



WP7. Case studies on medical deserts

D7.1: Case study report

Project title	A Roadmap OUT of mEdical deserts into supportive Health WorkForce initiatives and policies		
Acronym	ROUTE-HWF		
Grant agreement number	101018379		
Call identifier	HP-PJ-2020-2		
Topic	PJ-01-2020-2 Support to reforms in health workforce field - Initiatives on medical deserts (Heading 1.2.1.1 of the AWP 2020)		
Starting date	01/03/2021	Duration in months	M36
Work package	WP7 – Case studies on medical deserts		
Submission date	6/12/2023	Dissemination level	Public



Co-funded by
the Health Programme
of the European Union

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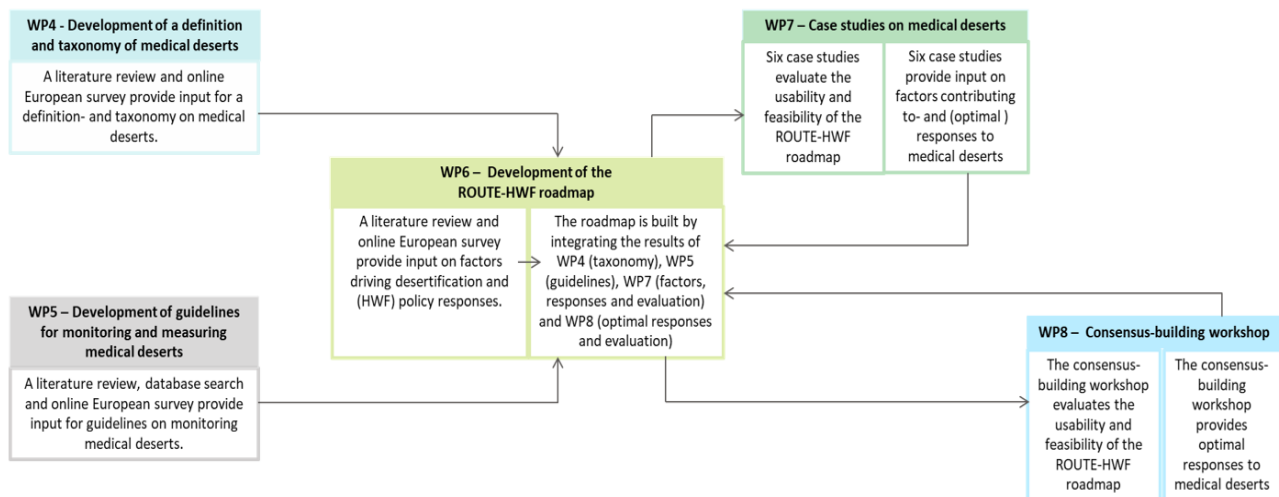
Introduction

Objective

The general objective of this report is to provide an in-depth overview of factors driving desertification, health workforce (HWF) policy responses and approaches to medical deserts in six selected countries: The Netherlands, Spain, Poland, Croatia, Germany and Ireland.

Together with the measuring and monitoring guidelines (WP5) and the definition and taxonomy (WP4), the case study report aims to feed into the creation of the 'ROUTE-HWF Roadmap out of medical deserts' (WP6), as well as to evaluate its applicability and usability. Figure 1. shows the interplay between the [ROUTE-HWF Project](#) activities.

Figure 1. The interplay between the ROUTE-HWF Project Work Packages



Source: ROUTE-HWF Project proposal and Grant Agreement

Methods

For the case studies a dedicated protocol and template were developed, based on the outcomes of other activities of the ROUTE-HWF project, being the results of a literature review (Flinterman et al. 2023), information from the ROUTE-HWF Questionnaires, and reports from national stakeholders' workshops. All six case studies were conducted according to a case study protocol, ensuring cross-country comparison. Each case study was developed via an iterative approach with a mixture of methods and data sources. The following activities have been completed:

1. Development of case study protocol and template.
2. Selection of the six countries for case-studies according to the pre-defined criteria.
3. Analysis of information from the European ROUTE-HWF questionnaires of the included countries.
4. Collection of a preliminary information through desk research.

5. Preparation of a draft version of individual case-study.
6. Identification of the country informants.
7. Development of the interview guide for consultation with country informants.
8. Conducting interviews/consultations with country informants.
9. Reviewing the case-study description according to the information and new sources indicated by country informants.
10. Preparation of the final report from all six case-studies (deliverable D.7.1).

Based on the defined criteria, including diversity in geographic area, population characteristics, economic status, and a variety of factors driving medical deserts and policy responses, six European countries were selected (including four project's partner's countries): **the Netherlands, Spain, Poland, Croatia, Germany and Ireland.**

In the initial phase of our research, we conducted **a literature review** for each country, including scientific papers, and national documents/strategies, reports and regulations, alongside a quantitative analysis of data obtained from both national and international databases. The main sources of statistical data were as follows: Eurostat Health Statistics, OECD Reports, WHO European Observatory on Health Systems and Policies, European Commission and European projects on the health workforce.

The qualitative component included **interview/consultations with national experts (country informants)**. The country informants were selected via purposive sampling based on their experience and knowledge of policies related to health workforce and medical deserts. Informants were selected for an interview based on their knowledge/experience of the topic. The participants were recruited through telephone or email contact. Each informant received an email invitation, explaining a brief overview of the study and the research objectives. During the interview, the preliminary results (draft version of the case -study) were discussed and reviewed. Similar questions were repeated for all respondents, but the scope of the questions varied depending on the expert's profile and the context of each case study. The consultation was based on the **interview guide** containing the following questions:

1. *Can you provide general comments on the draft version of the case study on medical deserts in your country, e.g.: Are there any other sources of information not used in our draft document that are important for the topic of medical deserts in your country?*
2. *Can you comment on the applicability of the ROUTHE-HWF Project approach to defining and measuring medical deserts (taxonomy based on four objects)?*
3. *Can you comment on the list of factors contributing to medical deserts and solutions to mitigate them described in the draft document:*
 - *Are there any other factors, not described in our draft document that are applicable to your country/ region and that contribute to the creation and maintenance of medical deserts?*

- *Can you comment on our list of policies that we found in the literature (and other sources) that were implemented to mitigate or eliminate medical deserts in your country? In your opinion in what extend these policies are effective?*
 - *Can you help us map factors contributing to medical deserts and solutions to mitigate them – per identified type of medical desert?*
4. *Are there any other approaches/policies implemented to mitigate medical deserts in your country/region? What contributes to policies successes in mitigating medical deserts?*

After consultations with country informants (conducted between April and July 2023), the material has been expanded according to the new information and additional sources. This report (D.7.1) presents all six ROUTE-HWF case studies. According to our case-study protocol, each case-study consists of the following parts:

- A short description of the geographical and socio-demographic characteristics of the country and its regions;
- A short description of the health system organization and financing;
- A short description of the HWF trends in the country and its regions;
- Results of the application of the ROUTE-HWF definition and taxonomy on the country and identification of different types of medical desert in the country;
- Factors contributing to medical desert;
- HWF policies and approaches to mitigate medical deserts;
- Analysis of successful and sustainable HWF policies in medical deserts
- Evaluation of the applicability of the ROUTE-HWF roadmap in the particular national / regional context.

It should be noted that the version of the taxonomy that was tested and evaluated in our case studies (D.4.2) is not the final version. According to the project methodology, the final version of ROUTE-HWF Definition and Taxonomy (D.4.3); ROUTE-HWF Guidelines (D.5.3); and ROUTE-HWF Roadmap (D.6.3) will be completed after gathering information from the case studies and further project activities.

Acknowledgements

We would like to express our gratitude to the numerous national experts for their input in developing this report. These include respondents to the ROUTE-HWF Questionnaire, participants of the national stakeholders' workshop on medical deserts, and the country informants involved in the case study report consultations.

1. The Netherlands

1.1. General country context

1.1.1. Geography and socio-demographic characteristics of the country and its regions

The Netherlands is located in Western Europe¹. The country is for the most part flat and has five inhabited islands in the north. With an area of 41,543 km² (of which almost 20% is water), it is a relatively small, but densely populated country. In 2019, the Netherlands had a total population of 17.3 million and the population density ratio of 507.3 persons per km² (Eurostat 2022). Administratively the country is divided into 12 provinces (Figure 1).

Figure 1. Provinces in the Netherlands

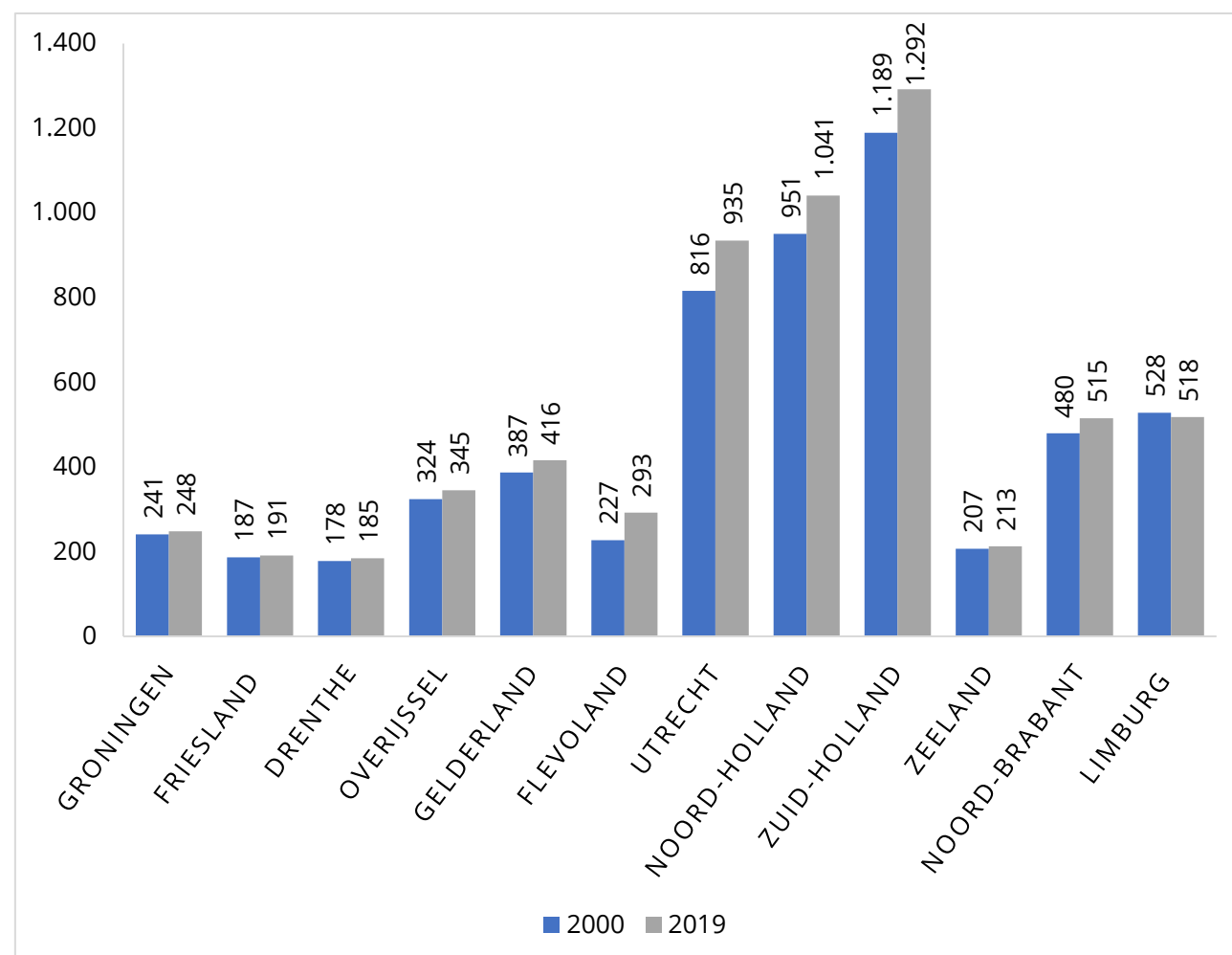


Source: based on www.mapchart.net

¹ A number of overseas territories in the Caribbean (Bonaire, Sint Eustatius, Saba) are also municipalities of the Netherlands.

In 2019, the population density ranged regionally from 184.5 per km² in Drenthe to 1292.2 in Zuid-Holland (Eurostat 2022). In the majority of the provinces, the population density increased within the last two decades (Figure 2).

Figure 2. Population density per provinces in 2000 and 2019 (persons per km²)



Source: based on Eurostat 2022

In 2021, the median age of the population in the Netherlands was 42.7 years while the share of population aged 65 years and over was 19.8% (both ratios were slightly below the EU-27 averages of 44.1 years and 20.8% respectively). The share of population aged 65 years and over ranged across provinces from 14.5% in Flevoland to 24.3% in Limburg. (Eurostat 2022)

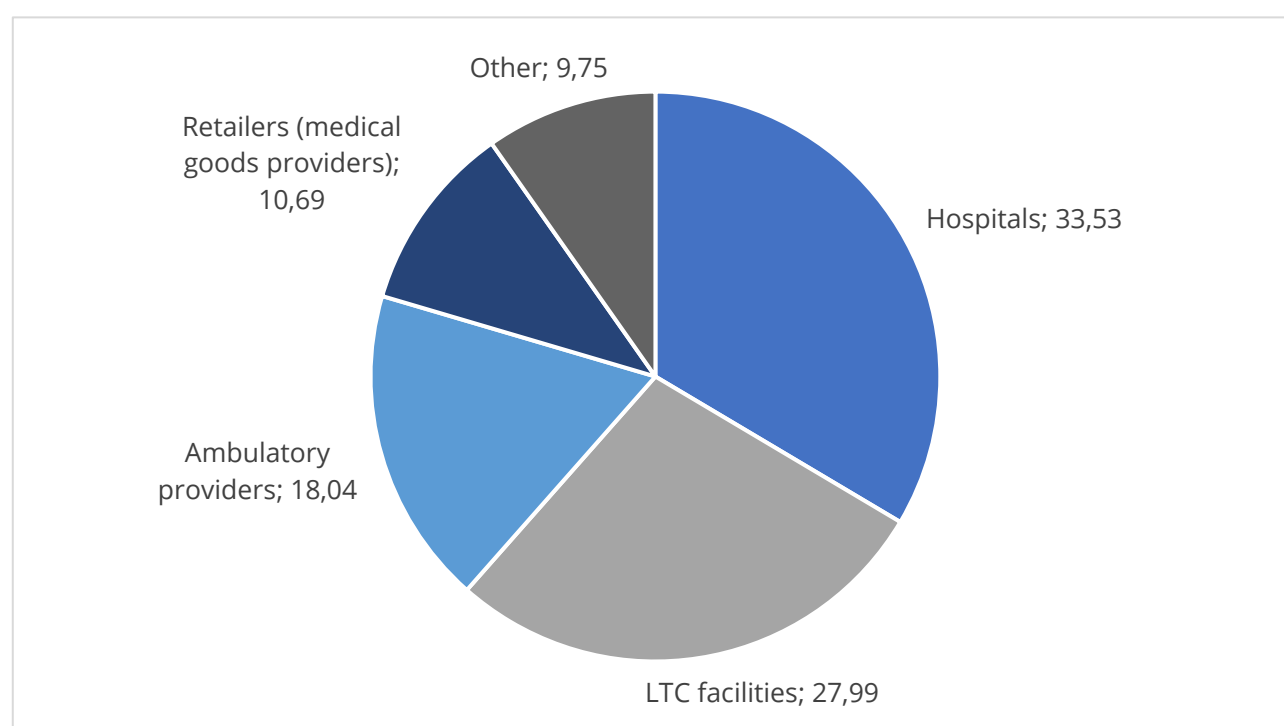
1.1.2. Health system organization and financing

The health system in the Netherlands is based on a three separate coverage schemes: two social health insurance systems (for curative care administered by competing insurers and long-term care carried out by the insurer dominating in the region), and tax-funded social care system

implemented by municipalities. All three schemes are controlled and inspected by the government and together provide a **broad coverage** as every citizen has a mandatory health insurance (OECD/European Observatory on Health Systems and Policies, 2021).

In 2020, the country spent 11.14% of its GDP on health. Per capita the **health spending** was at the level of 5,108 Euros, which was above the EU-27 average of 3,269 Euros (Eurostat, 2022). In the country approx. 33.5% of the current health expenditures is spend on hospitals, 28.0% on long-term care, and 18% on ambulatory care providers (Figure 3). Spending on long-term care is one of the highest in Europe.

Figure 3. Share of different types of providers in total current health expenditures (2019)



Source: based on Eurostat 2022

In terms of the **health system governance**, the national government has overall responsibility for setting health system priorities and monitoring the access to health services, their quality and costs. The municipalities are responsible to organize social support including long-term care, while numerous responsibilities related to direct supervision and management of the health system are delegated to independent bodies/agencies (Wammes et al., 2020). For example, the Dutch Health Care Authority ([*Nederlandse Zorgautoriteit*](#)) is responsible for ensuring that the markets for health insurance, purchasing, and care delivery function properly, while the Health and Youth Care Inspectorate ([*Inspectie Gezondheidszorg en Jeugd*](#)) monitors the quality and safety of health services.

The level of **unmet health needs** is low. In 2020 only 0.2% of population above 16 years old reported unmet needs for medical examination, due to the reasons that this is “too expensive”

or the service is “too far to travel or has waiting lists”. The average for the EU-27 was 1.8% (Eurostat, 2022).

1.1.3. Overall picture of the HWF trends in the country and its regions

In 2020, there were on average 383.4 practicing medical doctors per 100,000 inhabitants, yet the ratio varied between the 12 provinces from 130.5 in Flevoland to 613.5 in Utrecht (Table 1, Figure 5). The differences between the provinces, and hence the regional disparities in the supply of medical doctors, has increased. The province of Utrecht, with the highest ratio of medical doctors, also experienced the highest increase in the medical doctor to population ratio (+62%) over the last 20 years. Flevoland on the contrary, was the only province where the number of practicing medical doctors decreased within the last two decades while at the country level this ratio increased by 57% between 2000 and 2020 (Table 1). In the same period, the number of medical studies graduates (medical doctors) per 100,000 inhabitants increased from 8.9 to 14.3, an increase by 61% (Eurostat, 2022). Yet, the age structure of the physician population shows unfavorable trends: in 2020, 24.4% of physicians was above 54 years old while in 2000 it was only 13.7% (Eurostat, 2020).

Table 1. Medical doctors per 100,000 inhabitants across provinces

GEO/TIME	2000	2005	2010	2015	2020	2020/2000
NETHERLANDS	244.28	270.75	296.36	348.72	383.4	+56.95%
Groningen	351.77	395.96	429.52	512.65	558.15	+58.67%
Fryslân	171.63	195.30	197.28	221.00	243.40	+41.82%
Drenthe	221.54	233.30	240.84	270.36	297.76	+34.40%
Overijssel	184.76	204.77	214.41	251.56	275.38	+49.05%
Gelderland	236.51	265.88	297.73	345.16	382.18	+61.59%
Flevoland	133.72	134.96	129.77	128.81	130.49	-2.42%
Utrecht	366.69	405.81	453.12	537.29	613.54	+67.32%
Noord-Holland	320.09	353.11	389.47	468.24	495.43	+54.78%
Zuid-Holland	239.82	264.24	290.68	339.20	377.93	+57.59%
Zeeland	142.75	145.23	146.28	154.34	165.59	+16.00%
Noord-Brabant	173.15	190.58	207.42	246.02	271.02	+56.52%
Limburg	233.46	259.54	287.26	335.24	362.07	+55.09%

Source: Eurostat 2022

As part of the medical doctor population, there was also an increase in the number of general practitioners (GPs) in the Netherlands: in 2020, there were 91.3 GPs per 100,000 inhabitants to only 61.4 in 2000 and 73.0 in 2010.

In 2020, there were 1,019.1 practicing nurses and midwives per 100,000 inhabitants. Per region, the ratio varied from 797.9 in Noord-Holland to 1,400.7 in Drenthe (Table 2b). The former was

the only province where the number of nurses and midwives per population decreases within the last five years (2015-2020) (Statistics Netherlands 2023). Here, other provinces have the highest and lowest provider to population than in the case of medical doctors to population ratio (Table 2b). In the previous period (2000 – 2013), based on Eurostat data, the number of nurses and midwives per population increased in all regions (Table 2a).

Table 2a. Number of nurses and midwives per 100,000 inhabitants across provinces (2000, 2005, 2010 and 2013)

GEO/TIME	2000	2005	2010	2013	2013/2000
NETHERLANDS	1,040.72	1,151.69	1,195.46	1,222.97	+17.51%
Groningen	1,130.07	1,307.96	1,406.93	1,447.40	+28.08%
Fryslân	1,121.88	1,328.19	1,364.42	1,409.86	+25.67%
Drenthe	1,262.29	1,432.04	1,537.06	1,620.58	+28.38%
Overijssel	1,059.20	1,209.20	1,262.80	1,352.67	+27.71%
Gelderland	1,122.62	1,244.26	1,306.82	1,341.85	+19.53%
Flevoland	919.30	999.30	1,047.64	1,089.02	+18.46%
Utrecht	1,132.60	1,214.63	1,230.76	1,238.83	+9.38%
Noord-Holland	952.12	1,022.34	1,030.68	1,025.05	+7.66%
Zuid-Holland	897.42	975.82	1,000.01	1,021.82	+13.86%
Zeeland	1,104.73	1,235.26	1,330.38	1,390.58	+25.88%
Noord-Brabant	1,095.51	1,204.81	1,258.99	1,282.59	+17.08%
Limburg	1,111.71	1,244.36	1,313.84	1,349.39	+21.38%

Source: Eurostat 2022

Table 2b. Number of nurses and midwives per 100,000 inhabitants across provinces (2015 and 2020)

GEO/TIME	2015	2020	2020/2015
NETHERLANDS	975.52	1,019.12	+4.47%
Groningen	1,174.77	1,338.19	+13.91%
Fryslân	1,106.37	1,256.24	+13.55%
Drenthe	1,273.09	1,400.70	+10.02%
Overijssel	1,095.43	1,229.78	+12.26%
Gelderland	888.52	927.85	+4.43%
Flevoland	1,065.84	1,119.15	+5.00%
Utrecht	962.75	968.75	+0.62%
Noord-Holland	813.74	797.87	-1.95%
Zuid-Holland	852.08	883.46	+3.68%
Zeeland	1,112.35	1,187.78	+6.78%
Noord-Brabant	1,010.15	1,032.40	+2.20%
Limburg	1,098.90	1,167.20	+6.22%

Source: Statistics Netherlands (Statline.nl)

In the Netherlands, nursing attracts more candidates to the profession than in other European countries (OECD/European Observatory on Health Systems and Policies, 2021). Within the last two decades (2000 – 2020) the number of nurse graduates per 100,000 inhabitants increased from 28.5 to 60.0 for nurses and from 15.3 to 25.5 for nursing professionals (increase by 110% and 67% respectively) (Eurostat 2022).

In case of the remaining medical professionals, in 2020 there were 49.9 practicing dentists and 30 practicing pharmacists per 100,000 inhabitants with visible regional variations (Table 3; Statistics Netherlands, 2023). The province of Groningen appears to have the highest ration of dentists and pharmacists per population, while Zeeland has the lowest ratio for both occupations. Again, we see another pattern of regional differences in provider to population ratio, compared to the previous ratios shown for nurses/midwives and medical doctors. The number of graduates per 100,000 inhabitants in case of both professions has fluctuated within the last decade: from 1.52 in 2010, to 1.01 in 2014 and 1.43 in 2020 for dentists and from 0.85 in 2010, to 1.42 in 2014 and 0.97 in 2020 for pharmacists (Eurostat, 2023).

Table 3. Number of dentists and pharmacists per 100,000 inhabitants across provinces (2015 and 2020)

GEO/TIME	Dentists			Pharmacists		
	2015	2020	2020/2015	2015	2020	2020/2015
NETHERLANDS	48.93	48.92	-0.04%	30.35	29.90	-1.49%
Groningen	69.36	67.42	-2.79%	42.81	44.38	+3.66%
Fryslân	39.46	34.62	-12.27%	20.12	20.77	+3.25%
Drenthe	38.89	38.49	-1.03%	28.65	35.45	+23.71%
Overijssel	36.38	38.71	+6.40%	26.74	27.53	+2.95%
Flevoland	28.62	27.19	-5.02%	17.42	16.55	-5.02%
Gelderland	52.30	52.97	+1.28%	25.41	24.21	-4.73%
Utrecht	56.98	55.36	-2.85%	75.98	74.55	-1.88%
Noord-Holland	76.21	74.67	-2.03%	30.23	27.96	-7.53%
Zuid-Holland	41.67	42.87	+2.89%	27.92	28.45	+1.90%
Zeeland	27.58	27.38	-0.72%	11.82	9.13	-22.78%
Noord-Brabant	39.18	40.58	+3.58%	24.71	23.02	-6.84%
Limburg	38.02	35.80	-5.82%	18.78	18.35	-2.32%

Source: Statistics Netherlands (Statline.nl)

1.2. Types of medical deserts in the country and factors driving desertification

1.2.1. Definition and examples

There is **no formal definition** of the term ‘medical deserts’ in the Netherlands. The national experts refer to the following terms that are close to the definition of medical deserts: shrinking or depopulating area (*'krimpegebied'*), potentially depopulating area (*'anticipeergebied'*) and labour market shortages area (areas with *'personeelstekort'*). More directly related to health care, areas with GPs shortages are specifically termed (areas with *'huisartsentekorten'*). The first two terms were formally introduced by the government, as areas with the strongest population decline (projected as: decline by 12.5% or 2.5% of the population by the year 2040 for shrinking and anticipatory areas respectively; [Rijksoverheid 2014](#)). In 2018, nine (out of 350) municipalities were classified as shrinking areas, and 11 as potentially depopulating (anticipatory) ones ([Rijksoverheid 2018](#)).

