care quality,

efficiency and better coordination of care of clients with multiple health and social problems. There is, however, also growing evidence of positive employee outcomes. Similarly, e-health has both patient benefits through providing access to care (when face-to-face consultations are not required) and coordination of care from the viewpoint of healthcare professionals. Different eHealth solutions may dramatically change the accessibility of care. During the Covid-pandemics, digital services have increased sharply. In rural areas, digital services can be used for education, remote consultation and actual appointments. In analysing medical deserts, digital services must be taken into account. Even if physical GP's appointment is located far away, many health problems can be treated remotely. Extending opening hours and providing walk-in care were identified as ways for increasing access to care.

The ways to mitigate medical desertification partly answer to the determinants. It was, however, not possible to give an answer to the question, how did the ways to mitigate answer to each determinant. It is typical that a way to mitigate medical desertification answers several problems.

There are several ways to decrease the stress levels and to increase job satisfaction of health workforce in rural areas as well as in cities. In many countries, nurses have more responsibility at patient care among chronic patients, and in many countries, they act as a first contact person, and more often are able to treat the patient independently – or with GP's short consultation.

There are many ways to alleviate medical desertification in health care practices and locally. Planning the health (and social) services requires up to date information. So far, information has been rather weak in Europe. Planning the services requires information on health workforce and accessibility of care not only at the national level but also at subnational level. Fostering the development to obtain subnational information is absolutely essential. It is also important to increase research on different ways to organize services, task shifting, care integration and eHealth from the point of view of employees. And, finally, local service models or eHealth solutions do not necessarily work in different environments and service systems. More information is needed on the service systems in Europe.

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Promoting evidence-based reforms on medical deserts

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