Within a broader health system perspective, medical deserts can be defined as areas where imbalances exist between low medical care supply and high demand. In the Netherlands they are mostly located on the peripheries, with lower population density and lower access to health care services. In general, even though there is no (large) national physicians shortage overall, there are severe regional imbalances. Especially **rural areas and depopulating regions** (mostly located along the Dutch border) the GP to population ratio is relatively low, and **shortages are expected to grow** in the years to come (Batenburg et al. 2018; Van Hassel et al 2019; Flinterman, 2023). The experts consulted for this case study report selected Zeeland and Fryslân as provinces that the most prominent examples of medical deserts.

1.2.2. Application of the ROUTE-HWF taxonomy to identify and measure medical deserts

The [ROUTE-HWF Project](#) approach to define and measure medical deserts (see the Deliverables 4.2. and 5.2) is based on a set of four objects/elements: Two that address the level of health care demand and two that address the health care supply in a given area. These demand-related objects are indicated by (1) % of population 65+ and (2) economic resources of the population, while the supply-related objects are indicated by (3) travel times to public health facilities and (4) population-provider ratio. These four indications are measured in terms of the relative value for a certain area, being either above or below the country average. Combining these four dichotomous variables, the framework results in five exclusive types of medical deserts, where at least three of the four objects of a medical desert apply (Table 4).

Table 4. The [ROUTHE-HWF Project](#) taxonomy, defining five exclusive types of medical deserts

Type of medical desert	POPULATION AND HEALTHCARE DEMAND OBJECTS		AREA AND HEALTHCARE SUPPLY OBJECTS	
	Object 1: Percentage population aged 65 and over <i>The proportion of inhabitants aged 65 and over living in this area, is <u>higher</u> than the proportion of all inhabitants in a country living in this area</i>	Object 2: Economic resources of the population <i>The proportion of inhabitants below the poverty line living in this area, is <u>higher</u> than the proportion of all inhabitants in a country living in this area</i>	Object 3: Travel time to health facilities <i>The percentage of the population that lives within 15 minutes by car from a hospital in this area is <u>smaller</u> than the average percentage at the national level of the country</i>	Object 4: Population-provider ratio <i>The proportion of health professionals working in this area, is <u>lower</u> than the proportion of all inhabitants in a country living in this area</i>
↓				
1	x	x	x	x
2	x	x	x	
3	x	x		x
4	x		x	x
5		x	x	x

Source: Deliverable 4.2. Second version of a definition and taxonomy on medical deserts.

The application of the [ROUTHE-HWF Project](#) taxonomy for the Netherlands, using Eurostat data at the NUTS-2 (i.e., province level), results in the identification of four provinces as medical deserts (Table 5). These include: Fryslân, where the value of all four objects (i.e., medical dimensions) is more disadvantaged than the country average (marked in red), and three provinces where three out of four objects show disadvantaged values (marked in red): Groningen, Drenthe and Zeeland. In terms of our taxonomy, Fryslân is medical deserts type 1; Groningen – medical desert type 2, while the two provinces: Drenthe and Zeeland are medical deserts type 4. The geographical location of these provinces (see Figure 4), indicate that they are situated at the north and south borders of the Netherlands. The four ‘medical desert provinces’

partially came forward in the previous chapter, but not all of them have a lower (or the lowest) level of healthcare providers per population. Taken other elements of medical deserts into account (besides provider to population ratio), as it is done in our taxonomy, therefore appears to be useful to achieve a broader and integrative method to identify medical deserts in the Netherlands.

Table 5. Application of the ROUTE-HWF Project taxonomy

NUTS-2 region	Proportion of population aged 65 years and more (2021)	Percentage of population at risk of poverty or social exclusion (2021)	Percentage of population within 15 minutes from a hospital (2020)	Medical doctors per 100,000 inhabitants (2021)
NETHERLANDS	19.8	16.5	95.0	384.1
Groningen	20.3	22.2	87.2	558.2
Fryslân	22.1	17.6	77.1	243.4
Drenthe	23.8	15.9	86.3	297.8
Overijssel	19.8	15.0	97.6	275.4
Gelderland	20.8	15.2	98.4	382.2
Flevoland	14.5	14.4	98.7	130.5
Utrecht	17.4	13.1	99.9	613.5
Noord-Holland	18.3	18.7	98.7	495.4
Zuid-Holland	18.4	18.8	99.5	377.9
Zeeland	24.2	14.6	94.7	165.6
Noord-Brabant	20.6	13.7	97.3	271.0
Limburg	24.3	16.2	99.5	362.1

The numbers in red colours indicate that the regional value is below or above the country average, implying that it adheres to the particular object/element indicator of the ROUTE-HWF taxonomy of medical deserts.

Sources: Eurostat 2023

Figure 4. Identified types of medical deserts*



*MD1: Fryslân; MD2: Groningen; MD4: Drenthe; Zeeland

Source: based on www.mapchart.net

1.2.3. Factors contributing to medical deserts

A variety of factors contributes to the existence of medical deserts in the Netherlands. In general, the health care context is intertwined with regional labor and housing market disparities, geographical accessibility and population aging. The latter strongly particularly affect both the demand and supply side of health care provision.

Depopulation and aging play a pivotal role in the (potential) desertification of regions in the Netherlands. From one side young people move out from ‘shrinking areas’ for better education and job opportunities while from the other side, the older population with increased health care needs remains. Older people are stimulated to live independently at home as long as possible, but combined with the growing number of single-person households this leads to an increase of vulnerable groups that are highly dependent on care available in the area ([Platform 31](#)). As a result, in aging areas the higher demand for health services is confronted with lower supply of both informal and professional health care. Although not restricted to medical deserts areas, the program [“Future-proof Care Labor Market; Learning and working differently together”](#) states that the expected shortage of personnel in combined health and welfare sectors in 2022 in the

Netherlands is almost 49 thousand people. In the long term, the more limited increase in the labor supply and an increase in health care use due to an aging population will increase the deficit. **A shortage of 135 thousand employees is expected in 2031.** The largest shortages are expected in nursing home care and home care. With regard to professional groups, the expected shortages are the largest among carers and nurses in vocational education and vocational training ([Prognosemodel](#)).

The **lack of job opportunities** in economically underserved and depopulated areas further contributes to health workforce deficits. Medical professionals are less willing to practice in these areas if there are less labor market opportunities for their partners. The prognosis (for the period 2018-2028) shows that in some depopulated areas located on the peripheries the demand for GP care will increase by 20%-40%, while its supply will remain stable and/or decrease in some areas ([Batenburg et al 2018](#), [Vis et al 2020](#)).

In addition, issues related to the **changes in models of health care provision** has impacted the differences in health care accessibility across Dutch regions. Although the health system in the Netherlands is not strongly centralized, increases in scale (e.g., centralization of highly specialized services) and clustering of the supply of care facilities (setting multidisciplinary health centers, hospitals and group practices), can have led to poorer accessibility, especially in sparsely populated areas. Larger, integrated and specialized health care facilities can be difficult to reach for people with limited mobility or those who do not have access to a car ([Platform 31](#)). The accessibility issue is also related to the travel-related regional characteristics. In the provinces with lower degree of urbanization (like: Groningen, Fryslân, Drenthe and Zeeland) the **geographical distance** to basic facilities, including schools as well as GP practices is higher than in the remaining ones. A report by Netherlands Environmental Assessment Agency ('Planbureau voor de Leefomgeving' - PBL) showed e.g., that in January 2022: the share of elderly that cannot reach a GP practice within 15 minutes by public transport in rural areas was 23%, while in urban areas it was 6%. Also, it appeared that the share of elderly that can reach *only one GP* practice within 15 minutes by public transport was 33% in rural areas, in urban 10% ([PBL 2022](#)). The differences are similar for other type of services and travel by bike and car.

1.3. HWF policies and approaches to mitigate medical deserts

1.3.1. Policy perspective on medical deserts in a country

The main stakeholders involved in health workforce policies are: the [Ministry of Health, Welfare and Sport](#) (responsible i.e., for budget allocation for training policies) and the two supervising units: the [Health and Youth Care Inspectorate](#) (monitoring care quality and safety) and the [Dutch Healthcare Authority](#) (supervising providers financing, including health care insurers). The main organization responsible for medical workforce planning (i.e., physicians and medical specialist, specialized nurses, physician assistants, dentists and oral hygienists) is the [Advisory Committee for Medical Manpower Planning \(ACMMP\)](#) (see the following subchapters). There are also

providers associations as well as academic/research organizations involved in HWF policies planning (e.g. [Netherlands Institute for Health Services Research](#) – NIVEL, [The Research Centre for Education and the Labour Market](#) at Maastricht University – ROA, [The National Institute for Public Health and the Environment](#) – RIVM, [RegioPlus](#) Partnership, the care and welfare labor market research program – ABF research).

Diversity of policies and initiatives have been applied in the Netherlands to mitigate the negative effects of medical deserts existence or limit their further development. Some of the initiatives have been focused directly on the medical desert areas specifically (e.g., increasing regional training opportunities for GPs there). Other policies have a more general character and have been applied at the whole health system level (e.g., HWF planning and forecasting, task-shifting) which also can have impact on the situation of medical desert areas.

1.3.2. Policies and approaches to mitigate medical deserts

1.3.2.1. Health workforce planning and forecasting

The Netherlands has a long tradition of health workforce planning and forecasting. In 1972 the government introduced the ‘*numerus clausus*’ for the study of medicine. From this moment on, it explored different approaches to plan medical workers supply and distribution. In 2001, **a stock and flow model** were developed to estimate the required number of GPs in training to meet the demand for care in the country. This model was based on realizing equilibrium in the target year based on the data on the demand and supply side. At the supply side, trends are modelled for different cohorts of GPs while on the demand side, it includes demographic and epidemiological metrics. The model shows the number of GPs needed vs the number of GPs is/would be available and covers different scenarios. Scenarios vary on different dimensions as high/low expected demand growth, high/low expected reduction of average working time, and high/low expected efficiency gains. After 2001, the model was extended to be used for different types of physicians (medical specialties), advanced practice nurses, physician assistants, specialists nurses, dentists and oral hygienists. A main outcome of the planning model is an advice to ministries and training institutes how to plan future training inflow to achieve or retain balance between the demand and supply of health workforces at the national level. The model results are therefore specifically translated into an adequate policy recommendation ([Van Greuningen et al., 2012](#)). Since 1999 health workforce planning is executed by the [Advisory Committee for Medical Manpower Planning \(ACMMP\)](#), that actively involves representatives from insurance and training units as well as occupational associations in the planning system. Every three years, the ACMMP advises the government on the optimal training inflow with a projection for upcoming years (up to 15). The strategic goal is to ensure sustainable coverage of health care needs on national and regional levels, by profession.

Next to the planning model for specialized health care professionals (as developed by the ACMMP), **labor market forecasting** (e.g., expected shortages of personnel) is developed for

other workforces in the health and welfare sectors. The Care and Welfare Prognosis Model ([Prognosemodel Zorg en Welzijn](#)) is a research program that has been launched on behalf of the Ministry of Health, Welfare and Sport. It provides both, a national and a regional component. The Care and Welfare Prognosis Model monitors the health labour market for 28 regions and provides for each region its own forecast, specified to subsectors within healthcare and welfare. The model is fed with information about expected demand, supply, number of employees and mobility. The subsector analyses executed by the model include: university medical centres; hospitals and other medical specialist care; mental health care; primary care and health centres; nursing and caring, home care. For example, the prognosed shortage of health workers in general practice will increase in the Netherlands from 4.6% in 2020 to 9.37% in 2031.

As an example, we show the prognosis of the Care and Welfare Prognosis Model with regard to primary care shortages in three regions: Zeeland and Fryslân (previously indicated as medical desert provinces) and the typically urban region of Amsterdam (Table 6). The prognoses are clearly different, i.e., increasing shortages for Zeeland and Fryslân and fluctuating in the Amsterdam region.

Table 6. Prognoses of general practice health workforce needs in the Netherlands and its three regions (2020 – 2031)

Year / Region	2020	2022	2024	2026	2028	2030	2031
NETHERLANDS							
Need of health workforce	34100	36700	38400	40000	41600	42700	43200
Number of health workers	33700	35700	37500	38800	39800	40400	40600
Number of jobs	32600	34800	36700	38000	38900	39300	39500
Shortage	4.60%	5.46%	4.63%	5.26%	6.94%	8.65%	9.37%
Zeeland							
Need of health workforce	900	1000	1100	1100	1100	1200	1200
Number of health workers	900	1000	1000	1100	1100	1100	1100
Number of jobs	900	1000	1000	1000	1100	1100	1100
Shortage	0.00%	0.00%	10.00%	10.00%	0.00%	9.09%	9.09%
Fryslân							
Need of health workforce	1500	1600	1600	1700	1800	1800	1800
Number of health workers	1500	1500	1600	1600	1700	1700	1700
Number of jobs	1400	1500	1600	1600	1600	1600	1600
Shortage	7.14%	6.67%	0.00%	6.25%	12.50%	12.50%	12.50%
Amsterdam							
Need of health workforce	1200	1300	1300	1400	1500	1500	1500
Number of health workers	1100	1200	1300	1400	1400	1500	1500
Number of jobs	1100	1200	1300	1300	1400	1400	1500
Shortage	9.09%	8.33%	0.00%	7.69%	7.14%	7.14%	0.00%

Source: <https://prognosemodelzw.databank.nl/dashboard/dashboard-branches/huisartsen-en-gezondheidscentra>

Regarding the **geographical distribution** of health care providers, the Netherlands is among the countries with the highest percentage of people with uniform proximity to hospitals and GPs practices. In addition to its high population density, this is regulatory norms are set by the government e.g. a standard for maximum travelling time to hospital of 30 minutes and to a GP of 15 minutes ([Wismar et al., 2011](#)).

1.3.2.2. High level strategy for more sustainable health care provision

In 2023 a high-level strategy, The Integral Care Agreement (*Het Integraal Zorgakkoord -IZA*): working together for healthy care was launched ([Central Government 2022](#)). The Integral Care Agreement aims to ensure good, accessible and affordable care for the future. To achieve this, agreements have been made between the Ministry of Health, Welfare and Sport and a large number of organizations in the health sector, including umbrella organizations of hospitals, mental and elderly care. It focuses on addressing the three major challenges faced by the Dutch health care: care accessibility, quality and affordability. The focus is on curative care, but where relevant also long-term care, public health and the social domain. Sustainable care is the starting point, accompanied by the lowest possible impact on climate and environment.

The strategy focuses on eight main components of the work agenda:

1. Appropriate care (value-driven – together with the patient, benefit package management and quality);
2. Regional collaboration (health care providers and the government agree to look beyond their own interests and focus on appropriate distribution of medical specialist care; close to home where possible, further from home for highly specialized complex care);
3. Strengthening primary care organization (care providers and health insurers make agreements on relieving the workload through the use of digital (self) care and enabling 'More time for the patient').
4. Cooperation between social domain, general practitioner care and mental health care (cooperation and a better organization of care and support for people with complex mental health needs: close by, digitally and via self-help modules where possible, as early as possible);
5. Healthy living and prevention (support for healthy lifestyle from the public or social domain);
6. Labor market and unburdening health care professionals (reducing bureaucracy, improving development opportunities, making salaried work more attractive);
7. Digitization and data exchange (Data exchange is essential to achieve the goals in the Integral Care Agreement – all residents of the Netherlands will have digital access to their own healthcare data in 2025 through a dedicated portal);
8. Contracting (health insurers are going to pay closer attention to the procurement of appropriate care).

1.3.2.3. Promoting careers in medical professions

Numerous initiatives, at both national and regional level have been implemented in the Netherlands in order to **increase inflow and improve retention of workers in medical professions**. They include for example:

- marketing campaigns from the national government;
- regional cooperation of health care organizations and educational institutions to attract young people and start a health care education;
- subsidized social welfare programs to help unemployed to find a job in the health care sector;
- subsidized projects to promote inflow of workers from other economic sectors;
- regional branding by regional organizations and governments.

An example of the national government initiative aimed to attract new health care workers is the ['Ik Zorg'](#) (I care; *discover care and well-being*) campaign. It is a multiyear collaboration between the Ministry of Health, Welfare and Sport and professional, employee and employer organizations in the care and welfare sector launched in 2018. The aim of the campaign is to make and keep more people enthusiastic about working in this sector. One of the campaign tools is an interactive online platform providing stories by active professionals, vacancies search, educational tips and ideas etc. The early results showed limited impact of the campaign on the health professionals, as they were mostly enthusiastic about their work (already motivated) prior the campaign. Yet, the initiative helped in strengthening positive public attitudes /opinion toward health professionals ([Ik Zorg, 2023](#)).

In 2022 the Ministry of Health, Welfare and Sport published the 'Programma Toekomstbestendige Arbeidsmarkt Zorg & welzijn - [Future-proof Labor Market Care and Welfare \(TAZ\) programme](#)' – an **action plan aimed i.a. to attract and retain health workers** by increasing their job satisfaction ([The Ministry of Health, Welfare and Sport, 2022](#)). The plan is focusing on more space for innovative working methods, i.e., flexible hours and reduced workload, more space for being a good employer and better training and development opportunities. From 2023, a total of 500 million euros per year will be available for the cross-sectoral collaboration initiatives (agreements with employers, employees, professional and sector associations, education, care purchasers and supervisors). The activities will take place at both organizational, regional and system level and follow pre-defined themes, e.g.: upscaling, self-reliance, professional control and autonomy, increased focus on mentoring and onboarding new employees, a healthy and save work environment, work/live balance. One of the examples is direct collaboration between health care providers and the educational institutions to offer new employees mentoring on the job during the first year after they graduate (Programma Toekomstbestendige Arbeidsmarkt Zorg & welzijn – [Future-proof Labor Market Care and Welfare \(TAZ\) programme](#)).

There are also regional initiatives focused at **supporting collaboration and knowledge sharing** within the health care sector. For example '*De juiste zorg op de juiste plek*', [The Right Care in the Right Place](#) initiative promotes diverse actions aimed at putting daily functioning of people at the center of care provision. The philosophy behind the initiative is based on three pillars: (1) preventing (more expensive) care, (2) moving and organizing care around the people, and (3) replacing care with smart care and using e-health. The online portal provides i.e., detailed regional data on health care demand and supply, knowledge transfer resources as well as descriptions of numerous examples of practical, innovative solutions for care organization. The examples can be filtered depending on e.g. type of action (e.g. moving care towards patients, replacing care by digital solutions, improving citizens participation), type of provider organization involved and the province where the action was applied ([The Right Care in the Right Place Portal, 2023](#)).

Another example of a regional initiative yet focused mostly on general practices is '*Hechte huisartsenzorg*', [Regional cooperation in primary care](#) project. The online portal provides regional data on GP practice distribution, **guidelines on organizing local cooperation between GPs**, other health care providers and municipalities, overview of training offers etc. ([Regional cooperation in primary care Portal, 2023](#)).

1.3.2.4. Attracting GPs to work in medical deserts areas

Several policies are focused on training and recruiting young GPs in underserved regions, especially since the outflow of retiring GPs in these areas is above the national average. There is a central placement system for GP residents. This aims to ensure that all training places for GP residents are filled and used and, at the same time, to increase the chance that students stay in the region where they learned the profession. Although the system is not specifically designed to combat desertification, it helps to distribute GP residents and GPs across the country. There were also local initiatives, e.g.

- additional training in local language for physicians starting job in the province of Fryslân;
- help with finding housing and jobs for spouses in Zeeland;
- the “vacation doctor” program in Zeeland: during the vacation period, GPs can work in Zeeland with free accommodation for their family, allowing them to get acquainted with the local living environment.

In general, all actions that help physicians to familiarize with the rural/local area and enhance the advantages of working in such environment are needed. This include promoting rural lifestyle, offering flexible working arrangement allowing for keeping satisfying work-life balance, support for family arrangements (work for spouse, school for children etc.).

1.3.2.5. New / innovative models of care

Task shifting

Task shifting is promoted as a mean to mitigate health workforce deficits and increase the overall effectiveness and efficiency of health care. It focuses on redistribution of tasks among health workforce teams and has been implemented in the Netherlands for more than a decade in several sectors. In 2011, Dutch advanced practice nurses and physician assistants were allowed to conduct a range of procedures that had previously been reserved for physicians (e.g. cardioversion/defibrillation, catheterization, endoscopy, injections, some prescribing, and minor surgical procedures; [De Bruijn-Geraets et al., 2018](#)). In the following years the scope of practice was expanded also for allied medical clinical technologists and dental hygienist (currently on an experimental basis; [de Haan et al., 2019](#)). The Dutch experiences with task shifting indicate a significant potential, not only in mitigating health workforce deficits but also enhancing the quality of care and in creating the right skill-mix of a team of professionals responsible for the care of a specific group ([van Tuyl et al., 2021](#)).

The barriers in implementing task shifting in the Netherlands include among others: legal issues, which historically enforced strict professional boundaries between different groups of health workers (scope of practices are defined in the Dutch Law for Individual Health Professions 'Wet BIG'), strong opposition from the profession which tasks were being redistributed (e.g. from physicians towards nurses), lack of budget for adequate training ([De Bruijn-Geraets et al., 2018](#); [de Haan et al., 2019](#); [Dankers-De Mari et al., 2023](#)). Researchers also point out that in some specified health care areas (long term care and care for people with mental disability), task shifting is hindered by the deficit of staff who is supposed to take over care activities (nurse practitioners and physicians assistants) ([van Tuyl et al., 2021](#)). On the facilitators side, the incremental approach supported the reform implementation. *"The law on healthcare professions in the Netherlands makes explicit provision for experiments whereby designated health care professionals can carry out new procedures for up to 5 years and, if the new model is positively evaluated, it can then be incorporated into law. This link to evaluation has made it easier for otherwise controversial changes to be accepted. A provision for nurses with basic qualifications to prescribe a very restricted list of low-risk medicines was accepted with little controversy but another proposal, to allow nurses with additional training to prescribe a wider range of medicines was strongly opposed by physicians and only accepted within the framework of an experiment"*([European Commission, 2019](#)). Related to the above, adequate organizational preparations are needed prior implementing task shifting, including: vision on how an optimal skill-mix can be achieved, policy on interprofessional teamwork as well as training and professional development activities ([van Tuyl et al., 2021](#)).

E-health solution

Although e-health solutions had been used within the Dutch healthcare prior 2020, the COVID pandemic has significantly accelerated its uptake ([Keuper et al., 2021](#); [Vart et al., 2022](#)). Use of **video calling** in particular increased substantially. In 2021, half of the doctors and nurses had contact with a patient and/or their family in this way (while back in 2019 this hardly happened). In addition, more healthcare organizations offer diverse versions of a 'patient portal' / online application / website where the patient can view his/her medical data. For example, general practice use of such solutions increased from 42% in 2019 to 79% in 2021 ([Tuyl et al., 2022](#)). Uptake of e-health solutions is seen as an opportunity that might help dealing with the challenges of the aging population and increasing staff shortages in underserved areas. For example, it can help with **home monitoring** for patients with Parkinson's disease, chronic bowel disease, diabetes and heart failure – and thus support keeping patients out of hospital and treat them at home as much as possible ([Tuyl et al., 2022](#)). Yet application of e-health solutions requires adequate educational activities (for both patients and medical professionals) including a change in organizational models and financial support.

New home care models

Diverse innovative home care programs have been implemented in the Netherlands. These types of initiatives can be broadly applied to mitigate medical deserts impact. For example in 2019 in Amsterdam, a pilot program of home chemotherapy was launched. Oncology nurses started using **electric cargo bikes to administer chemotherapy to their patients at home**. Initially the program was mostly focused on patients with bone marrow cancer (patients with low mobility for which the treatment required numerous yet rather short visits). The number of home visits increased from 146 in 2019 to more than 700 three years later. Since 2023, the program was transformed into regular care model. The advantages of the program include among others: home care being less stressful for the patients, better patient-nurse relationship and saving the capacity of the outpatient clinic for more complex treatments. In addition, limiting the patients' needs for travel and using electric cargo bikes makes the service beneficial for the environment, which consequently might attract medical professional inflow and/or improve retention. According to the project leader, *"(...) the model helps us retain and attract oncology nurses. (...) Employees find vitality and sustainability increasingly important. Just like a pleasant change in their work. What could be more fun than standing on the day treatment one day and cycling through Amsterdam the next"* ([Chemo at home 2023](#)).

Also in 2019, in Tilburg a pilot project of **nurse specialist ambulance** services was launched. The project was based on cooperation between the local primary care center and hospitals, focusing on nursing specialists using dedicated ambulances to treat patients at home. The rapid-responder vehicles were equipped complementary to ambulances, yet without the capacities to transport patients. The specialist nurses provided more expertise than regular ambulance,

working as a link between general practice and hospital care. The project led to better patients' satisfaction and a lower pressure on the emergency department in the region. After the successful completion of the pilot, RAV Brabant Midden-West-Noord has implemented the model in more regions ([Nurse ambulance, 2023](#)).

With regard to the elderly population, the Dutch government strongly supports the concept of **elderly population living independently at home for as long as possible**, which is particularly relevant for the underserved areas within the country. It promotes suitable, adapted housing and home care activities. Municipalities are responsible for ensuring that people are able to live independently and participate in society for as long as possible, while health care insurers are responsible for home care right up to and immediately after hospital admission. The latter include district nurses, who provide both medical care as well as arranges help with daily life activities. District nurses are responsible for liaising with the municipality and coordinating the client's care needs ([Government of the Netherlands, 2023](#)).

Care coordination / transition programs

Diverse innovative solution aimed at better care coordination and /or supporting care transition can be identified in the Netherlands. For example, initially implemented in Breda as a pilot project, the "Traffic light" – is an application showing district nursing capacities in a real time aimed at **supporting patients transfer from hospital to district nursing** ([Traffic light, 2023](#)). The app was accompanied by interactive dashboard showing hospital staff who can provide follow-up care. It limited the time and resources needed for identifying a follow-up care option. After a successful pilot, the application was implemented on a national scale.

Another example is the Dolce Vita project – **a data-driven system for acute elderly care distribution**. It was developed within a partnership in the regions of Noord-Holland Noord, Zaanstreek-Waterland, Amsterdam, Diemen and Amstelveen and involves cooperation between nursing homes, general practitioners and hospitals. The system works like a Big Data regional 'control tower' for the care logistics of people aged 65+. It focuses on resolving the bottleneck problems in the transition of elderly patients between the various health care providers, by applying innovative technologies and modeling techniques (stochastic mathematics, data analytics, system dynamics, artificial intelligence) ([Dolce Vita, 2021](#)).

At the national scale, The Dutch National Care for the Elderly Programme run between 2008 and 2016 aimed at supporting **person-centred and integrated care for elderly** patients, an issue that is prominent is the underserved areas of the Netherlands. It led to establishing geriatric networks around the medical universities with more than 600 cooperating organizations. The network run various research projects aimed at development of innovative solutions for elderly care. The projects were related mainly to better coordination, focusing on patient -centered approach, improving care transitions pathways etc. The program was later transformed into Aging Better (BeterOud) campaign ([long et al., 2018](#)).

1.3.2.6. Transport services

A number of examples of **innovative transport solutions aimed at improving access** to health services can be identified in the Netherlands. For example, in 2018 a self-driving, free of charge, shuttle bus started to operate between the **Ommelander Hospital in Scheemda (located in the underserved area of Groningen, in the north of the Netherlands)** and the nearest bus stop. Only within the first six months, more than 3,000 travelers (both patients, staff and visitors) have used the shuttle service. Implemented initially as a pilot, the service was extended for the upcoming year with plans to extend its route (depending on the results of evaluation, including user survey) ([Platform 31](#)). It was a joint initiative between the provinces governments, the hospitals, transport office and the transportation company. In general, the project showed that innovative transport solutions, including self-driving vehicles, has the potential to make a major contribution to the accessibility of facilities in sparsely populated areas.

1.3.2.7. Cross-border initiatives

The Netherlands created with Germany the first European cross-border region (the 'Euro-region') in 1958 (Wolf et al., 2006), while in the following years additional six of these regions were created, (on both German and Belgium borders; [Brand et al., 2008](#)). The majority of these Euro-regions have active working groups for health care issues and realize projects focused e.g. on training and education of medical staff, joint use of resources, outpatient and in-patient treatment and disease prevention.

As an example, we cite from [Wismar et al., 2011](#) a "*regional collaboration has been in effect since the mid 1970s between Belgian hospitals and Zeeuws-Vlaanderen – a narrow Dutch region that shares a border with Belgium. The local population's multidimensional proximity (locals share the same Flemish dialect and the same culture), the scarce hospital facilities in Zeeuws-Vlaanderen, the fact that the region is geographically cut off by a waterway from the rest of the Netherlands but has good access routes to and from Belgium, and the good relatively availability of hospital care in Belgium have all contributed to making cross-border collaboration a meaningful solution to structural under-capacity. Following the closure of a local hospital, the Zeeuws-Vlaanderen arrangement was set up to allow inhabitants of the area access to specialized care in Belgian hospitals, including cardiology, nuclear medicine, haemodialysis, radiotherapy, plastic surgery, respiratory and rheumatic treatments and some paediatric care. The arrangement for facilitating access is based on an agreement between regional and state-level actors*" ([Wismar et al., 2011](#)). In general, cross-border patient mobility of Dutch citizens is being supported by cross-border contracts between Dutch insurers and Belgian providers. The survey conducted among Dutch patients seeking care abroad showed that the main reason was faster access to care ([Wismar et al., 2011](#)). Other examples of active cross border cooperation include: creating information portal for citizens and providers with the data about the available health care in the region (Portal developed by three Euro-regions between Belgium, the

Netherlands and Germany) or medical professionals cooperation between the Academic Hospitals in Maastricht (Netherlands) and Aachen (Germany), situated just 40 km apart. ([Wismar et al 2011](#)). In addition, during the COVID pandemic, Dutch patients received care in German hospitals.

1.3.2.8. Community involvement

A lot of emphasis have been put in the Netherlands on the concept of 'bringing care back to the community' i.e. by closer cooperation between community and health care workers. Community engagement has been recognized as key to the development of citizen-centred and sustainable health care systems in particular in low-populated or underserved areas (De Weger et al., 2020).

Both volunteers and informal care providers play an important role in Dutch social and health care systems (Schippers & Conen, 2014; De Klerk et al., 2021). The Netherlands has strong tradition and in consequence, a **high level of volunteering** compared with other European countries (Schippers & Conen, 2014). There are dedicated online platforms that connect volunteers with the available vacancies across the country and/or region based on their interests, talents and available time. One of such platforms (<https://volunteering.nl/>) gathers almost 9 thousand voluntary organizations. Volunteers play an active role in both health and social related activities for the growing population of elderly. In 2021, the highest share of volunteers was identified in sports clubs (11.7%), followed by nursing organizations (6.3%) and schools (6.1%). Yet, the **major challenge is the declining number of volunteers**. Between 2012 and 2021, the share of people who declared that volunteered at least once within the last year declined from 50.5% to 38.9% (Statistics Netherlands, 2023). Hence, intensified policies are needed to encourage volunteering activities.

Strongly related to the issue of community involvement are innovations that focus on building solidarity through volunteering in **multi-generational housing developments**. These include programs that encourage students to live (with reduced rent or rent-free) alongside elderly residents; on the condition of spending time with them (e.g., participating in joint social activities) or other social housing developments allowing for multigenerational support.

1.4. Analysis of successful and sustainable HWF policies in medical deserts

A diversity of policies and/or actions can be identified in the Netherlands that focus directly or indirectly on mitigating the effects of medical deserts existence. They can be distinguished at the national, regional or local levels and focus on the demand side (e.g., limiting patients demand for health care), or supply side (improving access to care, providers work efficiency) or both. As medical deserts constitute a complex problem in the Netherlands – no single, individual policy can be sustainable – instead **a multidimensional and intersectoral approach must be applied**.

The following factors can be indicated as contributing to Dutch policies success and sustainability:

- **Multidisciplinary approach** (cooperation between different medical care professionals; building linkages between home-, out- and inpatient care);
- **Intersectoral approach** (collaboration and building linkages between health, social care, community work, education and housing sectors);
- **Stakeholders involvement** (involving local communities, municipalities, patient and providers in care planning and implementation);
- **Piloting and evaluation** (testing on a local/regional space; evaluation prior country level implementation);
- **Knowledge transfer** (evidence-informed health policy);
- **Implementing environmentally friendly solutions** (e.g. limiting travel needs, using electric cars/bikes);
- **Data and IT system support** (data systems for both: care management – e.g. IT system allowing for monitoring care capacities in real time; and clinical process – portals/app with patients records).

1.5. Evaluation of the applicability of the ROUTE-HWF roadmap in the particular national / regional context

The application of the ROUTE-HWF Project taxonomy in the Dutch context showed that **four provinces can be defined as medical deserts**: Fryslân, Groningen, and Zeeland. These areas were also indicated during the national stakeholders' workshop that was held within the ROUTE-HWF project (especially Fryslân and Zeeland). The usefulness of the taxonomy was also confirmed during the consultation with the country informants. Yet, it was also emphasized that when the compromise must be reached between the model universality and applicability to specific context - some local features might be overseen. One of the suggestions was to add indicators related to the actual usage of health care services to the taxonomy indicators. In addition, the availability of informal carers and volunteers is an extremely important factor in monitoring access to care in the Dutch context.

Some regional (specific) factors, and in consequence solutions to medical deserts, can be identified. For example, in Fryslân the use of local language might limit health providers willing to work in this area, while the related solution is provision of dedicated language courses. In Zeeland, examples of successful cross-border cooperation with Belgian hospitals were identified, which was possible mostly due to its geographical localization next to the border. Yet in all types of medical deserts, a mixture of factors and possible solutions can be identified. Table 7 below shows, as a summary, how in the different types of medical deserts areas in the Netherlands, the (regional specific) factors/causes for desertification are aligned with the (regional specific) solutions for this.

Table. 7. Mapping factors and solutions per type of medical desert

Medical desert type	Area / province of the Netherlands (NUTS 2)	(regional specific) Factors/causes for desertification	(regional specific) Solutions for desertification
Medical desert type 1 Areas that deal with: • a relative high proportion of population aged 65 years and more • a relative high proportion of population below poverty line, and • a relative small proportion of population within 15 minutes from a hospital • a relative low ratio of medical doctors per 100,000 inhabitants	Fryslân	– Aging – Poverty – Area characteristics (distance) – HWF shortages – Command of the Frisian language (limits the employment choices)	– Regional campaign encouraging GPs to work in Fryslân province (interactive platform, support in housing, communication): Platform 11huisartsen.frl – Providing courses in local language – Local, multi-stakeholder collaboration in health promotion/ diseases prevention action: Vitale Regio Fryslân
Medical desert type 2 Areas that deal with: • a relative high proportion of population aged 65 years and more • a relative high proportion of population below poverty line, and • a relative small proportion of population within 15 minutes from a hospital	Groningen	– Aging – Poverty – Area characteristics (distance)	
Medical desert type 4 Areas that deal with: • a relative high proportion of population aged 65 years and more • a relative small proportion of population within 15 minutes from a hospital • a relative low ratio of medical doctors per 100,000 inhabitants	Drenthe; Zeeland	– Aging – Area characteristics (distance) – HWF shortages	– Multidisciplinary teleconsultation network for palliative care: Network Palliative Care Zeeland – Cross-border care initiatives (e.g. with Belgian hospitals) – Local training for GPs – The ‘vacation doctor’ program in Zeeland.

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2. Spain

2.1. General country context

2.1.1. Geography and socio-demographic characteristics of the country and its regions

Spain is a Southern European country. With an area of 505,990 km², it is the second largest country in the EU. It has a total population of 47.4 million and an average population density of 93.8 persons per km², yet with huge regional differences (Eurostat 2022). Most of the topography of Spain consists of flat plains that are surrounded by rugged, undeveloped hills. The northern part is dominated by the Pyrenees Mountains. Spain presides 175 islands. Administratively the country is divided into 19 regions, so called autonomous communities (17 communities and two cities) (Figure 1).

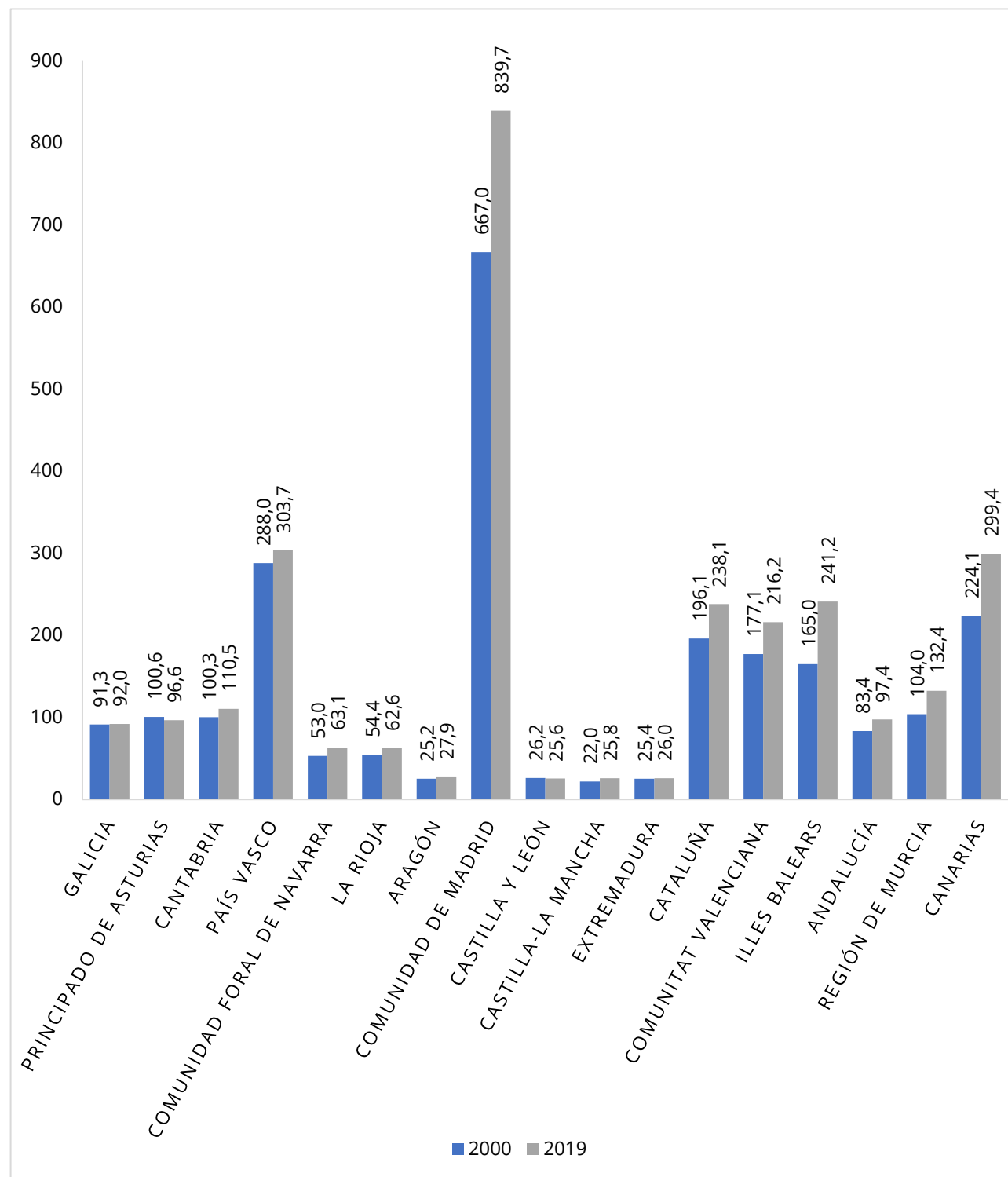
Figure 1. Autonomous Communities in Spain



Source: based on www.mapchart.net

In 2019, the population density ranged across the 17 communities from 25.6 in Castilla-y-León to 839.7 in Comunidad de Madrid (Eurostat 2022). In the majority of the regions, the population density increased within the last two decades (Figure 2).

Figure 2. Population density per autonomous communities in 2000 and 2019 (persons per km²)



*

*in the case of the two autonomous cities, Ceuta and Melilla, the population density in 2019 was 4,222.9 and 6,041.5 persons per km² respectively

Source: based on Eurostat 2022

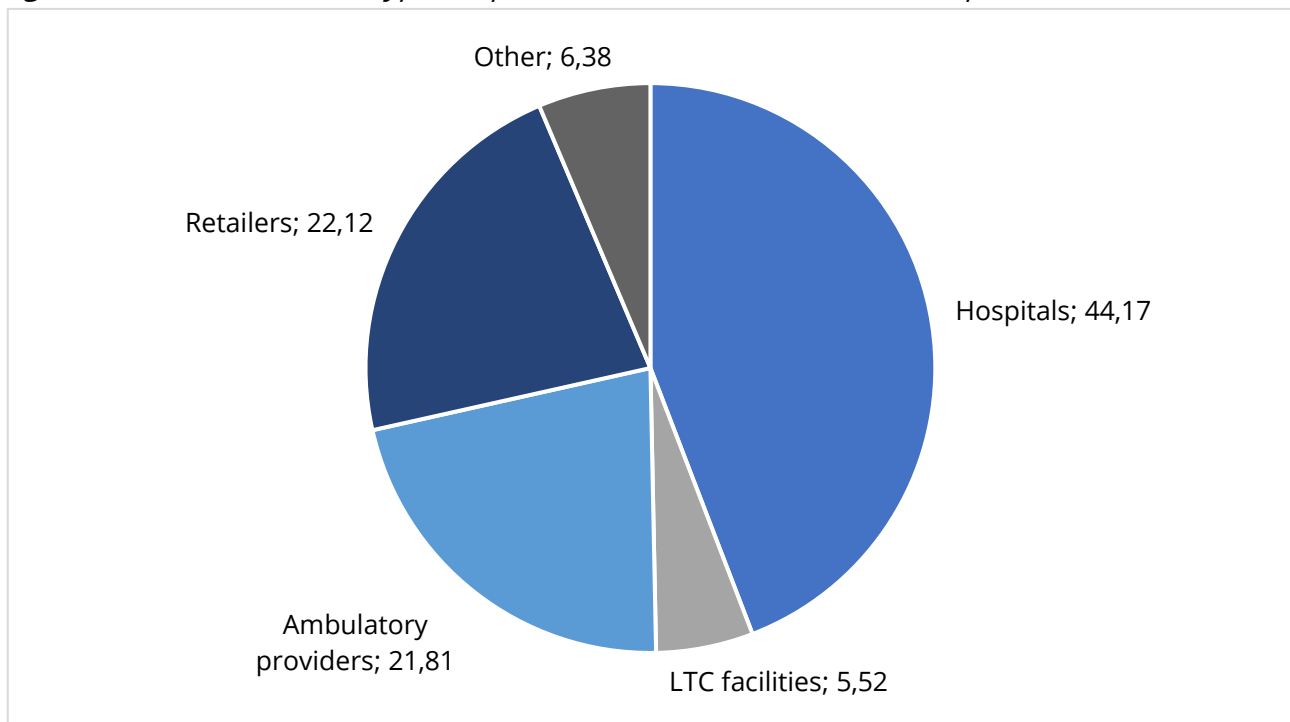
In 2021, the median age of the population in Spain was 44.7 years, which was slightly above the EU-27 average of 44.1 years. The share of population aged 65 years, and more was 19.8% (with the EU-27 average of 20.8%). Yet, the latter ranged across regions from 11.3% in the autonomous city of Melilla to 26.5% in Principado de Asturias (Eurostat 2022).

2.1.2. Health system organization and financing

In Spain, a tax based, national health system (*Sistema Nacional de Salud* - SNS) provides **universal coverage**. The system is decentralized, yet with national coordination (its organization mirrors administrative division of the country) ([Bernal-Delgado et al 2018](#)). Strong primary care constitutes a core element of the system, with primary health care teams forming the basis of the SNS.

Although Spain's health spending has increased in recent years, it remains below the EU-27 average. In 2020, the country spent 10.71 % of its GDP on health. Per capita the **health spending** was at the level of 2,538 Euros, which was below the EU-27 average of 3,269 Euros (Eurostat 2022). Share of public funding in total health expenditure was 70.6 %. Out-of-pocket payments are mainly due to co-payments (for outpatient prescribed pharmaceuticals and to specific medical aids) and their share in total health spending is above the EU-average.

The country spends approx. 44.2% of its current health expenditures on hospitals; 21.8% on ambulatory care; and only 5.5% on long-term care providers (Figure 3). Spending on pharmaceuticals (retailers) is higher than the EU average.

Figure 3. Share of different types of providers in total current health expenditures (2019)

Source: based on Eurostat 2022

In terms of the **health system governance**, the national level planning and regulation is the responsibility of the Ministry of Health, yet numerous tasks related to resource allocation, purchasing and provision are delegated to the 17 regional authorities (autonomous communities). In practice there are separate, regional health systems (in each autonomous community) coordinated by the Interterritorial Council of the National Health System. Both the national and regional ministries of health comprise the Interterritorial Council (OECD/European Observatory on Health Systems and Policies 2021).

The level of **unmet health needs** is low. In 2020 only 0.4% of population above 16 years old reported unmet needs for medical examination due to the following reasons: “too expensive or too far to travel or waiting list”. The average for the EU-27 was 1.8% (Eurostat 2022).

2.1.3. Overall picture of the HWF trends in the country and its regions

In 2020 there were on average 457.7 practicing medical doctors per 100,000 inhabitants, yet the ratio varied between regions from 277.0 in Castilla-la-Mancha to 640.7 in Comunidad Foral de Navarra (autonomous community) and 871.7 in Ciudad de Ceuta (autonomous city) (Table 1). The **distribution of doctors is thus clearly unbalanced**, with many autonomous communities well below the EU average. In 2020, only **in four out of 17 autonomous communities almost 60% of active medical doctors were concentrated** (128.2 thousand doctors out of the total number of 216.8 thousand were located in the four regions: Madrid, Cataluña, Valencia and Andalusia).

At the country level, the number of practicing medical doctors per 100,000 inhabitants increased by 46% between 2000 and 2020. Yet here also, huge differences can be observed between the regions. For example, in region of Castilla-la-Mancha the ratio increased by only 7.6%, while in País Vasco the number of medical doctors per 100,000 inhabitants more than doubled (Table 1).

*Table 1. Medical doctors per 100,000 inhabitants across regions**

GEO/TIME	2000	2005	2010	2015	2020	2020/2000
SPAIN	313.55	354.54	375.79	384.54	457.67	145.96%
Galicia	302.45	310.67	346.20	452.27	463.74	153.33%
Principado de Asturias	325.06	341.73	442.83	373.25	418.10	128.62%
Cantabria	305.91	388.45	333.57	548.35	595.31	194.60%
País Vasco	263.95	410.09	411.08	505.18	560.36	212.30%
Comunidad Foral de Navarra	321.14	583.59	566.87	434.73	640.66	199.50%
La Rioja	291.36	288.64	374.54	511.51	326.97	112.22%
Aragón	419.03	387.56	528.16	461.40	576.32	137.54%
Comunidad de Madrid	338.66	432.04	502.31	473.63	569.63	168.20%
Castilla y León	344.38	320.12	365.23	454.21	438.64	127.37%
Castilla-la-Mancha	257.55	274.30	396.79	314.67	277.04	107.57%
Extremadura	261.16	270.39	260.41	349.35	370.35	141.81%
Cataluña	299.52	362.59	323.60	358.91	468.71	156.49%
Comunitat Valenciana	347.13	338.81	372.42	355.25	450.70	129.84%
Illes Balears	291.31	397.82	288.05	289.23	490.04	168.22%
Andalucía	300.73	335.55	333.18	294.81	368.01	122.37%
Región de Murcia	368.26	300.23	391.40	434.71	423.09	114.89%
Ciudad de Ceuta	609.70	276.27	911.04	471.23	871.74	142.98%
Canarias	277.67	319.71	256.20	330.18	447.03	160.99%

*No data for Ciudad de Melilla

Source: Eurostat 2022

Within the last two decades the number of medical studies graduates (medical doctors) per 100,000 inhabitants fluctuated from 10.4 in 2000, to 9.23 in 2010 and 13.9 in 2020 (Eurostat 2022). There is steady increase in the number of general practitioners (GPs) in Spain: in 2020, there were 91.4 GPs per 100,000 inhabitants (in comparison to only 71.54 in 2005). Yet, the age structure of physician population show unfavorable trends. The **share of physicians above 54 years old almost tripled within the last two decades**, from 12.03% in 2000 to 31.88% in 2020 (Eurostat 2022).

In 2020, there were 583.3 registered (non-retired) nurses per 100,000 inhabitants. Within the last two decades, the number of nursing graduates per 100,000 inhabitants fluctuated between a minimum of 17.5 to maximum 25.2 and was 21.8 in 2020. The regional data show significant differences. In 2020, the number of registered (non-retired) nurses per 100,000 inhabitants ranged from 309.8 in Canarias to 870.7 in Navarra (Table 2).

Table 2. Number of registered (non-retired) nurses per 100,000 inhabitants across regions

GEO/TIME	2005	2010	2015	2020	2020/2005
SPAIN	454.90	500.26	535.78	583.34	128.23%
Andalucía	358.06	359.11	392.25	452.04	126.25%
Aragón	N/A	511.75	526.99	697.84	N/A
Asturias, Principado de	548.85	554.52	613.03	685.48	124.89%
Balears, Illes	472.23	489.35	507.53	561.31	118.86%
Canarias	437.51	205.97	253.27	309.82	70.81%
Cantabria	556.11	587.43	609.51	655.08	117.80%
Castilla y León	527.56	611.05	657.49	717.19	135.94%
Castilla-La Mancha	464.84	558.20	547.07	601.44	129.39%
Cataluña	532.49	580.66	593.64	637.64	119.75%
Comunitat Valenciana	448.49	469.41	501.36	543.73	121.24%
Extremadura	523.76	540.87	639.30	699.37	133.53%
Galicia	332.48	499.60	507.39	527.61	158.69%
Madrid, Comunidad de	523.25	584.32	664.21	674.44	128.89%
Murcia, Región de	339.87	345.15	399.33	466.64	137.30%
Navarra, Comunidad Foral de	821.76	847.28	856.08	870.73	105.96%
País Vasco	601.74	675.86	738.87	788.84	131.09%
Rioja, La*	N/A	N/A	N/A	N/A	N/A
Ceuta	585.12	543.94	553.53	644.92	110.22%
Melilla	651.17	655.57	654.40	778.34	119.53%

*No data available

Source: Instituto Nacional de Estadística 2022 (The National Statistics Institute: <https://www.ine.es/en/index.htm>)

Similarly, regional differences in number of health professionals per population are visible in the case of dentists, pharmacists and physiotherapist (Table 3).

Table 3. Number of affiliated health professions (registered, non-retired) per 100,000 inhabitants, in 2020, across regions

GEO/TIME	Dentists	Pharmacists	Physiotherapists
SPAIN	82.14	150.4	124.66
Andalucía	74.27	143.07	93.71
Aragón	70.17	125.25	128.40
Asturias, Principado de	85.11	128.2	149.40
Balears, Illes	65.82	106.42	118.12
Canarias	61.38	135.36	103.56
Cantabria	70.68	123.73	146.14
Castilla y León	63.95	159.08	119.00

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Castilla-La Mancha	49.33	131.56	95.26
Cataluña	77.44	137.21	140.77
Comunitat Valenciana	86.91	144.58	116.99
Extremadura	58.41	147.76	104.55
Galicia	83.95	174.52	112.26
Madrid, Comunidad de	128.47	199.85	166.62
Murcia, Región de	79.80	115.47	138.59
Navarra, Comunidad Foral de	58.91	213.47	118.58
País Vasco	85.73	148.84	139.46
Rioja, La	83.01	138.87	118.36
Ceuta	44.03	104.71	57.11
Melilla	53.39	103.22	65.26

Source: Instituto Nacional de Estadística 2022 (The National Statistics Institute: <https://www.ine.es/en/index.htm>)

2.2. Types of medical deserts in the country and factors driving desertification

2.2.1. Definition and examples

Although, there is **no formal definition** of the term ‘medical desert’ in Spain, the national experts indicate their existence in the form of mostly **rural areas** with limited access to health care. Medical deserts (*Desiertos medicos*) are usually related to **sparsely populated and isolated areas**. In general, the issue of depopulation plays a pivotal role. In several autonomous communities, depopulated areas called ‘**Empty Spain**’ can be identified. While discussing the concept, the national experts often pointed out the applicability of the definitions from other countries (e.g., France and United States) in the Spanish context, where medical deserts are often linked to irregular distribution of health care providers across regions and the related shortage of physicians, especially in rural areas.

In general, no single indicator would be appropriate to define and measure a medical desert in Spain. Instead, a **complex set of features must be taken into consideration**. In terms of categories that are relevant while defining medical deserts, the national experts indicated the following order (from most to less relevant): (1) distance to a health facility or health worker; (2) characteristics of the area; (3) population characteristics; (4) characteristics of health workers or health care; (5) population size. The first two categories can be interrelated, as longer distance to nearest health facility (e.g., distance to nearest hospital above 50 km) is often related to remote or rural areas. In addition, geographical accessibility (mountain regions, islands) are of importance in Spanish context. In case of the population characteristics, lower socio-economic status of the population affects the demand for health services and might determine the existence of medical deserts.

In general, although the numbers of doctors and nurses have increased in recent years in Spain, their **distribution varies** across regions, and is uneven between urban and rural areas. The national experts listed the following areas as examples of medical desert in Spain: Region Aragon, smaller Canary Islands, and western zones of Madrid Region.

2.2.2. Application of the ROUTE-HWF taxonomy to identify and measure medical deserts

The [ROUTE-HWF Project](#) approach to define and measure medical deserts (see the Deliverables 4.2. and 5.2) is based on a set of four objects/elements: two that address the level of health care demand and two that address the health care supply in a given area. These demand-related objects are indicated by (1) % of population 65+ and (2) economic resources of the population, while the supply-related objects are indicated by (3) travel times to public health facilities and (4) population-provider ratio. These four indications are measured in terms of the relative value for a certain area, being either above or below the country average. Combining these four

dichotomous variables, the framework results in five exclusive types of medical deserts, where at least three of the four objects of a medical desert apply (Table 4).

Table 4. [The ROUTHE-HWF Project](#) taxonomy, defining five exclusive types of medical deserts

Type of medical desert	POPULATION AND HEALTHCARE DEMAND OBJECTS		AREA AND HEALTHCARE SUPPLY OBJECTS	
	Object 1: Percentage population aged 65 and over	Object 2: Economic resources of the population	Object 3: Travel time to health facilities	Object 4: Population-provider ratio
	<i>The proportion of inhabitants aged 65 and over living in this area, is <u>higher</u> than the proportion of all inhabitants in a country living in this area</i>	<i>The proportion of inhabitants below the poverty line living in this area, is <u>higher</u> than the proportion of all inhabitants in a country living in this area</i>	<i>The percentage of the population that lives within 15 minutes by car from a hospital in this area is <u>smaller</u> than the average percentage at the national level of the country</i>	<i>The proportion of health professionals working in this area, is <u>lower</u> than the proportion of all inhabitants in a country living in this area</i>
1	x	x	x	x
2	x	x	x	
3	x	x		x
4	x		x	x
5		x	x	x

Source: Deliverable 4.2. Second version of a definition and taxonomy on medical deserts.

The application of the [ROUTHE-HWF Project taxonomy](#) in the Spanish context showed that **six autonomous communities can be defined as medical deserts** (Table 5 and Figure 4). Extremadura is medical deserts type 1 (MD1), Comunitat Valenciana is MD2; Castilla y León is MD4, while three autonomous communities: Castilla-la Mancha, Andalucía and Canarias represent medical deserts type 5.

Table 5. Application of the [ROUTE-HWF Project](#) taxonomy of medical deserts per region (autonomous communities)

NUTS-2 region	Proportion of population aged 65 years and more (2021)	Percentage of population at risk of poverty or social exclusion (2020)	Percentage of population within 15 minutes from a hospital (2020)	Medical doctors per 100,000 inhabitants (2020)
SPAIN	19.8	27.8	71.0	458.0
Galicia	25.7	25.2	60.7	463.7
Principado de Asturias	26.5	26.3	84.6	418.1
Cantabria	22.7	21.4	76.1	595.3
País Vasco	23.1	16.0	90.6	560.4
Comunidad Foral de Navarra	20.1	14.7	81.8	640.7
La Rioja	21.4	21.3	84.8	327.0
Aragón	21.8	20.0	64.8	576.3
Comunidad de Madrid	18.1	21.6	96.9	569.6
Castilla y León	25.7	23.1	61.6	438.6
Castilla-la Mancha	19.0	32.5	58.9	277.0
Extremadura	21.1	38.7	54.6	370.4
Cataluña	19.3	22.3	84.4	468.7
Comunitat Valenciana	19.9	30.6	83.7	450.7
Illes Balears	16.2	22.4	79.2	490.0
Andalucía	17.7	38.7	70.6	368.0
Región de Murcia	16.1	33.8	81.4	423.1
Ciudad de Ceuta	12.8	43.0	94.2	871.7
Ciudad de Melilla	11.3	35.2	99.7	n/a
Canarias	17.0	37.8	61.5	447.0

The numbers in **red colours** indicate that the regional value is below or above the country average, implying that it adheres to the particular object/element indicator of the ROUTE-HWF taxonomy of medical deserts.

Source: Eurostat 2023

Figure 4. Identified types of medical deserts*



*MD1: Extremadura; MD2: Comunitat Valenciana; MD4: Castilla y León and MD5 Castilla-la Mancha, Andalucía, Canarias

Source: based on www.mapchart.net

2.2.3. Factors contributing to medical deserts

A mixture of factors contributes to the existence of medical deserts in Spain. In general, health system regulatory issues (including poor health workforce planning and inadequate funding) are intertwined with depopulation, aging, social challenges, geographical accessibility and health workforce working conditions.

A distinctive feature of health workforce situation in Spain is that although no general deficit of medical professional exists (the number of medical doctors per 1000 inhabitants is higher than in the majority of other European countries), there is an **unequal distribution of health workforce across autonomous communities** (as well as within the communities). As the level of independence between the regional health systems (in each autonomous community) is quite high – **the differences in regional approaches might also be significant**. One example are major differences in working agreement regulations (e.g. more or less flexible) and salaries level.

As with any other country, the **political factor** is also important. It related to both macro decision at the Ministry of Health level, as well as local authorities involvement in health system organisation. Without strong and continuous political support, no policies aimed at mitigating medical deserts can be implemented. In Spain, in many regions issues related to health workforce planning and distribution seemed to be forgotten/neglected many years ago, which results in current problems (when family doctors retires there are no candidates to his/her replacement).

The observed uneven geographic distribution of health workers is partially related to the **different levels of regulation** ([Bernal-Delgado et al. 2018](#)). Physicians and nurses are distributed according to regional health authorities' planning and redistributive policies. The basic planning tool are health/sanitary maps which define '**basic health zones**' (*Zonas Básicas de Salud - ZBS*) in each autonomous community. These zones are perceived as basic geographical areas used for the planning and organization of the work of the primary care teams. Although the formal obligation to define basic health zones was introduced in the 80s of the previous century, the major problem is that they are not regularly updated. They are therefore often **obsolete and do not show the real workforce distribution and accessibility to primary care services**. Pharmacists experience a mix of public and corporate regulation, health authorities and colleges of pharmacists; while dentists' distribution depends on market forces, thus showing the highest variation in the distribution of workers across autonomous communities ([Bernal-Delgado et al. 2018](#)). In 2020, the number of dentists per 100,000 inhabitants was almost three times higher in Madrid than in Ceuta or Castilla-La Mancha (it ranged from 44 in Ceuta and 49 in Castilla-La Mancha to 128 in Madrid (Instituto Nacional de Estadística 2022)).

Budgetary and personnel reduction policies implemented during the financial crisis strongly impacted medical workforce **migration trends**. There was increasing outflow of doctors and nurses seeking employment abroad and a reduction of the doctors coming to Spain from other countries, particularly Latin America ([Bernal-Delgado et al. 2018](#)). In general, the demand for doctors in public health system is highly dependent on the current **economic and political contingency** ([Finotelli & Mateos 2015](#)). Although the number of doctors and nurses have increased within the last decade, so have the share of **temporary contracts**. For example, it is estimated than the region of Madrid in 2022, approx. 50% of physicians employed in hospitals and more than 80% of emergency medicine specialist were working based on temporary contracts ([Comunidad de Madrid Health Portal 2022](#)). These types of contracts are characterized by high workload and lower wages than permanent positions thus contributing to growing dissatisfaction among medical personnel. During the medical doctors' strike in Madrid in May 2022, the main demands were related to limiting the temporary work agreements ([The Olive Press 2022](#)). A partially related to work agreements schemes is the issue of **inflexible work/employment regulations** which limit or even prohibit physicians from working in

additional places/different providers organizations (even if physician is willing to work additional hours in different provider organization – it is sometimes not allowed by legal regulations).

In general, **economic incentives** play a crucial role in health workforce distribution across the whole country. For example, Catalonia Region has experienced a decrease in registered doctors between 1997 and 2017, as approx. 30 percent of all doctors trained in Catalonia chose to work in Valencia and the Balearic Islands. Aragon was another popular destination because, even though it had an income per capita lower than Catalonia, doctors there earned more ([Pedret 2020](#)).

The difficult **working conditions for health workers** in remote, rural areas (e.g., long hours, large patient lists, solitude and lack of peers' support) are intertwined with **location choices** of the health workforce (e.g., young doctors in training) and strongly contribute to medical desertification in Spain. Family medicine is often perceived by young professionals as an unattractive choice of specialization. In 2018, only 1 out of 10 chose that field. In 2022 there were more than 8 thousand specialty training posts (for 45 different specialties) offered while the number of applicants was more than 12 thousand. Yet, in the case of family and community medicine specialty approx. 8.5% post remained vacant (which means that some applicant preferred not to do specialization, than do it in family medicine) ([Ministerio de Sanidad 2022](#)). Young people prefer to choose specialization with higher salaries prospect as well as work in bigger cities, with better infrastructure and broader spectrum of choices for employment. Consequently, **when a general practitioner in some rural area retires, there are no candidates for his/her replacement**. Although there is no precise data, experts assessed that the total number of doctors working in rural areas in Spain ranges between 11,000 and 15,000. It is also estimated that approx. 28% of them will retire in 2027 ([General Council of Official Colleges of Physicians 2022](#)). **A survey conducted by the General Council of Official Colleges of Physicians on the group of approx. 5000 rural doctors from 17 autonomous communities showed that 45% of the respondents travel more than 50 kilometers daily to go to their towns and up to 5% travel more than 200 km. At the same time, 88% of rural doctors bear the cost of their 'travels to work' and do not receive a budget item for the travel expenses** ([General Council of Official Colleges of Physicians 2022](#)).

Geographical characteristics (more mountainous, isolated areas) intertwined with the **lack of adequate infrastructure** (e.g., Internet access in some rural areas or public transportation services) strongly contributes to desertification in Spain. There are medical practices in isolated, rural areas where lack of Internet access blocks possibility to issue e-prescription (GP is forced to travel to neighboring village / city to access the IT portal).

In general, Spain's population is strongly concentrated, leaving relatively high share of an uninhabited territory. **Spain's rural areas have the worst access to basic local services** (including e.g., health clinics, nursery schools, supermarkets, hospitals, sports centers) among European Union countries. According to the analysis by Bank of Spain: in rural provinces, the average Spanish citizen has to travel 12.4 kilometers to the nearest local service, compared to 4.8

kilometers in Germany, 7.6 kilometers in France and 4.7 kilometers in Italy ([Maqueda 2021](#)). With young people leaving rural areas in search for better education and job opportunities in bigger cities, the depopulation process continues. OECD database provides information on the percentage of population within a 20-minute drive from a hospital per three types of regions: metropolitan region; regions near metropolitan area; and the ones far from metropolitan area. In Spain in 2022, these data presented as follows: 79%; 70% and 59% respectively ([OECD Regions and Cities at Glance 2022](#)).

According to the report “Distribution of the population and accessibility to services in Spain” (Goerlich et al. 2021), the municipalities, where travel time to the nearest health center is above 20 minutes are mostly scattered throughout the interior of the peninsula, especially in the northern half (e.g. municipalities of the Pyrenees, Picos de Europa, the Montes de León or the Iberian System), and in many cases the travel time is linked to orographic conditions of the terrain and the road network. It is noteworthy that **all urban municipalities are within the 20 minutes of access to the nearest health center and that practically all of the municipalities with access greater than 20 minutes are rural in nature**. In general, 42% of municipalities have a health center to 10 minutes, which covers coverage of the 90% of the population. If we extend the margin up to 20 minutes, we find the 85% of the municipalities and practically 99% of the population (Goerlich et al. 2021).

Finally, **population aging and changing population health needs structure** also impacts medical deserts, by influencing the demand for health services. As one of our country informant (practicing GP) emphasized – many of the primary care consultations for elderly patients, especially in big cities are more related to the social care needs than the actual health problems. Such consultations (e.g., focusing on patients’ needs related to loneliness, lack of social support) could have been provided within the social care system and thus freeing up space/capacities within health care.

2.3. HWF policies and approaches to mitigate medical deserts

2.3.1. Policy perspective on medical deserts in a country

The main stakeholders involved in health workforce policies at the central level are: [the Ministry of Health](#) (responsible i.e., for executing government policies via Interterritorial Council of National Health System) and the [Ministry of Education and Vocational Training](#) (focused on policies related to education and vocational training). The **Interterritorial Council of the National Health System** is responsible for health care coordination, cooperation, and communication amongst health care services in the autonomous communities and between them and the central government. Within the Council there is a **working group devoted to human resources in health system - Human Resources Commission**. It is responsible i.a. for the design of training programs and modernization of the human resources of the National Health System as well as defining the basic criteria for evaluating the competencies of health

professionals ([Regulation 192/2004](#)). There are also regional governing bodies (the health councils of the autonomous communities) as well as numerous providers and academic associations.

Diverse policies, at both central and regional levels, have been implemented or proposed in Spain with the objective to limit medical deserts or at least mitigate the factors contributing to their existence. These policies faced different challenges and were not always successful.

2.3.2. Policies and approaches to mitigate different types of medical deserts

2.3.2.1. Health workforce planning and forecasting

The main workforce planning tool in the Spanish national health system are the “*numerus clausus*” that set the limit for the number of places available for undergraduate medical education, as well as define access to the postgraduate programs: residency (doctors) and specialization (nurses). For example, the number of postgraduate training places for physicians increased from 7,512 in 2020 to 8,188 in 2022, with a particular focus on increasing places in family and community medicine specialty. In 2022, out of the total number of 8,188 specialty places – 28.5% (2,336) were in family and community medicine (200 of which remained unfulfilled/vacant – there were no candidates for training in this specialty) ([Ministerio de Sanidad 2022](#)). In general, training quotas are based on a needs analysis, yet are restrained by the available budget. One of the challenges is a lack of alignment between the two planning measures, as the ungraduated limits are set by the education system and the postgraduate one by the health system: “*each with different contextual and institutional incentives*” ([Bernal-Delgado et al. 2018](#))

In 2014, the National Registry of Health Care Professions had been launched by the Ministry of Health. It collects relevant information from health professionals (in the public and private sectors) and coordinates the workforce registries developed by the autonomous communities ([Bernal-Delgado et al. 2018](#)).

The general rule for workforce distribution is the **availability of health center within 30-35 minutes of travel**. As mentioned before, the health centers planning and organization is based on so called ‘basic health zones’ – geographical areas defined in each autonomous community. For example, in Castilla León there are 11 Health Areas (*Áreas de Salud*) which are further divided into 248 basic health zones (*Zonas Básicas de Salud - ZBS*) ([Guía de Ordenación Sanitaria de Castilla y León 2023](#)). The basic health zones are classified as rural, urban or mixed. The regional health department publishes the information on health centers localization in each basic health zone. Yet, the major challenge is updating the data. In some of the autonomous communities – no updates were made within more than a decade. A strongly recommended action is therefore **gathering and utilizing the newest data in the health maps development**. These should involve i.e., (1) including medical workforce age structure prognosis (to foresee and plan

adequate action when physician retires); (2) taking into account cooperation between neighboring zones/health centers to provide care in a shared way; (3) taking into account new, more efficient model of care (e.g., digital solutions).

2.3.2.2. Attracting medical professionals from abroad

In 2007, the Spanish Ministry of Health modified the regulation on the **access to the national medical exam for non-EU citizens**. The previously existing limits (cups) were eliminated and non-EU foreigners with a study permit could apply for a medical training slot in Spain (in practice, they received equal rights in access to medical training as EU citizens) ([Finotelli & Mateos 2015](#)). *"The new rules made the health sector more attractive to foreigners, triggering a 'pull effect', especially from Latin American countries, where several training schools were opened with the sole aim of preparing applicants for the state examination in Spain"* ([Finotelli & Mateos 2015](#)). It contributed to internationalization of the health workforce in Spain by increasing the presence of foreigners. In 2010, 34% of all training slots were taken by foreigners (mostly non-EU citizen), while in specialty of family and community medicine the share of foreign doctors in training was 44.7% (of all of those who chose this specialty) ([Finotelli & Mateos 2015](#)).

Yet, only three years later, the legal situation changed abruptly. Both central and autonomous communities' governments implemented measures to restrict foreigners' access to medical training. In 2010, the Ministry of Health adopted regulations that reduced the number of medical training slots to the level of 2007, as well as re-implemented the "foreigners' cap" (up to 4% in training including, those non-EU foreigners who obtained their medical degree at Spanish universities). These actions were one of the **measures implemented to mitigate the consequences of the global financial crisis**. *"Growing unemployment in the Spanish health sector during the crisis showed that the international recruitment of foreign physicians in particular was characterized by a short-term perspective (it failed to tackle the structural problems in the health sector while a large number of medical trainees were hired without considering their real long-term possibilities of being integrated into the labour market after completing their training)"* ([Finotelli & Mateos 2015](#)). Similarly, as with doctors, evidence suggest that economic crisis effectively closed the door to internationally educated nurses to work as nurses in Spain. Successful applications for credential recognition of overseas nursing qualifications (from Latin America) plummeted from a peak of 1,384 in 2007 to 55 in 2016 ([Pastor-Bravo & Nelson 2019](#)).

2.3.2.3. Local training for medical students and GPs

Local training for young professionals is recommended as a successful way to attract young doctors in medical deserts. Also in Spain, numerous experts recommend training young general practitioners in rural areas. The **General Council of Official Colleges of Physicians** proposes **rural centers** as suitable to benefit the so-called MIR (medical residency program) training and support adequate generational change. Yet, one of the challenges is a lack of adequate resources

(both human and infrastructure). A survey conducted among rural doctors showed that majority of them works in health centers that are not accredited to provide teaching activities. ([General Council of Official Colleges of Physicians 2022](#)).

Therefore, the first step should involve significant **investments in health centers infrastructure** in rural/isolated areas. The **support of regional authorities** is crucial as accreditation to provide teaching activities is assigned at the regional level. Then a **stronger cooperation between medical and nursing schools and accredited rural health centers** is needed. Student should be able familiarize themselves with rural environments, experience practices in such areas, and be supported in choosing them as training options (including scholarships to cover accommodation and travel expenses). An example of successful initiative from other sectors is [Erasmus Rural](#) initiative launched by University of Castilla-La Mancha and supported by the regional government (The Government of Castilla-La Mancha 2022). It focuses on organizing summer practices (including scholarships) for last year students (e.g., in agro-food engineering) in rural areas to help them familiarize themselves with rural areas, made local contacts and encourage choosing rural areas as future employment sites. Starting from 2021, the initiative was also extended to medical students.

2.3.2.4. Flexible working arrangements

In Catalonia a more flexible regulations regarding physicians work agreements were introduced. GPs were allowed to work additional hours/shifts in other (not their primary employer) health centers. Redefining work arrangements is also needed for building local strategic alliances between neighboring health centers and/or health centers and nearest hospitals to promote sharing the limited resources.

2.3.2.5. New models of healthcare

Multidisciplinary PHC with task shifting

Spain, as many other European countries, moved towards a broader **skill-mix**, especially in primary care. **Multidisciplinary primary care teams** have been set up to overcome the limitations of solo practices and offer a more comprehensive set of services for patients with chronic and multimorbid conditions. This has been accompanied by **task shifting** of some of the clinical and non-clinical tasks to other professionals, mainly nurses and health care assistants ([Maier et al 2022](#)).

An example of successful policy is implementation of an advanced nursing practice model in rural areas of Navarra region ([Martinez 2022](#)). **Advance practice nurses** are part of multidisciplinary teams consisting of administrative staff, nursing professionals (including students), social workers, doctors (including paediatricians and resident doctors), psychologists, and physiotherapists. The advance practice nurse is responsible for acute care consultations for

low-complexity cases. The nurses in this role provide comprehensive care, including assessment, education, and treatment, referring to a doctor only when necessary. The project also includes advanced practice nurses in chronic disease management and community outreach. The model emphasizes the importance **of empowering patients and promoting self-care**. To ensuring the model success strong collaboration and support of local authorities is a prerequisite ([Martinez 2022](#)).

Another example of regional approach is **The Primary Care Strengthening and Transformation Plan** set up within Catalan health system in 2020. The project focuses on primary care teams and aims at strengthening the four dimensions: (1) professionals (improving professional skills; incorporating other specialist, e.g.: nutritionists, psychologists, social workers; new management roles e.g. screening, school references) (2) technology (improve telephone and digital accessibility; hardware and software tools for telemedicine), (3) spaces (expand spaces to accommodate new professionals; specialization of areas with a territorial vision, e.g., pediatric demand care, vaccination) and, (4) work processes (optimization of internal work processes, e.g., communication circuits, protocols and guides). The project aims at improving access, responsiveness and comprehensiveness of primary care services ([The Primary Care Strengthening and Transformation Plan 2020](#)).

Coordinated care models

Coordinated care models were implemented. For example, between 2007 and 2010 an **integrated care model** focusing on coordination of care between primary care centers and hospitals for patients with complex needs (**case-management**) was implemented in Valencia. It introduced new nursing roles: the hospital nurse care manager and community nurse case manager. The former is responsible i.e., for hospital discharge planning and assuring continuity of care, while the latter oversees community-based care model. Both managers underwent adequate training and were equipped with adequate tools (i.e., guidelines on patients' needs assessment and individual care plan, IT tools for information sharing). This dual-case management model was gradually extended to other autonomous communities ([Maier et al 2022](#)). The model evaluation showed positive effect for both patients and their families/careers as well as health professionals ([Gallud et al 2012](#); [Barabella et al. 2015](#)).

Digital solutions

Numerous examples of digital solutions successful implementation can be identified within Spanish health care system. For example, within the Galician Health Service a successful **telemonitoring program for primary care patients** have been operating for many years now ([Alonso 2022](#)). The telemonitoring project was piloted in 2017 in Santa Comba, a rural population with a high percentage of elderly residents. The positive outcomes and acceptance led to its expansion throughout all health care centres in Galicia by 2020. The telemonitoring system

utilizes the existing electronic medical record infrastructure and allows health care professionals to remotely monitor patients' health status. The system employs color-coded indicators to identify patients who require attention, enabling targeted interventions. Patients can enter their health data using their smartphones, ensuring ease of use and accessibility. The system also supports secure communication between patients and health care providers, including asynchronous messaging, phone calls, and video consultations. The system was recognized as a best practice in primary care (to be implemented also in another countries) ([Alonso 2022](#)). The success factors are related i.a. to putting a great emphasis on user-friendliness of the system as well as existence of adequate infrastructure (Galician Health Service has a unique electronic medical record which has been in place for over ten years; it allows for consistent electronic records sharing across all health care centres and hospitals in Galicia, facilitating the implementation of technological solutions).

Another example is the **proactive monitoring of chronically ill patients in complex situations supported by innovative digital solutions** have successfully implemented in the autonomous community of Andalusia ([Mesa 2022](#)). The project aimed to enable patients with complex chronic conditions to stay longer in their homes and avoid hospitalizations. It is part of the primary care strategy and includes measures for chronic socio-sanitary care, mental health, and support for palliative care. The project involves a digital transformation and the implementation of an online platform. It utilizes proactive measures such as telephonic follow-up and reinforced with in-person visits. These interventions have been shown to reduce exacerbations, hospital admissions, and improve the overall quality of life for patients. It also provides greater support for caregivers. The initial phase focused on identifying the target population, which includes individuals with complex chronic diseases who have a higher health care utilization rate, such as hospital admissions, emergency visits, and consultations. In Andalusia, this population represents approximately 5% of the total population, consisting of over 400,000 people. The project prioritized individuals diagnosed with heart failure and chronic obstructive pulmonary disease (COPD), totalling around 110,000 to 120,000 individuals in Andalusia. The primary care team, comprising the doctor and nurse, conducts a comprehensive assessment of the patient and develops a personalized action plan. The patient's chronic disease follow-up sheet serves as a basis for ongoing monitoring and coordination of care. The plan is a collaborative effort between the health care professional and the patient, allowing the patient to have a say in their treatment and care decisions. The project includes various technological tools such as a telephonic follow-up report manager and therapeutic education manager. Patients have access to a **mobile application** that provides advice and recommendations related to their specific conditions, allowing them to monitor variables such as weight, blood pressure, and heart rate. This includes **Internet of Things (IoT) platform** that allows for the collection of vital signs automatically, without the need for manual intervention by the patient. The project's organization involves a nurse case manager who coordinates the proactive monitoring process, provides information and training to health care professionals, and oversees the review of patient lists within the clinical history. The case manager can access not

only individual patient information but also the complete list of prioritized patients, which is regularly updated. This enables a comprehensive assessment of patients' health care utilization, including hospitalizations. The mobile application used by patients includes a set of questions related to their conditions, such as heart failure, post-operation care, and diabetes. The application also facilitates the collection of quantitative indicators ([Mesa 2022](#)).

2.3.2.6. Cooperation with social care sector and community involvement

A stronger **cooperation with social care sector and more emphasis on local community involvement** might help in limiting the demand for health care services, especially within the primary care system. This might be particularly important in the case of growing share of elderly patients, often living alone, experiencing loneliness and lack of social network/support.

2.4. Analysis of successful and sustainable HWF policies in medical deserts

A major challenge of health workforce situation in Spain is not the deficit of medical professionals (the number of medical doctors per 1000 inhabitants is higher than in the majority of other European countries) but their **unequal distribution across autonomous communities as well as within communities, especially between rural and urban areas**.

Therefore, the urgently needed solutions to medical deserts in Spain focus mostly on **encouraging medical staff to work in rural and other sparsely populated areas**. Examples of successful local/regional initiatives can be identified (e.g. local training for medical students in Castilla-La Mancha). Yet, there is no single, macro solution that can be applied and be sustainable. Instead, a **comprehensive and multidimensional approach** must be applied. Policies are needed to address both the medical staff education system (more training in family and community medicine) and working conditions (better infrastructure, peers support, local strategic alliances between neighbouring health centres) as well as more intersectoral approach to the population health management (e.g. community involvement, patients' empowering).

Due to the general characteristics of the Spanish health care system – existence of separate regional health systems per each autonomous community – a strongly recommended action is **launching a national knowledge translation platform (KTP) focused on identifying, evaluating and sharing best practices** in limiting medical deserts across different regions. Such platform can take a form of organization or network supporting evidence-informed decision-making – that is making health policy decisions *“informed by the best available evidence from research, as well as other factors such as context, public opinion, equity, feasibility of implementation, affordability, sustainability, and acceptability to stakeholders”* ([WHO 2022](#)). Different regions and communities across Spain can learn from each other when the examples of best practices are identified and widely disseminated.

Involvement of major stakeholders, including local authorities seems especially important the Spanish context. As mentioned earlier, without **strong and continuous political support**, any

policy aimed at mitigating medical deserts can face planning and implementation obstacles. Diverse **consensus building actions** can be taken in order to involve multiple stakeholders and ensure better applicability and sustainability of health policies. One of the positive examples is development and implementation of primary care system reform in the Valencian Community ([Lloria 2022](#)). The preparatory efforts were led by the regional authorities and included various stakeholders involvement, including scientific societies, medical associations, and the general public. A network of multidisciplinary working groups (including citizens' representatives) was set up - with each group working on separate topic related to the reform and having administrative support provided by the health department. The reform aimed at strengthen primary care as the core of the health care system and promote person-centred care. It included complementary actions related to: providing adequate funding, increased human resources, adoption of new technologies, and the integration of education, research, and training into daily practice. It also highlighted the importance of community participation, prevention, and the management of chronic conditions. The regional authorities' representatives (the Commissioner of Health and the Deputy Director General of Integrated Care) personally meet with the working teams, including administrative staff, nursing coordinators, and primary care leaders. These meetings provided an opportunity to discuss the implementation process, address challenges, and gather first-hand feedback from the teams. The Valencian Community reform experience confirmed the need for a comprehensive approach to primary care as well as the importance of collaboration, stakeholder involvement, and effective communication to achieve the desired outcomes ([Lloria 2022](#)).

2.5. Evaluation of the applicability of the ROUTE-HWF roadmap in the particular national / regional context

Application of the [ROUTE-HWF Project taxonomy](#) in the Spanish context showed that **six autonomous communities can be defined as medical deserts**: MD1 – Extremadura; MD2 - Comunitat Valenciana; MD4 - Castilla y León; MD5: Castilla-la Mancha, Andalucía and Canarias. Yet, the Spanish autonomous communities (NUTS-2 regions) can represent extremely large geographical areas. For example, Castilla y León has the geographic area of more than 94,222 km², which makes it bigger than numerous European countries (including the Netherlands, Croatia, Ireland). **Therefore, the application of the ROUTE-HWF taxonomy helped to define regions with the most disadvantageous values of the selected indicators, yet still the situation within smaller areas of each region can vary.** Most importantly there can be **major differences between rural and urban areas**. For example, in Castilla y León, in major cities (Valladolid, Salamanca, León) the situation is diametrically different than its numerous rural areas. Application of the [ROUTE-HWF Project taxonomy](#) showed **the importance of gathering and analyzing the data at the smallest, local level**. When data are available, the proposed indicators matrix can be applied to smaller territorial units – e.g., compare municipalities and/or basic health zones of Castilla y Leon to the region averages and thus indicating medical deserts more precisely.

Nevertheless, the application of the [ROUTHE-HWF Project](#) taxonomy helped to identify some regional (specific) factors, and in consequence solutions to medical deserts. Table 6 shows, as a summary, how in the different types of medical deserts areas in Spain, the (regional specific) factors/causes for desertification are aligned with the (regional specific) solutions for this.

Table 6. Evaluation of the applicability of the ROUTE-HWF in the Spanish context

Medical desert type	Region (autonomous community)	Factors / causes for desertification	Solutions for desertification
Medical desert type 1 Areas that deal with - a relative high proportion of population aged 65 years and more - a relative high proportion of population below poverty line, and - a relative small proportion of population within 15 minutes from a hospital - a relative low ratio of medical doctors per 100,000 inhabitants	Extremadura	- Aging - Poverty - Area characteristics (distance) - Lack of adequate infrastructure (lack of WIFI in rural areas) - HWF shortages - Physician working conditions (inflexible regulations limiting the possibilities of working in additional places/different providers organizations) - Limited number of medical schools/academic medical centers - Limited involvement of local health authorities	- Local training for GPs - Offering housing for GP willing to work in rural/isolated areas - Promoting working in rural areas (scholarship for students) - Investing in PHC infrastructure (including better wifi access) - Task shifting (from GPs to nurses)
Medical desert type 2 Areas that deal with - a relatively high proportion of population aged 65 years and older - a relatively high proportion of population at-risk-of-poverty rate - a relatively small proportion of population within 15 minutes from a hospital	Comunitat Valenciana	- Aging - Poverty - Patients social needs putting strain on health care - HWF shortages - Concentration of physicians in one areas - Physician working conditions (inflexible regulations limiting the possibilities of working in additional places/different providers organizations)	- Local training for GPs - Promoting working in rural areas (scholarship for students) - Offering housing for GP willing to work in rural/isolated areas - Integrated care models (case management, inc. discharge management) - Task shifting (from GPs to nurses) - Attracting doctors from other regions by offering higher salaries - Introducing more flexible working conditions (allowing for physicians working in additional places/different providers organizations)

Case studies on medical deserts – Spain

Medical desert type 4 Areas that deal with: • a relatively high proportion of population aged 65 years and older • a relatively proportion of population within 15 minutes from a hospital • a relatively low ratio of physicians per 100,000 inhabitants	Castilla y León	– Aging – Area characteristics (distance) – Lack of adequate infrastructure (lack of WIFI in rural areas) – HWF shortages – Concentration of physicians in one areas – Limited number of medical schools/ academic medical centers – Lack of local political support to implement major changes	– Local training for GPs – Offering housing for GP willing to work in rural/isolated areas – Task shifting (from GPs to nurses)
Medical desert type 5 Areas that deal with: • a relative high proportion of population aged 65 years and more • a relative small proportion of population within 15 minutes from a hospital • a relative low ratio of medical doctors per 100,000 inhabitants	Castilla-la Mancha Andalucía Canarias	– Poverty – Area characteristics (distance) – Lack of adequate infrastructure (lack of WIFI in rural areas) – HWF shortages – Limited number of medical schools/ academic medical centers	– Local training for GPs – Promoting working in rural areas (scholarship for students) – Connecting nursing and medical schools with rural areas (to organize trainings) – Task shifting (from GPs to nurses) – Health care demand management (e.g. screening programs to detect early disease deterioration)

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3. Poland

3.1. General country context

3.1.1. Geography and socio-demographic characteristics of the country and its regions

Poland is located in Central Europe with a total land area of 312,696 km². In January 1999, the three-tier administrative (territorial) division of Poland was introduced and divided the country into **voivodships**, which are further divided into **powiats** (counties) and **gminas** (municipalities). Current administrative division of Poland include: **16 voivodships; 314 powiats and 66 cities with powiat status; 2477 gminas**, including 302 urban gminas, 662 urban-rural gminas and 1513 rural gminas (Statistics, Poland, 2023).

Each region has a capital city, and the largest cities within each voivodeship often serve as economic and cultural centers. Poland has a highly varied topography, with lowlands in the central and northern regions, uplands and mountains in the south (WorldData 2023).

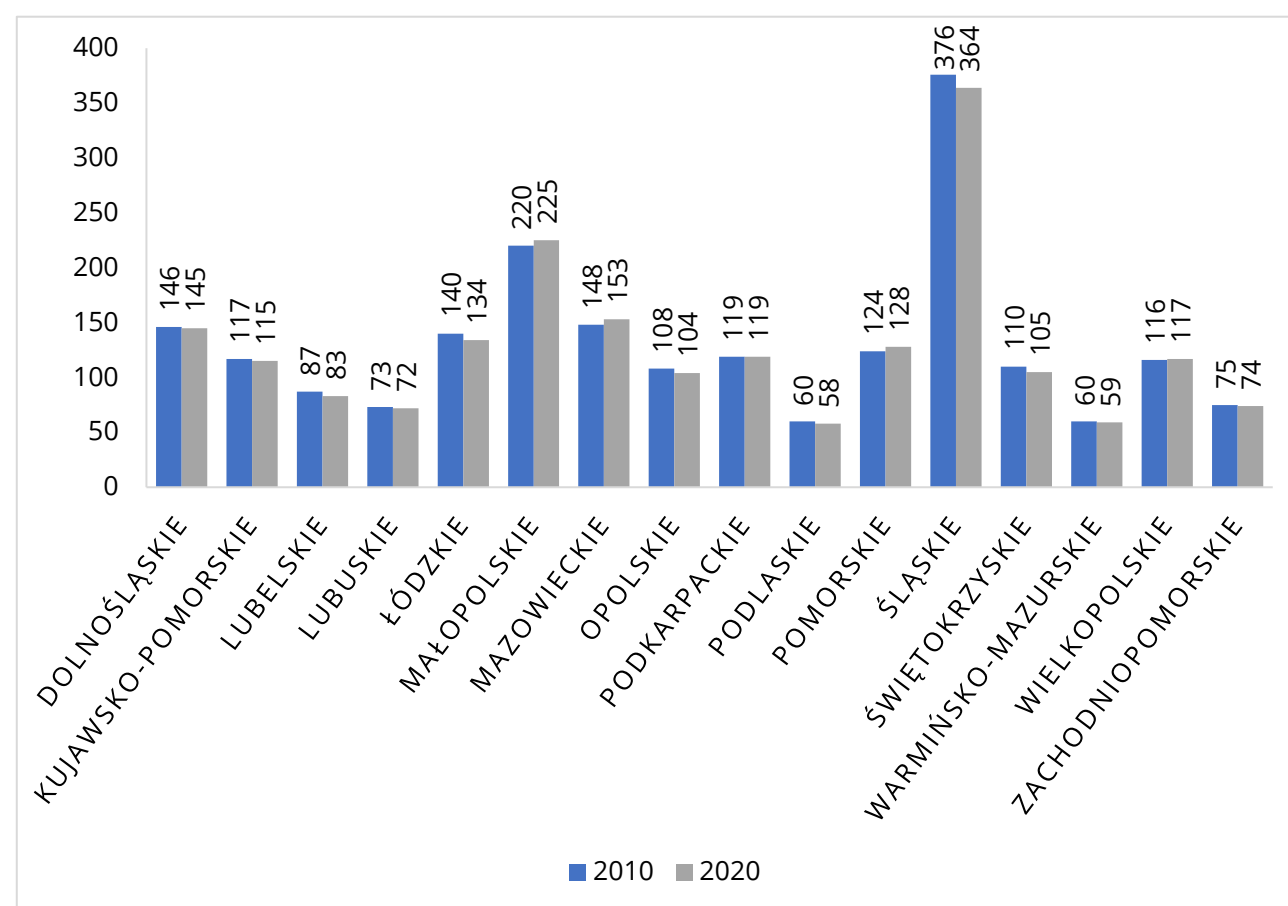
Figure 1. Map of regions (voivodships) in Poland



Source: based on www.mapchart.net

Poland **has a population of over 38 million people** (the largest in central and eastern Europe and sixth largest population in the EU), with the majority living **in urban areas**. The average **density of the population is 122 people** per km² (Eurostat 2023). In 2022, the population density ranged regionally from 58 per km² in Podlaskie voivodship to 355 in Śląskie voivodship. In majority of the voivodship (11/16), the population density decreased within the last decade (Figure 2). Nevertheless, these changes are very small, both the increase and decrease in the number of inhabitants over the decade (2010-2020) did not exceed 5% (Statistics Poland, 2023). The most populous cities in Poland are: **capital city Warsaw**, with a population of approximately **1.8 million** (the political, economic, and cultural center of the country), **Krakow** with a population of around 780,000, and **Lodz** with a population of about 700,000 (a major industrial and commercial city in central Poland (Statistics Poland 2023).

Figure 2. Population density per counties in 2010 and 2020 (persons per km²)



Source: Statistics Poland, 2023

3.1.2. Health system organization and financing

The health care system in Poland is based **on social health insurance (SHI)**, which is universal and covers almost all legal Polish residents. The compulsory health insurance contribution at the level of 9% of the remuneration is transferred through the Social Insurance Institution to the

National Health Fund (NFZ), which finances health services provided to the insured and reimburses medicines. All citizens and legal residents are required to contribute to the NFZ, which is the main source of the system's funding. Yet, in addition to social security contributions, general taxes are also used to finance health care.

The Polish health system is divided into primary care, specialized care, and hospital care. Private health care facilities provide mainly outpatient care. The majority of inpatient care is provided in mainly public hospitals. The governance of the health system is divided between the Ministry of Health (and supporting institutions) and territorial self-government: counties supervise smaller counties hospitals; and voivodships/regions oversee the larger regional hospitals. The Ministry of Health is responsible for **developing and implementing health care policies, regulations, and guidelines**.

National Health Fund (NFZ) is the main source of financing for the health care system and remains the only purchaser in the statutory health system. In Poland the purchasing and provision of medical services are strictly separated. The NFZ is responsible for managing the allocation of health care resources, including purchasing medical services and equipment (Sowada et al., 2019).

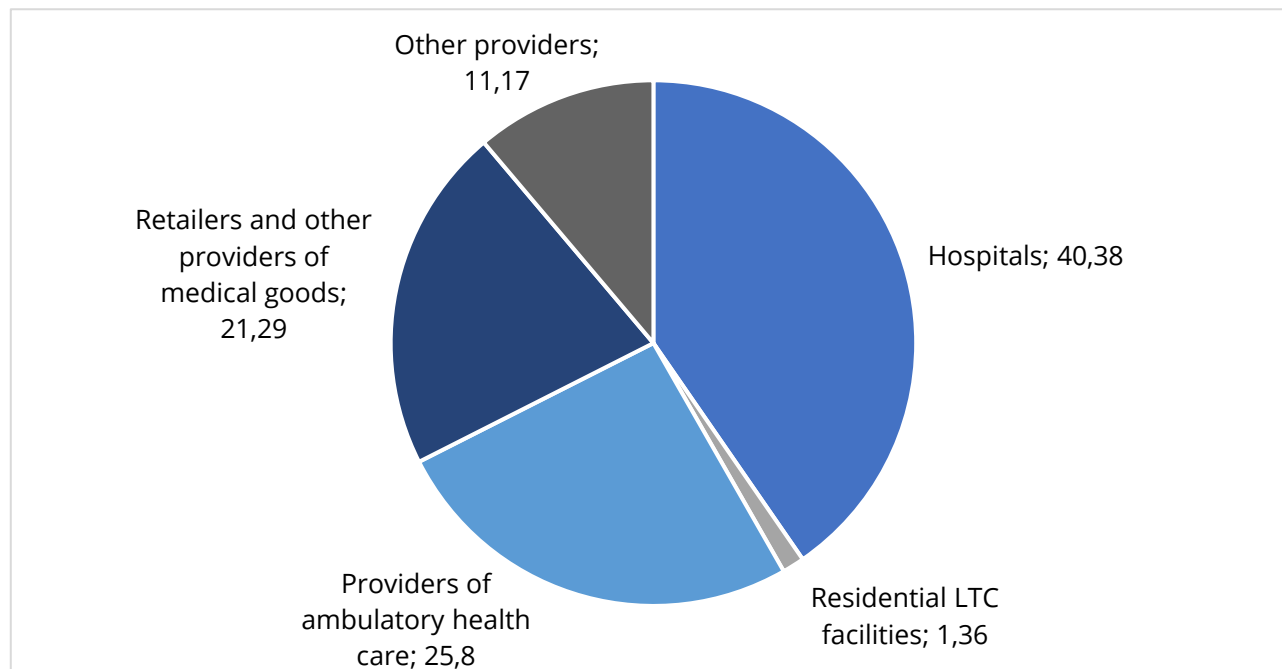
Associations of the health care professionals (including the National Chamber of Physicians and Dentists, the National Chamber of Nurses and Midwives, the Polish Chamber of Physiotherapist, the National Chamber of Pharmacists and the National Chamber of Laboratory Diagnosticians) also play an important role. These associations are responsible for maintaining professional standards, regulating the vocational training, certification of medical staffs and promoting good practices in their respective medical fields. Membership in a chamber is mandatory for all practicing professionals. These chambers maintain central registers of licensed (with the right to practice) and actively practicing health care professionals.

The Polish health care system faces some **challenges, including long waiting times for specialist care and shortages of medical personnel**. However, in overall, it provides comprehensive coverage to its population, and is continuously working to improve access and quality of care (OECD 2021). Approximately 91% of the Polish population has the right to receive health benefits financed by the NFZ (Sowada et al., 2019). The majority of the remaining 9% are most probably eligible for public coverage and receive services, although their status is not confirmed in the NFZ register (e.g. due to technical delays).

Poland spends **less on health per capita than most other EU countries** (EUR 901.9 vs EU-27 average of 3369.2 in 2020), and total health spending accounts for 6.5% of GDP in 2020 (Eurostat 2023). The share of public health expenditure in Poland (72%) is slightly lower than the EU average (76%), while out-of-pocket payments account for as many as 20% of current health care expenditure which is higher than the EU average of around 15% (OECD 2021; Eurostat 2023). Poland spends more than **1/3 of its current health expenditures on hospitals (40,38%);** 25,8% on providers of ambulatory health care and 21,29% on retailers and other providers of

medical goods (e.g. pharmacies, retail sellers and other suppliers of durable medical goods and medical appliances etc.) (Eurostat 2023).

Figure 3. Share of different types of providers in total current health expenditures (2020).



Source: based on Eurostat 2023

In 2021 the level of unmet needs, both nationally and in rural areas due to "too expensive or too far to travel or waiting list" was lower than in the EU-27: 1.0 for Poland vs 3.1% EU-average (Eurostat, 2023). The main health challenges in Poland are socioeconomic health inequalities, significant increase of mental disorders, ageing of the population and high rates of overweight and obesity among population (Sowada et al., 2019).

3.1.3. Overall picture of the HWF trends in the country and its regions

According to the data gathered in registers conducted by national medical chambers, 155.6 thousand doctors, 43.8 thousand dentists, 305.8 thousand nurses, 40.3 thousand midwives, 37.3 thousand pharmacists, and 17.7 thousand laboratory diagnosticians had the right to practice in Poland in 2021 (Statistics Poland, 2022). Compared to 2020, all medical professions showed an increase in the number of professionals (in case of doctors an increase of 2.7%). The numbers of practicing health care professionals employed in medical facilities are presented in Table 1.

The situation of the Polish health workforce is characterized by **significant staff shortages, increase of average age of practicing professionals, and difficult working conditions**, including excessive workload, long working hours and the need to work simultaneously in several health care facilities (Domagała et al., 2022). Poland has a low ratio of practicing doctors

and nurses/1,000 population: 3.3 vs 4.0 EU average for doctors and 5.1 vs. 8.3 EU average for nurses (OECD, 2022). These indicators have increased slightly in recent years, yet still constitute a major challenge taking into account the health needs of the aging Polish society.

The majority of Polish doctors and dentists are females: respectively 58.9% and 76.6%. About 98 thousand of Polish physicians with right to practice (65.3%) are specialists physicians (Statistics Poland, 2022). The average age of medical doctors in Poland in 2021 was 50.2 (54.2 for specialists). Above 26% of Polish doctors are 65+ and only about 22% are younger than 35 years (Sowada et al. 2019). Among the doctors working directly with the patient, the largest group (approx. 23.5%) were doctors aged 50-59 years (Statistics Poland, 2022).

The **high average age of practicing professionals** means that many physicians and nurses are approaching retirement age, which will influence future workforce supply. It is a consequence of a **lack of generational replacement in the key groups of health care professionals** (doctors and nurses).

The development of primary care and strengthening of family medicine is one of the key issues of Polish health care reforms. Specialization of family medicine has not been popular among Polish young physicians, but this has changed in the last years. In order to address staffing shortages, Polish regulations now permit internal medicine specialists and pediatricians to practice in primary care facilities. Nevertheless, the proportion of primary care doctors in Poland stands at a mere 9%, which is considerably lower than the EU average of 21%. (Sowada et al., 2019).

An essential source of reliable data on medical staff is [the Maps of Health Needs](#) (*Mapy potrzeb zdrowotnych*), which cover information on all groups of Polish health care professionals (including doctors, dentists, nurses, midwives, physiotherapists, laboratory diagnosticians) and present information on the medical specialization, age and gender structure of professionals and their geographical distribution. The data are available by voivodship/region, down to the county (powiat) level.

Table 1. Medical personnel by regions (voivodships). Persons working in entities (public and private health care facilities and practices) reporting to the Ministry of Health, as of 31.XII.2021.

VOIVODSHIPS	Doctors	Dentists	Nurses	Midwives	Pharmacists	Physiotherapists	Laboratory diagnosticians
POLAND	129893	34874	214533	28388	28436	33451	12749
Dolnośląskie	10562	2950	16308	1848	2217	2306	805
Kujawsko-pomorskie	5918	1232	10957	1439	1428	2243	793

Lubelskie	7434	2013	13671	1809	1801	1705	703
Lubuskie	2295	730	4573	557	588	750	225
Łódzkie	9695	2637	12866	2037	2110	1556	742
Małopolskie	11802	3207	19450	2573	2531	3910	1246
Mazowieckie	23895	6001	33669	4260	4402	4990	2069
Opolskie	2316	667	5210	627	591	879	233
Podkarpackie	5541	1654	13463	1845	1296	3132	830
Podlaskie	4322	1234	6987	985	891	793	486
Pomorskie	8115	2228	10754	1447	1825	1372	798
Śląskie	15592	3791	26621	3264	3428	3813	1448
Świętokrzyskie	3573	990	8117	996	808	1674	564
Warmińsko-mazurskie	3447	926	7162	820	737	999	422
Wielkopolskie	10070	2943	16805	2808	2735	1850	943
Zachodniopomorskie	5316	1671	7920	1073	1048	1479	442

Source: National Statistics Poland based on data of the Ministry of Health, Ministry of Interior and Administration, Statistics Poland.

The largest number of doctors work directly with the patient in the large voivodships: Mazowieckie (23.9 thousand), Silesian (15.6 thousand), Małopolskie and Dolnośląskie (respectively 11.4 thousand and 10.6 thousand). With regard to the number of doctors per 10,000 inhabitants, the Mazowieckie Voivodeship ranked first (43.3 doctors per 10,000 inhabitants), followed by the Łódzkie (40.5 per 10,000 inhabitants).

The smallest number of doctors per 10,000 inhabitants was reported in the following voivodships: Lubuskie (23.3), Opolskie (24.4) and Warmińsko-Mazurskie (25.1), which belong to the group of smaller voivodships, with a relatively small number of inhabitants in cities which are the seats of voivodeship authorities.

Table 2. Persons working directly with patient on 10 thousand population by voivodships as of 31.XII.2021

VOIVODSHIPS	Doctors	Dentists	Nurses	Midwives	Pharmacists	Physiotherapists	Laboratory diagnosticians
POLAND	34.3	9.2	56.6	14.5	7.5	8.8	3.4
Dolnośląskie	36.4	10.2	56.3	12.3	7.7	8.0	2.8
Kujawsko-pomorskie	29.3	6.1	54.3	13.8	7.1	11.1	3.9
Lubelskie	36.5	9.9	67.1	17.2	8.8	8.4	3.4
Lubuskie	23.3	7.4	46.4	11	6	7.6	2.3
Łódzkie	40.5	11.0	53.7	16.2	8.8	6.5	3.1

Małopolskie	34.4	9.3	56.7	14.6	7.4	11.4	3.6
Mazowieckie	43.3	10.9	61.6	14.8	8.0	9.1	3.8
Opolskie	24.4	7.0	54.9	12.8	6.2	9.3	2.5
Podkarpackie	26.6	7.9	64.5	17.3	6.2	15.0	4.0
Podlaskie	37.6	10.7	60.8	16.7	6.8	6.9	4.2
Pomorskie	34.4	9.4	45.6	11.9	6.7	5.8	3.4
Śląskie	35.6	8.7	60.8	14.4	7.8	8.7	3.3
Świętokrzyskie	30.1	8.3	68.3	16.3	6.8	14.1	4.7
Warmińsko-mazurskie	25.1	6.7	52.1	11.7	5.4	7.3	3.1
Wielkopolskie	28.8	8.4	48	15.6	7.8	5.3	2.7
Zachodniopomorskie	32.2	10.1	48	12.6	6.4	9.0	2.7

Source: National Statistics Poland based on data of the Ministry of Health, Ministry of Interior and Administration, Statistics Poland.

Table 3. Practicing doctors per regions, as of 31 December 2021

VOIVODSHIPS	Number of practicing doctors	Number of practicing doctors per 100 000 population	Average age [years]	Average number of job places
POLAND	13 6217	357.7	50.18	1.92
Dolnośląskie	11995	416.4	49.54	1.58
Kujawsko-pomorskie	6511	317.9	50.14	1.49
Lubelskie	8362	402.7	50.03	1.74
Lubuskie	2581	258.3	52.24	1.39
Łódzkie	12681	524.7	51.02	1.62
Małopolskie	13167	386.4	49.48	1.6
Mazowieckie	34884	643.6	50.75	1.68
Opolskie	2556	263.7	52.19	1.49
Podkarpackie	6140	290.9	49.99	1.57
Podlaskie	4690	402.5	49.42	1.63
Pomorskie	8948	381.3	48.71	1.54
Śląskie	17005	381.6	50.54	1.66
Świętokrzyskie	3960	326.6	51.62	1.65
Warmińsko-mazurskie	3738	266	51.49	1.42
Wielkopolskie	11226	321.7	50.06	1.47
Zachodniopomorskie	5717	340.9	49.97	1.48

Source: Maps of healthcare needs, basiw.mz.gov.pl/mapy-informacje/mapa-2022-2026/analizy/kadry-medyczne/kadry-medyczne [accessed on 15 April 2023]

Three specializations dominate among physicians working in primary care: internal medicine (11,531 physicians), family medicine (9,484) and pediatrics (8,433). These numbers should not be added up, as many physicians have more than one specialty. In 2021, the contract with the National Health Fund for services in primary health care was signed by 81,949 professionals, including 38,074 doctors, 37,149 nurses and 6,710 midwives (National Health Fund, 2021).

Table 4. Number of doctors working in primary care (2019 – 2021).

VOIVODSHIPS	Doctors working in primary care					
	Number of practicing doctors			Number of practicing doctors per 100 000 population		
	2019	2020	2021	2019	2020	2021
POLAND	37 163	37 440	38 074	93.4	94.2	96.3
Dolnośląskie	3021	3076	3185	104.2	106.4	110.6
Kujawsko-pomorskie	2020	1997	1989	97.5	96.9	97.1
Lubelskie	2138	219	2253	101.4	104.9	108.5
Lubuskie	784	781	788	77.5	77.5	78.9
Łódzkie	2810	2826	2852	114.5	115.9	118.0
Małopolskie	3284	3327	3418	96.3	97.6	100.3
Mazowieckie	5714	5838	5916	105.4	107.6	109.2
Opolskie	855	864	877	87.0	88.5	90.5
Podkarpackie	1740	1772	1810	81.8	83.5	85.8
Podlaskie	1069	1073	1127	90.7	91.5	96.7
Pomorskie	2204	2230	2249	94.0	95.0	95.8
Śląskie	5035	5086	5149	111.5	113.2	115.6
Świętokrzyskie	1245	1205	1185	100.9	98.4	97.7
Warmińsko-mazurskie	1032	1021	1036	72.5	71.4	73.7
Wielkopolskie	2895	2847	2098	82.7	81.4	83.3
Zachodniopomorskie	1317	1309	1332	77.6	77.5	79.4

Source: Maps of Health Needs, basiw.mz.gov.pl/mapy-informacje/mapa-2022-2026/analizy/kadry-medyczne/kadry-medyczne [accessed on 15 April 2023]

In 2021, 240 922 nurses (98% women) were employed in Polish health care facilities. The average number of their job places was 1.67 (Health Needs Maps, 2023). Nurses are employed based on employment contracts, and civil-law contracts, or through individual or group nursing practice contracts (WHO, 2019). The number of practicing nurses per 100 000 population varies across the country; it is highest in the Mazowieckie region (988.2); and the lowest in the Lubuskie (531.8) Zachodniopomorskie (559.4) and Warmińsko-mazurskie (Table 5).

The National Chamber of Nurses and Midwives forecasts systematic growth in the number of nurses entitled to retire, a constant rise in the average age of practicing nurses, which lead to the generational gap (the lack of replacement of retirees by new professionals).

Table 5. Practicing nurses per regions, as of 31 December 2021

VOIVODSHIPS	Number of practicing nurses	Number of practicing nurses per 100 000 population	Average age [years]	Average number of job places
POLAND	240 922	632.7	49.02	1.67
Dolnośląskie	19843	688.9	50.68	1.45
Kujawsko-pomorskie	13110	640.2	49.22	1.38
Lubelskie	15537	748.3	48.31	1.44
Lubuskie	5314	531.8	50.72	1.35
Łódzkie	16238	671.9	50.05	1.49
Małopolskie	23765	697.4	47.59	1.4
Mazowieckie	53560	988.2	48.64	1.49
Opolskie	6077	626.9	48.26	1.42
Podkarpackie	16532	783.2	47.31	1.39
Podlaskie	8145	699.0	48.54	1.46
Pomorskie	12892	549.3	49.55	1.38
Śląskie	32042	719.1	49.65	1.52
Świętokrzyskie	9283	765.6	47.51	1.44
Warmińsko-mazurskie	8070	574.2	49.86	1.39
Wielkopolskie	20879	598.4	49.42	1.43
Zachodniopomorskie	9381	559.4	50.51	1.41

Source: Maps of healthcare needs, basiw.mz.gov.pl/mapy-informacje/mapa-2022-2026/analizy/kadry-medyczne/kadry-medyczne [accessed on 15 April 2023]

3.2. Types of medical deserts in the country and factors driving desertification

3.2.1. Definition of medical deserts

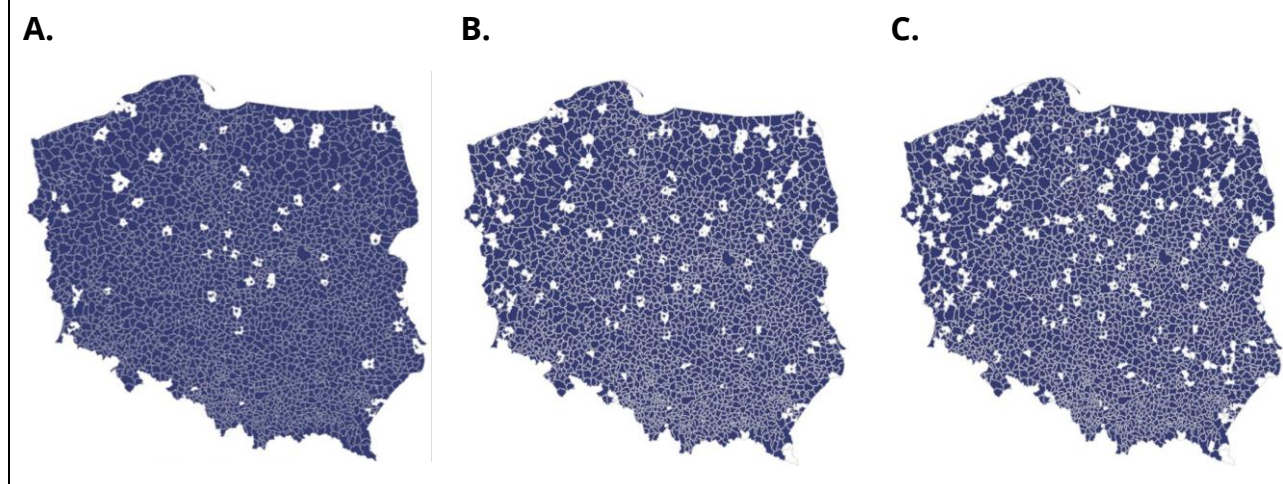
In Poland the term '*medical deserts*' is not used in any legal, administrative or policy documents. The terms used are "**staff shortages**" or "**white spots**" defined as areas of lacking service (due to lack of medical staff or long waiting time) or lowest availability of health services or lowest staff indicators in countrywide comparisons.

In 2019 in 47 Polish municipalities (1.9% of all municipalities) there was not a single primary care facility with signed contract with the public payer ("**white spots**"). In 124 municipalities (5%), there was no doctor who had signed a contract for PHC services, or a doctor with such a contract had already reached the retirement age. These "white spots" are dispersed all over the country and are usually result of organizational or local issues that are transient. It is stressed that a **significant proportion of family practice is carried out by doctors who already reached retirement age** (Figure 4).

According to the estimation of the National Health Fund, in 2024 – 190 municipalities (7.7%) will be without a PHC doctor before reaching the retirement age and without the inflow of young doctors in 143 municipalities there could potentially be a substantial decline in the access of primary health care services (Ministry of Health, 2021).

Figure 4. Municipalities without a primary care physicians

- A. 47 Municipalities without primary care physicians in 2019 (including those above retirement age)
- B. 124 Municipalities without primary care physicians in 2019 (up to retirement age)
- C. 190 Municipalities without primary care physicians in 2024 (up to retirement age)



Source: Ministry of Health, based on data from National Health Fund and National Statistical Office

In 2020, there were 28.7 doctors per 100,000 population with specialization in family medicine, while the indicator recommended by national consultants is 44.3, which means a lack of 15.6 doctors per 100,000 population (Maps of healthcare needs, 2021).

In 2020, there were 10,906 doctors with specialization in family medicine. According to the data from Maps of Health Needs, by 2025, 1,976 doctors will reach retirement age, while 2,210 doctors are undergoing specialization training, which means that all leaving the profession will be replaced with a surplus of 234 doctors.

3.2.2. Application of the ROUTE-HWF taxonomy to identify and measure medical deserts

The [ROUTE-HWF Project](#) approach to define and measure medical deserts (see the Deliverables 4.2. and 5.2) is based on a set of four objects/elements: Two that address the level of healthcare demand and two that address the healthcare supply in a given area. These demand-related objects are indicated by: (1) % of population 65+ and (2) economic resources of the population, while the supply-related objects are indicated by (3) travel times to public health facilities and (4) population-provider ratio. These four indications are measured in terms of the relative value for a certain area, being either above or below the country average. Combining these four dichotomous variables, the framework results in five exclusive types of medical deserts, where at least three of the four objects of a medical desert apply (Table 6).

Table 6. [The ROUTHE-HWF Project](#) taxonomy, defining five exclusive and prominent types of medical deserts

Type of medical desert	POPULATION AND HEALTHCARE DEMAND OBJECTS		AREA AND HEALTHCARE SUPPLY OBJECTS	
	Object 1: Percentage population aged 65 and over <i>The proportion of inhabitants aged 65 and over living in this area, is <u>higher</u> than the proportion of all inhabitants in a country living in this area</i>	Object 2: Economic resources of the population <i>The proportion of inhabitants below the poverty line living in this area, is <u>higher</u> than the proportion of all inhabitants in a country living in this area</i>	Object 3: Travel time to public health facilities <i>The percentage of the population that lives within 15 minutes from a hospital in this area is <u>smaller</u> than the average percentage at the national level of the country</i>	Object 4: Population-provider ratio <i>The proportion of health professionals working in this area, is <u>lower</u> than the proportion of all inhabitants in a country living in this area</i>
1	x	x	x	x
2	x	x	x	
3	x	x		x
4	x		x	x
5		x	x	x

Source: Deliverable 4.2. Second version of a definition and taxonomy on medical deserts.

The application of the [ROUTHE-HWF Project](#) taxonomy in the Polish context showed that two regions/voivodships **can be defined as medical deserts** (Table 7): Lubelskie is a medical desert type 2 (MD2); and Kujawsko-Pomorskie is a medical desert type 5 (MD5).

Table 7. Application of *the ROUTHE-HWF Project* taxonomy of medical deserts per region.

NUTS-2 region	Proportion of population aged 65 years and more (2021)	Percentage of population at risk of poverty or social exclusion (2021)	Percentage of population within 15 minutes from a hospital (2020)	Medical doctors per 100,000 inhabitants (2021) *
POLAND	18.7	16.8	62.8	357.7
Małopolskie	17.5	16.0	62.9	386.4
Śląskie	19.8	14.5	22.6	381.6
Wielkopolskie	17.3	17.8	71.6	321.7
Zachodniopomorskie	19.4	14.6	69.9	340.9
Lubuskie	18.3	17.3	70.7	258.3
Dolnośląskie	19.8	12.1	78.0	416.4
Opolskie	19.8	11.4	72.5	263.7
Kujawsko-Pomorskie	18.4	23.2	61.2	317.9
Warmińsko-Mazurskie	17.4	22.5	73.2	266.0
Pomorskie	17.6	15.3	63.3	381.3
Łódzkie	20.7	15.7	71.4	524.7
Świętokrzyskie	20.4	14.6	65.6	326.6
Lubelskie	19.2	24.4	32.5	402.7
Podkarpackie	17.6	19.2	72.7	290.9
Podlaskie	18.5	21.0	76.4	402.5
Warszawski stołeczny	19.1	10.7	82.8	643.6
Mazowiecki Regionalny	17.9	22.0	69.2	

The numbers in red colours indicate that the regional value is below or above the country average, implying that it adheres to the particular object/element indicator of the ROUTE-HWF taxonomy of medical deserts.

Source: Eurostat 2023

*Source: Maps of Health Needs <https://basiw.mz.gov.pl/mapy-informacje/mapa-2022-2026/analizy/kadry-medyczne/kadry-medyczne/>

Figure 5. Identified types of medical deserts in Poland

Source: based on www.mapchart.net

It should be noted that, based on the selected factors, two Polish regions can be classified as medical deserts. However, when considering **significant staff shortages, there are also other regions that require special attention: Lubuskie, Opolskie, and Warmińsko-Mazurskie** (Table 7). These regions were also indicated by national experts as areas in need of particular focus.

3.2.3. Factors contributing to medical deserts

Numerous factors contribute to the existence of medical deserts in Poland. The key drivers of desertification are as follows: poor HFW planning mechanisms, shortages of medical staff (mainly doctors and nurses), an aging society and simultaneously aging medical personnel, uneven geographical distribution of staff, and challenging working conditions.

Poor HFW planning mechanism

For many decades, Poland has **lacked a reliable planning process** in the field of training and employing medical workers. Consistent, long-term strategies in this regard have also been

absent. Consequently, the policies regarding medical workforce development were insufficient and inadequate. Previously, there were no dedicated governmental departments, agencies, or professional bodies responsible for planning the medical staff (Domagała and Klich, 2018). Health workforce analysis and forecasts were primarily developed by professional associations, such as detailed reports on the demography of physicians and dentists developed by the **National Chamber of Physicians** (<http://www.nil.org.pl>) or reports on possibilities of providing nursing and medical care in Poland – diagnosis and perspectives developed by the **National Chamber of Nurses and Midwives** (www.nipip.org.pl).

It should be noted that the situation has recently improved. Currently, health workforce analyses and forecasts are carried out by the Department of Analyses and Strategy of the Ministry of Health. A highly reliable and valuable platform has been developed to facilitate the process of collecting, analyzing, and monitoring data on medical personnel: [the Maps of Health Needs](#) (*Mapy potrzeb zdrowotnych*), which is an online interactive analytical tool.

Staff shortages

In Poland, **significant staff shortages** are the primary challenge facing the health care system and the main factor influencing limitations in the provision of health services in primary care (Windak et al., 2019). According to the report developed by the Ministry of Family and Social Policy titled “[Occupational Barometer 2022](#)”, among 30 shortage professions in Poland in 2021, 13 occupations were health and care professions, including physicians, physiotherapists, nurses, midwives, and caregivers. Based on the needs reported by national consultants, the greatest staff shortages occur in internal medicine (14,203 doctors are missing), family medicine (6,142 doctors are missing) and psychiatry (3,796 doctors are missing).

Moreover, there is **uneven geographical distribution of health workforce**. In case of primary care, the highest indicator is in the Łódzkie Voivodeship (118 primary care doctors/per 100,000 population), while the lowest rate (only 73.7) is in the Warmińsko-Mazurskie Voivodeship (Health Needs Maps, 2023).

In 2012, the Ministry of Health introduced legal regulations indicating **priority (deficit) medical specialties** with major shortages of professionals. More residency places for postgraduate training and higher wages have been offered to physicians pursuing these priority specializations (23 areas of medicine with the most severe shortages), including, family medicine, pediatrics, geriatrics and internal medicine.

Significant shortages also occur in **groups of nurses and midwives**. In 2017, the National Chamber of Nurses and Midwives in the report titled: [Securing the Polish society in the services of nurses and midwives](#) forecasts systematic growth in the number of nurses entitled to retire, a constant rise in the average age of practicing nurses and midwives, a clear lack of generational replacement and a further decrease in the number of nurses per 1,000 inhabitants, to the ratio value of 3.81 in 2030 (NiPIP, 2017).

Aging of the population and aging of health care workforce

The demographic challenge of both the aging of Polish society and aging of the practicing health professionals call for special attention and further development of dedicated health policies. For several years, there have been disadvantageous **trends in the age structure of medical professionals**. The unfavorable age structure shows an average age of practicing specialists at 54.2 years. More than 60% of practicing specialists over 50 years. Additionally, the share of doctors and nurses approaching retirement is growing and there is not enough young professionals to replace them.

The number of workers aged 60 and above has been increasing each year, particularly among key medical groups such as doctors and nurses. In 2021, the largest age group among doctors was the 50-59 age bracket, comprising 32,000 individuals, accounting for 20.6% of the total number of doctors. There was an observed increase in the number of doctors in the two youngest age groups: those aged up to 29 years, which amounted to 18,200 individuals, representing 11.7% of all doctors in 2021, and the group aged 30-39 years, with 28,500 doctors, making up 18.3% of all doctors with valid licenses. On the other hand, there was a decrease in the proportion of doctors aged 40-49 years, which amounted to 23,300 individuals (Health Needs Maps, 2023).

Changes in the age structure were also evident **among nurses and midwives**, with a continued rise in the number of nurses aged 50 and above. In 2021, the highest number of nurses authorized to practice (96,100 individuals) fell within the 50-59 age group. However, the next sizable groups were nurses aged 60-69 years (73,700 individuals) and 40-49 years (68,300 individuals). There were also almost 18,000 nurses in the oldest age group (70 years or older), constituting 5.9% of the overall number of licensed nurses (Health Needs Maps, 2023).

Long waiting time

According to the participants of the ROUTE-HWF national stakeholders' workshop important factor which should be applied in the Polish context is waiting times. This refers to the time patients need to wait before getting access to a particular medical service (including consultation and elective medical procedures). In Poland, the data on waiting times are being gathered by the National Health Fund and although numerous policies have been implemented within the last decade to tackle long waiting times (e.g., fast track oncological package), the problem remains valid and with no straightforward solutions. An important factor is the availability of specialists in "rare medical specialties". Access to some specialized services or some areas of medical services may be significantly different among voivodships/regions. The services are available for all citizens but waiting times can be very different among voivodships/regions and counties.

Migration of health care professionals

Approximately 7-9% of Polish physicians and nurses have applied for certificates confirming their right to practice in other countries, indicating the significant scale of emigration among the medical staff (Domagała et al., 2022). The main factors influencing decisions on emigration are unsatisfactory salary, lack of work-life balance, long working hours, heavy workload, and limited possibility of professional development. Emigration could be considered as particularly serious factor mainly in those regions where migration to work in Germany could play a role (close to the border regions - Lubuskie, Opolskie, Zachodniopomorskie). Moreover, there is a tendency for internal migration from small cities to big agglomerations with tertiary/university hospitals.

Work-related factors

As mentioned above, work-related factors are important emigration drivers. These factors were also indicated as especially important by participants of a ROUTE-HWF national stakeholder workshop. The issues related to job satisfaction, burnout, difficult working conditions, heavy workload, administrative burden, limited career prospects, unsatisfactory remuneration, and lack of career prospects were all mentioned as highly relevant factors contributing to the medical deserts in Poland. These factors are simultaneously the driving forces behind the aforementioned emigration of professionals. This is particularly evident among the group of young professionals, who have a higher preference for a good work-life balance, and they are less willing to work longer hours.

Lack of job opportunities and socio-economic factors

According to the respondents of the ROUTE-HWF Questionnaire, more opportunities to secure a good job with high satisfaction or establish a successful private practice are available in economically stronger and more populated regions². This factor could be the main driving force behind the very high indicators of medical staff in Mazowieckie voivodship. Private health services are concentrated in major cities and are more prevalent in "rich" areas. Mazowieckie has the highest GDP/per capita and the highest indicators for medical staff. Private health services are available all over the country. Although there is no data on this issue, obviously, socioeconomic status has a significant impact on the accessibility and usage of these services. Patients who have to or want to rely only on the public system have to wait for services longer.

² ROUTE-HWF Questionnaire - Poland

Those who want and can afford private medical expenses very often use this opportunity to avoid long waiting times (it is the primary motivation to use private health services).

3.3. HWF policies and approaches to mitigate medical deserts

3.3.1. Policy perspective on medical deserts in Poland

Currently, the main strategy for improving the access to health care services is increasing the number of higher education institutions offering undergraduate physicians education and increase in the number admissions to medical studies. The Minister of Health, in consultation with the Minister of Education and Science, sets admission quotas for medical studies – in each academic year and for each university. From the academic year 2014/2015 to the academic year 2023/2024, there has been a significant growth in the admission limits for medical and dental programs at authorized universities. The number of available spots has increased from 6,784 to 11,062, representing an increase of 4,278 places (Dziennik Prawny, 2023).

Starting from the academic year 2023/2024, the total admission limit for medical studies amounts to 9,725 places. The Minister of Health has set this record-breaking admission limit. **In 2015, there were 15 universities** offering medical studies, from October 2023, the medical studies are available at **34 Polish higher education institutions**. However, it should be noted that there is a lack of a dedicated long-term strategy or any forecasts in this area. There are also concerns regarding the practical capacities and quality of education in newly opened entities.

3.3.2. Policies and approaches to mitigate medical deserts

3.3.2.1. Health workforce planning and forecasting

In the Polish health system, there is still lack of comprehensive diagnosis of the staffing shortages, forecasts for this area or long-term strategy of health workforce development. As mentioned above, a valuable source of information on health care professionals is the *Maps of health needs*, which contain data on the main groups of medical professionals. The analyses are provided by region, down to the county level. The gathered data is based on registers maintained by medical chambers and serves as a valuable source for further analysis and monitoring of health workforce.

The challenge of nursing staff shortages and the ways to resolve it were covered in the document [“Long-term state policy for nursing and midwifery in Poland”](#), which has been implemented in 2019. It aims at increasing the number of nurses and midwives, reining in emigration, introducing tools and incentives to motivate graduates to take up their chosen profession in Poland and keeping nursing staff from retiring (Ministry of Health, 2019).

In the case of physician shortages, the current implementation of increasing the number of institutions educating future doctors and the significant increase in the number of admissions

to medical studies is not based on a specific long-term strategy or simulations in this regard. Opening medical studies at additional education institutions raises opposition from the medical community, which emphasizes that increasing the number of graduates will not solve the staffing issues in public health care. There are concerns about matters related to the quality of training, educational infrastructure, as well as doubts about the suitability of the postgraduate training system. According to the National Chamber of Physicians, this could result in a decline in knowledge levels and inadequacy in providing proper patient care, leading to reduced patient safety and healthcare quality.

Shortages of medical doctors are a serious challenge for the health system, leading to limited access and long waiting times for health services. According to information published in the [“Report on the Health Status of Rural Residents”](#) (European Rural Development Fund Poland, 2022) access to health care facilities in rural areas significantly differs from that available to residents of large cities. Young doctors are reluctant to settle outside major urban areas. The number of primary care facilities (POZ) 10,000 inhabitants is approximately 2.6 in cities and about 2.0 in rural areas. According to data presented by the Central Statistical Office, there are 3 health care facilities per 10,000 residents in rural areas, whereas in cities, this indicator is nearly 6.5. Evidence shows that rural residents utilize POZ services slightly less frequently compared to city dwellers. **In 2021, the average annual number of health services rendered was 4.5 for city residents and 3.9 for rural residents.** This may be partially linked to access to care, but the influence of social factors cannot be excluded (European Rural Development Fund Poland, 2022).

3.3.2.2. New/innovative models of care

Coordinated care

The Polish health system is highly fragmented with different types of services/level of care often operating in separate subsystems without any cooperation. In 2015, two significant initiatives were implemented to improve cancer patient care and reduce waiting times. These programs were known as the '**oncology package**' and the '**waiting times package**.' The primary focus of these packages was to enhance primary health care services and encourage a shift of patients from specialist to primary care settings. They included various financial and non-financial measures, such as: 1) introducing a 'prescription visit' at PHC clinics, allowing patients to obtain new prescriptions without the need to see a specialist; 2) implementing PHC gatekeeping for ophthalmologists and dermatologists, who were previously directly accessible without referral; 3) expanding the list of diagnostic tests available within PHC facilities; 4) authorizing nurses to prescribe certain medications and diagnostic procedures, as well as issue referrals for specific diagnostic tests. These measures aimed to strengthen primary health care, improve patient access, and optimize the utilization of specialists' expertise. Following the implementation of the oncology and waiting times packages, additional coordinated care programs were introduced as

part of comprehensive initiatives to further decrease waiting times. The Act on Primary Health Care 2017 established a legal framework to pilot new solutions of **coordinated primary care (“POZ Plus”)**. It outlines the broad objectives and organization of primary health care. According to this Act, PHC teams, consisting of a doctor, nurse, and midwife, are responsible for providing PHC services to individuals who have selected them as their primary care providers. These teams also take charge of coordinating patients' care within the health care system, which includes prophylaxis, health promotion, education, diagnostics, and specialist consultations (Badora-Musiał et al., 2021). The Act encourages the adoption of electronic and ICT solutions to facilitate coordination within PHC and between PHC and other healthcare providers. It also permits the introduction of new financing methods to complement capitation payments and support the achievement of proposed goals. These new financing approaches may include lump sum budgets to ensure care coordination and incentive payments tied to health outcomes and the quality of care.

The new coordinated model of primary care, aims to shift health care provision gradually from specialist care to primary health care while emphasizing disease prevention and health promotion services as integral aspects of PHC. To achieve this objective, the model introduces a comprehensive patient assessment at the PHC level and transfers the responsibility for certain diagnostic tests, specialist services, and the management of specific chronic conditions to PHC. This transfer is facilitated by expanding the competencies of both PHC doctors and nurses (Badora-Musiał et al., 2021). The implementation of the “POZ Plus” was piloted, evaluated and it is supported by a range of financial and non-financial incentives for primary health care facilities.

Care coordinators

The previous experiences with implementing coordinated care in Poland clearly demonstrate that health care facilities employing coordinators have gained numerous benefits and improvements in task execution. As shown by several years of experience in the labour market for oncology package coordinators, employees in these positions possess significant potential to enhance the functioning of individual entities within the system. This is a new and highly valuable group of professionals who are required to have a diverse set of competencies from various fields. Experiences after the introduction of the coordinators of primary care “POZ Plus” have shown that the range of benefits obtained from this new role is extensive, both for the patients, members of the therapeutic team, health care facility and, more broadly, for the healthcare system ([World Bank Group, PHC Plus Evaluation, 2021](#)). The vast majority of coordinators have direct contact with patients in their daily work, primarily supporting them in organizational aspects and other non-medical areas. Due to the implementation of care coordinators and their efforts, there has been an improvement in work organization, with certain tasks shifting from doctors to nurses and from nurses to coordinators. In the context of current medical staff shortages, achieving such an effect is highly important and should be implemented on a broader scale.

Skill-mix

In Poland, measures have been implemented to address the shortage of doctors and enhance access to medical services. These changes include granting additional responsibilities to various health care professionals. For instance, **nurses and midwives** are now authorized to issue prescriptions and medical orders, **paramedics** are allowed to provide medical emergency services and health care assistance, and **physiotherapists** are empowered to conduct independent physiotherapeutic visits. New qualifications for **medical caregivers** and a new core curriculum as well as a broad promotional campaign for this profession is taking place. But on the other hand, the interest among nurses, for example, in issuing prescriptions is much lower than expected - many nurses do not want new duties, and there are no special incentives, and there are shortages of nurses, even for the activities they have performed so far³. Introducing skill-mix and new task divisions requires an acceleration of legislative activity related to providing new competencies to particular medical professions. An illustration of collaborative healthcare interventions can be observed in recent years where various medical professions have been involved in administering Covid-19 vaccinations. Professionals such as physiotherapists, laboratory diagnosticians, and pharmacists were equipped to carry out this essential task. This skill-mix practice serves as evidence that such collaborative solutions are both feasible and effective. These changes contribute to increasing the availability of medical services for the patients.

3.3.2.3. Financial incentives for health workers to work in medical deserts

Higher remuneration during residency training in deficit specialization

The Ministry of Health attempts to increase number of specialists in "priority/deficit specializations" (list of such specializations is published by the Ministry of Health each year and currently includes 23 medical specialties) by offering **better residency contracts in the specialties with largest shortages of staff**. Usually, these specialties are considered unattractive and residency posts are not taken up. One of the measures to mitigate the effects of medical desert may be to encourage medical students to apply and **undertake deficit specializations**.⁴ One of the specialties facing a deficit is family medicine. According to the Ministry of Health, the number of doctors undergoing specialized training in family medicine in the residency program has increased in 2021 by 1,156 doctors in comparison to 2015, representing a growth of nearly 133 percent. Over the past 6 years, family medicine has

³ National ROUTE-HWF Stakeholders workshop

⁴ National ROUTE-HWF Stakeholders workshop

consistently ranked among the top four specialties with the highest number of trainees starting their training, and it has often been the specialty with the most residents starting their specialized training in the residency program (Ministry of Health, 2022).

Scholarship offered by local authorities

Financial incentives are also **offered by local authorities** to assure the availability of the staff. An important incentive to work are local government scholarships for medical students (offered to students starting from the second year of the study). Students receiving this scholarship usually take up work in this particular region/county/community for a specified period, defined in the scholarship agreement. To attract prospective candidates for work in unattractive area, local authorities even offer additional payment (**salary supplements**). Some local authorities also provide accommodation to recruit doctors to work in a specific area. The number and geographical distribution of such offers are not known.

3.3.2.4. Loan for medical studies

In 2022, the Regulation of the Minister of Health regarding a loan for medical studies has been implemented (based on art. 103 of the Higher Education and Science Act, financial assistance is available to students studying medicine). The loan for medical studies applies to studies at public universities and at private education institutions and aims at covering the tuition fees. In the academic year 2021/2022, the maximum amount of the loan was 18,000 PLN, in 2022/23 - 20,000 PLN and in 2023/2024, will be 22,000 PLN per semester for the duration covered by the loan. The loan forgiveness can be applied for after 10 years of work in public healthcare facilities in Poland (Ministry of Health, 2022).

3.3.2.5. Flexibility of formal requirements to attract young doctors to primary care

Staff shortages are particularly significant in small counties and in rural areas. In response to this, in 2019, the President of the National Health Fund has introduced **legal regulations to attract young doctors to primary care**: doctors who passed the State Medical Examination and not completed or even started a specialization were admitted to practice in primary care facilities in rural areas with a low population density (up to 50 inhabitants per square kilometers). Moreover, the doctors working in rural areas are paid **a monthly lump sum** of PLN 5,000 (appr. 1080 Euro) in addition to their regular salary (NHF, 2019).

3.3.2.6. Making the possibility of employing workers from outside the EU more flexible

Until recently, Poland served as a source country for training medical professionals, of whom approximately 7-9% decided to emigrate (Domagała et al., 2022). The immigration of medical staff to Poland was marginal, comprising only 1-2% of the working health care professionals.

Non-EU medical professionals seeking to practice legally in Poland had to undergo a lengthy and complicated diploma recognition process (nostrification procedure) to have their qualifications deemed equivalent to those obtained in Poland. However, this situation underwent significant changes following the Covid-19 pandemic in 2020, which prompted a need to strengthen the Polish health care workforce. Consequently, legal regulations were simplified and the process of recognizing qualifications and employing professionals from outside the EU became more flexible. In 2022, due to Russia's invasion of Ukraine and the subsequent massive immigration of Ukrainian refugees to Poland, the process of obtaining a legal license to practice for non-EU professionals from Ukraine was further simplified. These changes led to a noteworthy increase in the number of doctors and nurses interested in seeking employment opportunities in Poland.

3.3.2.7. Digital solutions

Implementing e-prescriptions and e-referrals, despite some resistance from some health care professionals, has brought numerous advantages and made it easier for patients and medical staff to operate during the Covid-19 pandemic. Digitalization of health care is implemented in the whole country. On the other hand, the digital exclusion might strongly influence the access to health services. Primary health care professionals in Poland are often around retirement age and for them new technologies can constitute a significant barrier, which may drive the decision to stop their professional activity. Concrete programs supporting digitalization at the primary care level are being implemented, for example, within the "*E-Gabinet-Plus for primary care facilities*" program. Medical facilities receive funds for computer equipment and access to the "e-Gabinet Plus" application, which facilitates patient management and reporting to the National Health Fund.

In May 2023, the pilot phase of the "**E-konsylium**" platform was initiated. This platform aims to enable remote meetings between doctors of various specialties, which are necessary to make decisions regarding the treatment of patients, including those with cardiac and oncologic conditions. It will also facilitate the transmission, sharing, and processing of essential medical documentation. E-konsylium will allow e-consultations between primary care physicians and specialists from partner hospitals, as well as consultations between specialists from partner hospitals and those from highly specialized medical centers (Ministry of Health, 2023).

3.4. Analysis of successful and sustainable HWF policies in medical deserts

Numerous policies and activities can be identified in Poland that focus on mitigating the effects of staff shortages and medical deserts existence. They can be delivered at the national, regional or local levels and focus on the demand and supply sides. As indicated in this report, medical deserts are a complex and multi-factors challenge. Intersectorial and multidimensional approaches should be recommended to improve access to health care in medical deserts areas.

Of particular importance is the development of an interactive online platform *Health Needs Map*, which can be useful for monitoring medical personnel and conducting detailed analyses at the county level.

The main challenge of the Polish health workforce situation is **medical staff shortages and their uneven distribution** across regions, counties and communities (especially between urban and rural areas). Therefore, the most frequently undertaken actions are aimed at increasing the number of training institutions and increase of the number of medical students, as well as encouraging doctors to work in facilities located in small towns and villages. However, there is still a lack of a systematic long-term strategy or forecasts concerning the increase in the number of medical universities and admissions to medical studies.

3.5. Evaluation of the applicability of the ROUTE-HWF roadmap in the particular national / regional context

Application of the [ROUTE-HWF Project](#) taxonomy in the Polish context showed that two regions/voivodships can be identified as medical deserts: **Lubelskie** is MD type 2 and **Kujawsko-Pomorskie** is MD type 5. In Polish conditions, the main factor causing the occurrence of medical deserts significant shortage of doctors. Therefore, the areas most frequently indicated as medical deserts are regions with the lowest rates of doctors employment. National experts who participated in ROUTE-HWF stakeholders' workshop, ROUTE-HWF questionnaire and during consultations this report, pointed out that the regions with the lowest rate of doctors: **Lubuskie, Opolskie and Warminsko-Mazurskie** (see Table 7) should be also considered as Polish medical deserts. A particularly difficult situation occurs in the Lubuskie Voivodeship (the physician employment rate per 100,000 inhabitants is only 258.3, compared to the national average of 357.7), especially concerning primary healthcare facilities. For years, there was no academic centre training doctors in this region. Only in 2015, the medical program was launched at the University of Zielona Góra, and the first cohort graduated in 2021. This region, therefore, requires special attention from decision-makers to ensure proper access to healthcare.

Polish regions/voivodeships, cover large geographical areas encompassing significant urban cities and numerous small rural communities. As described in this report, doctors are more motivated to work in larger cities, making it challenging to attract them to smaller communities, particularly rural ones. As a result, the applicability of the ROUTE-HWF taxonomy has been instrumental in identifying regions with the most unfavourable values for the selected indicators. However, it should be noted that differences still exist within smaller areas of each region (particularly between rural and urban communities). The implementation of the ROUTE-HWF Project taxonomy highlights the importance of gathering and analysing data at the adequate level, such as counties or communities. When data is available, the proposed indicators matrix can be effectively applied to smaller territorial units. Table 8. below shows, as a summary, how in the different types of medical deserts areas in Poland, the regional factors/causes for desertification are aligned with the regional solutions for this.

Table 8. Mapping factors and solutions per type of medical desert

Medical desert type	Region	Factors	Solutions
Medical desert type 2 Areas that deal with: 1. a relative high proportion of population aged 65 years and more 2. a relative high proportion of population below poverty line, 3. a relative low proportion of the population that lives within 15 minutes from a hospital	Lubelskie	– Aging – Poverty – Migration of young generations – Area characteristics (long distance to medical facilities) – Shortages of medical staff	– Dedicated scholarships for medical students – Loans for students and support for doctors willing to work in rural areas – Support offered by regional and local government, including financial support and investments in infrastructure – Increase in the number of admission quotas to medical study
Medical desert type 5 Areas that deal with: 1. a relative high proportion of population below poverty line, and 2. a relative low proportion of the population that lives within 15 minutes by car from a hospital 3. a relative low ratio of medical doctors per 100,000 inhabitants	Kujawsko-Pomorskie	– Poverty – Area characteristics (long distance to medical facilities) and poorly developed public transport network – Unattractive working conditions for medical staff (in particular in rural areas). – Shortages of medical staff	– Additional training for medical staff – Increase the number of admission quotas to medical study – Scholarships for medical students – Activity of regional and local government, including support for doctors who declare to settle in areas with poor infrastructure.

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4. Croatia

4.1. General country context

4.1.1. Geography and socio-demographic characteristics of the country and its regions

Croatia is located in Central and Southeast Europe, on the coast of the Adriatic Sea. The country's territory in the extreme south surrounding Dubrovnik is a practical exclave connected to the rest of the continent by territorial waters but separated on land by a short strip of coast belonging to Bosnia and Herzegovina around Neum. Continental Croatia is connected to the exclave by the Pelješac Bridge.

The territory covers 56,594 km², including 56,414 km² of land and 128 km² of water. **In 2020, Croatia had a total population of 4.07 million and the population density ratio of 72,8 persons per km²** (Eurostat 2022). The territory of Croatia is geographically very diverse - the hilly northern parts of Hrvatsko Zagorje and the flat plains of Slavonia to the east, which are part of the Pannonian Basin, are crossed by major rivers such as the Drava, Danube, Sava and Kupa. The central and southern regions near the Adriatic coast and the islands are made up of low mountains and forested highlands. Island Croatia consists of **over a thousand islands and islets** of various sizes, of which only 48 are permanently inhabited. The largest islands are Cres and Krk, and each of them has an area of approximately 405 square kilometers (Croatian Bureau of Statistics, 2021).

The most common division of the Republic of Croatia is the division by culture and history, and there are four regions in this division, the most famous of which is Dalmatia, the others are Istria, Croatia Proper and Slavonia. A less known but official administrative division consists of 20 regions known as "*županijas*", best translated as "counties", and City of Zagreb - Capital of the Republic of Croatia is considered as the 21st county (European Committee of the Regions, 2020).

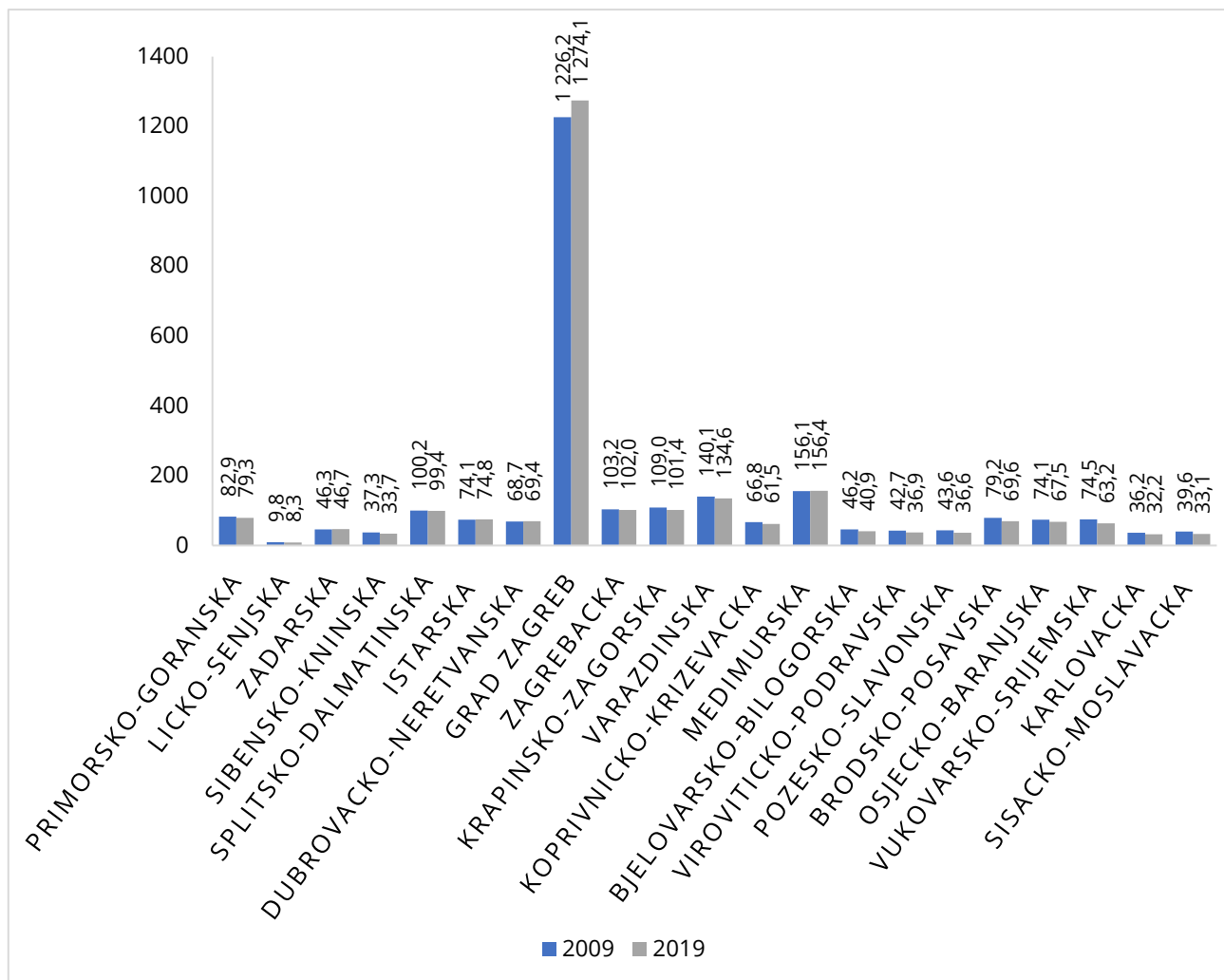
Figure 1. Regions (NUTS-2) in Croatia



Source: based on www.mapchart.net

In 2020 in Croatia, 52.3% inhabitants lived in only five counties, most of them in the City of Zagreb (809 268 - 20%) and the County of Split-Dalmatia (447 440 - 11%), while the least populated counties were the County of Požega-Slavonia (65 134 - 1.6%) and the County of Lika-Senj (44 068 - 1.1%) (Croatian Bureau of Statistics 2021).

In 2019, the population density ranged regionally from 8.3 in Licko-senjska zupanija (reflecting a lower population concentration typical of rural areas with more dispersed communities), to 1274,1 in Grad Zagreb (Croatia's capital). In majority of the counties (16/21), the population density decreased within the last decade (Figure 2). The largest and almost the only noticeable increase in the number of people per square kilometer in 10 years is observed in Zagreb (Eurostat 2022).

Figure 2. Population density per counties in 2009 and 2019 (persons per km²)

Source: based on Eurostat 2022

In 2021, the median age of the population in Croatia was 44.3 years while the share of population aged 65 years and more was 21.4% (Eurostat, 2022). In relation to the total population, the highest number of people aged 65 and over was recorded in the County of Šibenik-Knin (26.3%) and the County of Lika-Senj (25.3%), and the lowest in the County of Međimurje (19.4%) (Croatian Bureau of Statistics 2021).

4.1.2. Health system organization and financing

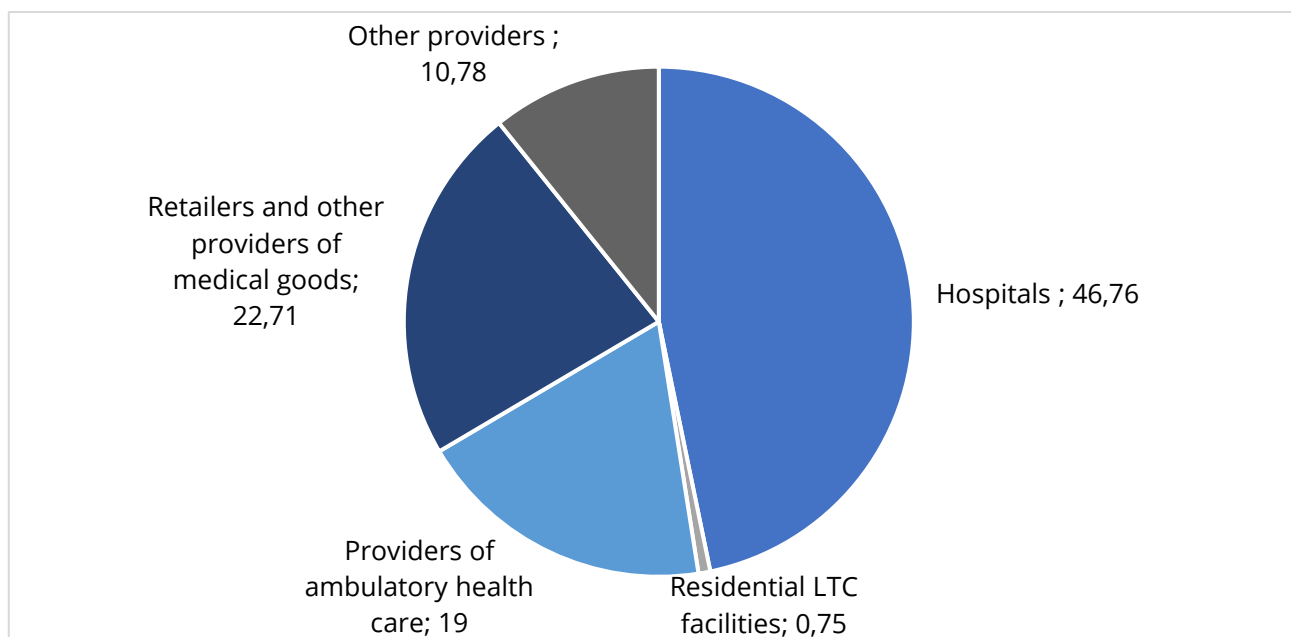
Health insurance is mandatory in Croatia and covers all residents. All citizens are required to register for compulsory health insurance in accordance with the dedicated regulations. The unemployed, students, children, war veterans, disabled people unable to work and other eligible persons are exempt from paying contributions. It is impossible to opt out of compulsory health insurance, and almost the entire population has access to a wide range of publicly paid services. **All insured persons are entitled to one package of benefits.**

The Croatian Health Insurance Fund (HZZO) is the sole procurer of health services and purchases all publicly funded individual health services that are provided by both public and private providers. HZZO is responsible for managing the compulsory health insurance system and concluding contracts with health care providers at all levels of care. HZZO, as the main procurer of health services, plays a key role in setting performance standards and pricing services.

With almost 80% of revenues from compulsory health insurance, individual wages and salaries contributions for health insurance are the largest source of HZZO revenues. The contribution rate for compulsory health insurance is a 15% payroll tax, fully covered by the employer on behalf of the employees. The contribution rate for self-employed workers is calculated on a sliding scale based on their disclosed earnings. Pensioners deduct 3 percent of their pension or less to health insurance, depending on the amount of their pension (Vončina et al., 2018).

Croatia spends less on health per capita than most other EU Member States, and total health spending accounts for 6.98% of GDP in 2019. The health spending per capita was the third lowest in the EU, reaching EUR 1,392, which was much below the EU-27 average of EUR 3,102 (Eurostat, 2022). Nevertheless, the share of public health expenditure in Croatia (82%) is higher than the EU average (76%), and the adoption of voluntary health insurance supplemental plans that cover patient co-payments meant that out-of-pocket payments accounted for only 11.5% of current healthcare expenditure. The Republic of Croatia spends almost half of its current health expenditures on hospitals (46.76%); 22.71% on retailers and other providers of medical goods (e.g., pharmacies, retail sellers, and other suppliers of durable medical goods and medical appliances etc.); and 19% on ambulatory health care providers (Figure 3).

Figure 3. Share of different types of providers in total current health expenditures (2019).



Source: based on Eurostat 2022

The Ministry of Health plays a central role in managing the healthcare system, both in terms of decision-making and in developing strategies and reforms. The latter are developed and consulted together with relevant stakeholder organizations and experts in health care management. The broader planning framework includes the National Health Strategy and the National Health Plan. The most recent planning period of the National Health Strategy was in years 2012-2020, and the Croatian Institute of Public Health helped formulate its goals. Currently, goals from the National Health Development Plan for 2021–2027 are being implemented. Yet, there is a lack of continuous and constructive evaluation processes that would allow for future improvements and corrections (Džakula et al., 2021).

The level of unmet health needs in Croatia is usually higher than in other European countries (EU-27). Based on population surveys, the unmet needs of respondents that state they do not have access to health care due to the reason "too far to travel" in Croatia was 0.6% in 2020, higher than the 0.1% average of the EU-27. The difference between Croatia and the EU-27 is higher for rural areas, where the level of unmet needs is 1.3% (for rural areas in European countries this is 0.2%). Likewise, the percentage of inhabitants that mentioned the "Too expensive or too far to travel or waiting list" reason for unmet demand in rural Croatia was 2.2%, while for the EU-27 it was 2.1%. It is surprising that for Croatia overall, this ratio was slightly lower than for the EU-27 (1.8%) and amounted to 1.5%, which can be attributed to the demographic distribution, where a significant proportion of Croatia's population resides in urban areas. Consequently, there are notable regional disparities, indicating the necessity for targeted healthcare accessibility initiatives in specific areas (Eurostat 2022).

4.1.3. Overall picture of the HWF trends in the country and its regions

In 2020, the ratio of practicing doctors in Croatia per 100,000 inhabitants was 352.24. The available Eurostat data at the NUTS2-level for this indicator are very limited which hinders providing a regional comparison. In addition, the data for several years period is available for only two regions. Eurostat data show that in the Jadranska Hrvatska region the number of practicing doctors per 100,000 inhabitants increased by 20%, while nationally, over the last two decades (2000-2020), the number of practicing doctors per 100,000 inhabitants increased by 48% (Eurostat, 2023).

The data published by the Croatian medical atlas presents a more detailed picture. The number of inhabitants per one doctor (i.e. how many doctors provide medical services in each region) is presented in Figure 4 and Figure 5. The data presented in the Table 1 provides a comprehensive overview of the healthcare landscape in Croatia, highlighting the distribution and characteristics of the medical workforce across different regions. The healthcare system in Croatia exhibits regional disparities in access and expertise. Primorsko-goranska županija, encompassing cities like Rijeka, boasts a remarkably low doctor-to-patient ratio (1.3), indicating high accessibility. With a higher average doctor and a substantial specialist count (265), this region displays a

seasoned and specialized medical community. In contrast, the coastal Splitsko-dalmatinska županija, including cities like Split, presents a relatively higher doctor-to-patient ratio (1.75), still indicating good access. The region features a significant specialist count (393), indicating a dynamic and specialized workforce. Conversely, Grad Zagreb, Croatia's capital, displays an impressively high doctor-to-patient ratio (5.4), ensuring robust accessibility. The presence of a large number of specialists (959) reflects a highly specialized medical workforce in the capital city.

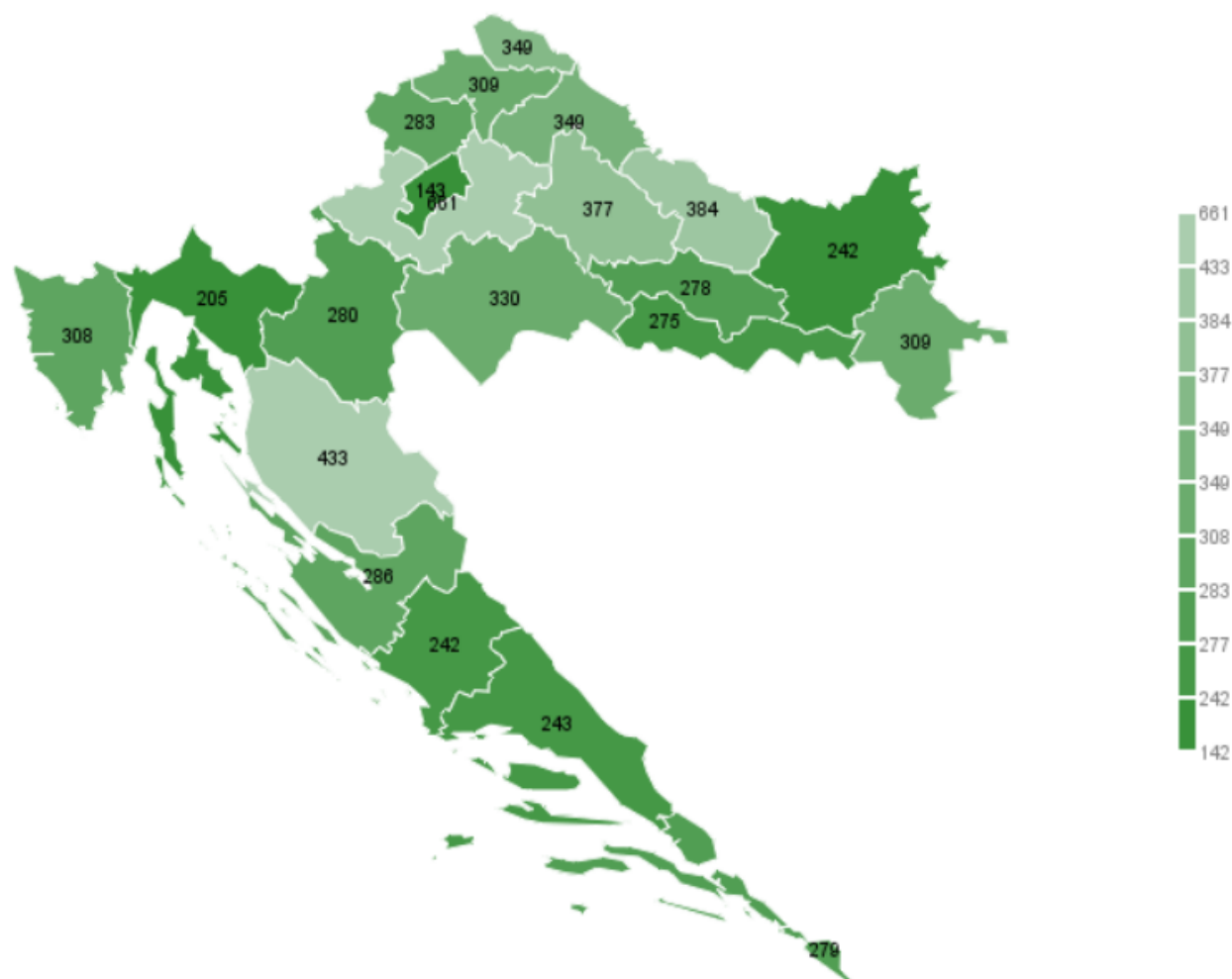
Table 1. Number of doctors; number of inhabitants per 1 doctor; Number of doctors aged 60+; Number of working retired doctors; Number of specialists by geographic area in Croatia, 2023

Geographic area	Number of doctors	Number of inhabitants per 1 doctor	Age of the doctor	Number of doctors aged 60+	Number of working retired doctors	Number of specialists
CROATIA	16,086	242	46	2,588	609	3,221
Bjelovarsko-bilogorska	271	377	47	57	16	45
Brodsko-posavska	475	275	46	69	24	115
Dubrovačko-neretvanska	415	279	48	92	19	63
Grad Zagreb	5,4	143	46	693	215	959
Istarska	635	308	47	122	34	105
Karlovačka	402	280	46	81	9	100
Koprivničko-križevačka	291	349	45	50	15	64
Krapinsko-zagorska	427	283	44	67	9	104
Ličko-senjska	99	433	50	32	5	14
Međimurska	303	349	43	40	5	68
Osječko-baranjska	1,074	242	44	177	14	236
Požeško-slavonska	232	278	48	55	9	33
Primorsko-goranska	1,3	205	47	232	56	265
Šibensko-kninska	399	242	46	76	13	68

Sisačko-moslavačka	426	330	46	94	12	103
Splitsko-dalmatinska	1,75	243	46	296	76	393
Varaždinska	519	309	44	69	18	132
Virovitičko-podravska	184	384	45	33	10	46
Vukovarsko-srijemska	468	309	45	78	6	102
Zadarska	560	286	46	96	22	105
Zagrebačka	456	661	45	79	22	101

Source: Atlas liječništva HLK – Liječništvo (Croatian medical atlas). Available at: <https://atlas.hlk.hr/atlas/> [online access 09.10.2023]

Figure 4. Number of inhabitants per 1 doctor (2023)



Source: Atlas liječništva HLK; <https://atlas.hlk.hr/atlas>

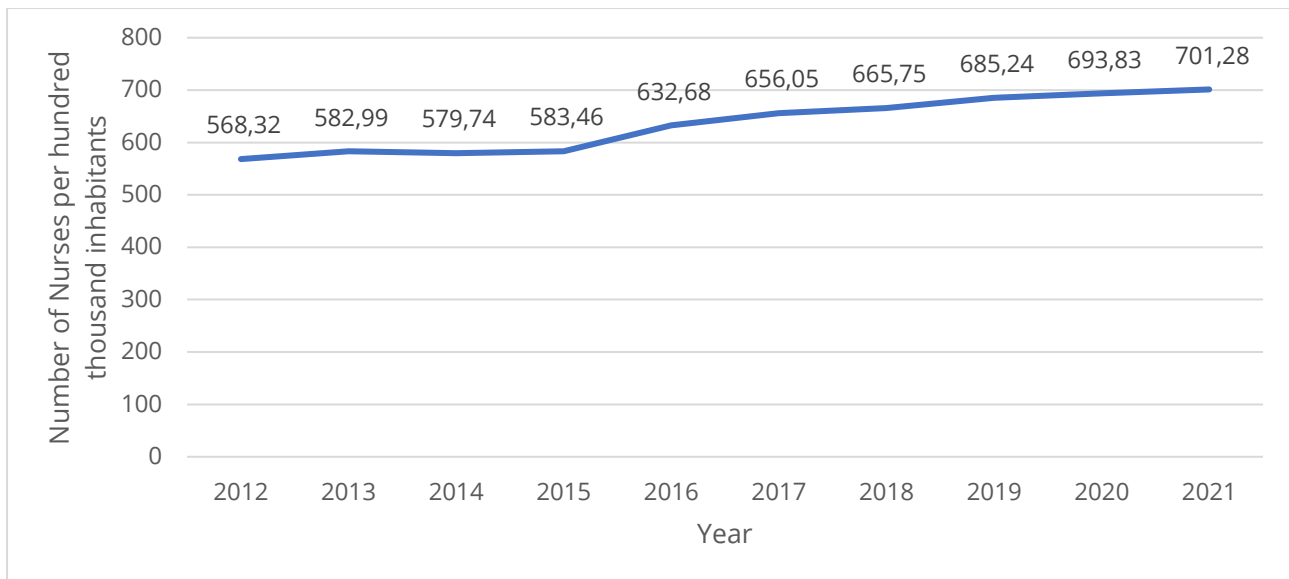
Figure 5. Number of doctors in particular regions in Croatia (2023)



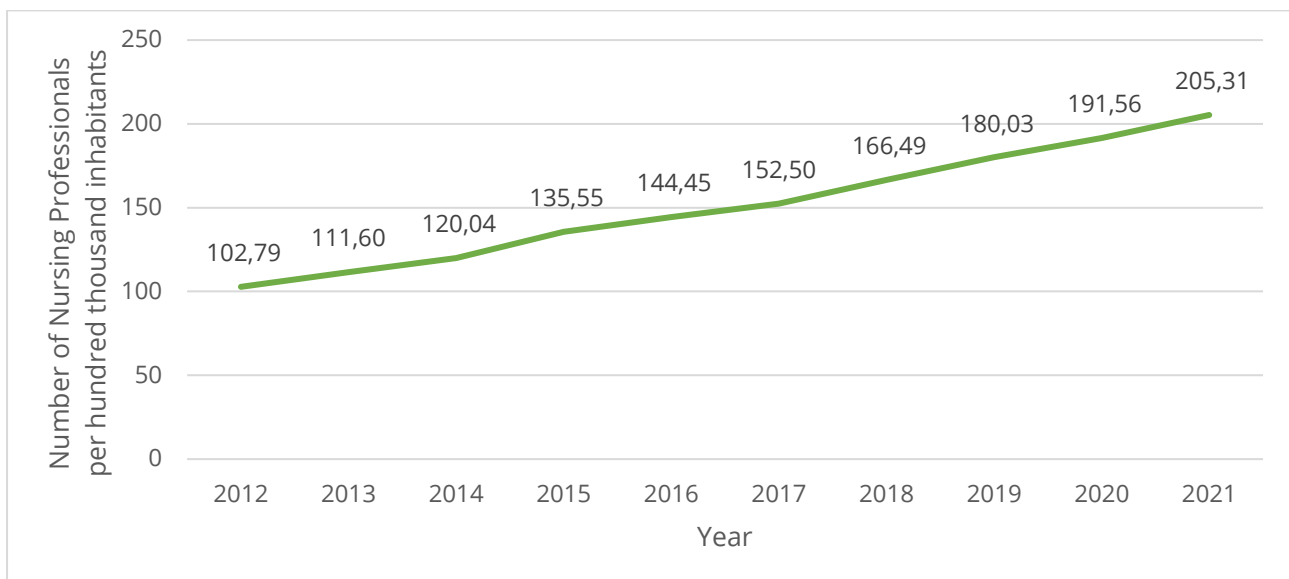
Source: Atlas liječništva HLK; <https://atlas.hlk.hr/atlas>

In the case of the nurses, **Croatia had fewer nurses than many other EU countries, with only 701 practising nurses per 100,000 inhabitants in 2021** (Fig. 6), **compared to an EU average of 913** (Eurostat, 2023). In recent years in Croatia, an increasing share of nurses with high competences (the so-called Nursing Professionals)⁵ has been observed. In the years 2012-2021, the share of only Nursing Professionals increased by as much as 99,7% (Figure 7.)

⁵These nurses have pursued postgraduate education and training in specific areas of nursing practice, similar to advanced specialties.

Figure 6. Number of Nurses per hundred thousand inhabitants in years 2012-2021

Source: Eurostat 2022

Figure 7. Number of Nursing Professionals per hundred thousand inhabitants in years 2012-2021

Source: Eurostat 2022

In Croatia, a shortage of physiotherapists may be observed. Their number per 100,000 inhabitants in 2021 was 48.3, while the average in the European Union countries was 128 physiotherapists per 100,000 inhabitants (World Physiotherapy, 2021).

In 2020, the number of practicing **pharmacists** in Croatia per 100,000 inhabitants was 78.6 (Eurostat 2022). The average for all European countries is not available; however, the number of

pharmacists in the EU-27 varies greatly and in 2018 was in the range of 50-100 pharmacists per 100,000 inhabitants, with one exception being the Netherlands with an exceptionally low number - 21 pharmacists/100,000 inhabitants (Eurostat, 2020). Pharmacists as the most readily available health care workers may have a role to play in mitigating health workers shortages in certain Croatian areas (Mucalo et al., 2016; Džakula et al., 2021).

4.2. Types of medical deserts in the country and factors driving desertification

4.2.1. Definition and examples

There is no formal definition of ‘medical deserts’ in Croatia. According to the regulations in force, medical deserts are indirectly determined by defining the territory of Croatia subject to special state care. Croatian experts emphasize that it is **an area with hard-to-reach healthcare** and the term ‘medical deserts’ is indirectly used as the **area of special state concern**.⁶

For Croatia, medical deserts can be indicated as areas that are underserved with regard to healthcare. It can be observed by significant differences in availability of healthcare between urban and rural areas in the country as well as between the northern and southern (Mediterranean) part of the country. National experts participated in ROUTE-HWF stakeholders’ workshop indicated such examples of medical deserts as: **Slavonia** - the eastern part of the country (due to the massive shortage of medical personnel) **and the Dalmatian coast, as well as Croatian islands**, outside of larger urban areas.⁷

According to the data presented in the ESPN Thematic Report on Inequalities in access healthcare from 2018 – Croatia lacked (and still lacks) gynecologists, paediatricians and there was a clear shortage of family doctors in 4 out of 21 Croatia counties: Virovitica-Podravina and Bjelovar-Bilogora in Panonska Hrvatska region, Koprivnica-Križevci in Sjeverna Hrvatska region and Lika-Senj in Jadranska Hrvatska region (Stubbs & Zrinščak, 2018).

4.2.2. Application of the ROUTE-HWF taxonomy to identify and measure medical deserts

The [ROUTE-HWF Project](#) approach to define and measure medical deserts (see the Deliverables 4.2. and 5.2) is based on a set of four objects/elements: two that address the level of healthcare demand and two that address the healthcare supply in a given area. These demand-related objects are indicated by (1) % of population 65+ and (2) economic resources of the population, while the supply-related objects are indicated by (3) travel times to public health facilities and (4)

⁶ Sources of the information: ROUTE-HWF country informants (answers from Route-HWF survey)

⁷ Based on the opinions of national experts expressed during ROUTE-HWF Stakeholders Workshop, Croatia, 2022.

population-provider ratio. These four indications are measured in terms of the relative value for a certain area, being either above or below the country average. Combining these four dichotomous variables, the framework results in five exclusive types of medical deserts, where at least three of the four objects of a medical desert apply (Table 2).

Table 2. Objects used in [the ROUTHE-HWF Project](#) taxonomy of medical deserts

Type of medical desert	POPULATION AND HEALTHCARE DEMAND OBJECTS		AREA AND HEALTHCARE SUPPLY OBJECTS	
	Object 1: Percentage population aged 65 and over	Object 2: Economic resources of the population	Object 3: Travel time to public health facilities by public transport	Object 4: Population-provider ratio
	<i>The proportion of inhabitants aged 65 and over living in this area, is <u>higher</u> than the proportion of all inhabitants in a country living in this area</i>	<i>The proportion of inhabitants below the poverty line living in this area, is <u>higher</u> than the proportion of all inhabitants in a country living in this area</i>	<i>The percentage of the population that lives within 15 minutes from a hospital in this area is <u>smaller</u> than the average percentage at the national level of the country</i>	<i>The proportion of health professionals working in this area, is <u>lower</u> than the proportion of all inhabitants in a country living in this area</i>
1	x	x	x	x
2	x	x	x	
3	x	x		x
4	x		x	x
5		x	x	x

Source: Deliverable 4.2. Second version of a definition and taxonomy on medical deserts.

The application of the [ROUTHE-HWF Project taxonomy](#) in the Croatian context, using Eurostat data at the NUTS 2 level showed that two out of four regions **can be defined as medical deserts** (Table 3, Figure 8): **Panonska Hrvatska** is medical desert type 3 (MD3) and **Jadranska Hrvatska** is medical desert type 4 (MD4).

Table 3. Application of the ROUTHE-HWF Project taxonomy of medical deserts per NUTS-2 region.

NUTS-2 region	Proportion of population aged 65 years and more (2021)	Persons at risk of poverty or social exclusion (2021)	Percentage of population within 15 minutes from a hospital (Eurostat data for 2020)	Medical doctors per 100,000 inhabitants (2020)*
CROATIA	21.4	20.9	53.7	351.29
Panonska Hrvatska	21.8	28.6	53.8	316.63
Jadranska Hrvatska	22.9	19.9	50.4	326.54
Grad Zagreb	19.7	9.5	93.8	588.66
Sjeverna Hrvatska	20.3	16.0	50.3	208.85

*own calculations based on the data from Eurostat

The numbers in red colours indicate that the regional value is below or above the country average, implying that it adheres to the particular object/element indicator of the ROUTE-HEWF taxonomy of medical deserts.

Source: Eurostat 2023

The regions Panonska Hrvatska and Jadranska Hrvatska have deviant scores from the national average for three out of four indicators of our taxonomy, categorizing them as a medical deserts. It should be noted however, that the Eurostat data applied here are quite limited, allowing to divide the country of Croatia into four regions only. More granulated data is necessary to apply the taxonomy more specifically and achieve a more distinctive identification of the (different types of) medical areas/regions in Croatia. The Croatian medical atlas regions (presented in section 2.3) is a good example of a national data source that might be used to identify medical deserts at lower territorial level.

Figure 8. Identified types of medical deserts in Croatia

Source: based on www.mapchart.net

4.2.3. Factors contributing to medical deserts

Social and economic problems in the country had a significant impact on the formation of medical deserts, which are the most prevalent in underdeveloped regions and parts of the country that incurred significant devastation during the Croatian homeland war (The Croatian War of Independence – 1991 to 1995). Both economic and non-economic factors influence individuals' decisions to emigrate, causing even greater problems of shortage of medical professionals and the emergence of medical deserts. **In 2020, Croatia was among the three countries of the European Union, from which the largest number of doctors emigrated.** The drivers for emigration of Croatian medical workers are the higher standards of living abroad, security for the future and greater opportunities for professional achievements (Gruber et al., 2020).

The occurrence and location of medical deserts in Croatia is closely related to the **geographical characteristics** of this country. Due to the insular nature and mountainous territory, the distribution of medical infrastructure and the density of doctors, depending on the specificity of a given region, is very diverse (OECD, 2021). Popular tourist regions usually enjoy much better infrastructure and a higher standard of living, which encourages medical professionals to work there. On the other hand, rural areas, apart from larger urban agglomerations, the east of the country (Slavonia) is less attractive for tourists, or the Mediterranean areas (Dalmatian coast) as well as numerous small islands are the main area where medical deserts occur. Islands are not

an attractive place to live for many reasons, such as high cost of living, power outages due to storms, lack of hospitals, extreme weather changes, limited and poor internet. In addition, having a car is essential, as there is no public transport there. Nevertheless, it should also be noted that many roads are excluded from car transport and can only be traveled on foot (Expat in Croatia, 2021). On the other hand, commuting to work on the island can also be troublesome, because it is associated with a sea crossing; few or almost no ferries outside the tourist season (winter) and is associated with a large loss of time needed for transport communication during the day.

As indicated by stakeholders during the ROUTE-HWF country workshop, working in areas of medical deserts involves frequent changes of primary care physicians due to their resignations, which makes the care of chronic patients inconsistent at best. Such situations can lead to general patient dissatisfaction and physician frustration, as well as burnout, which contributes to the high rotation cycle. In addition, in hard-to-reach areas (islands, mountains, remote and rural areas), air ambulances are overused for primary care, which overloads emergency physicians and can result in burnout and resignation, and consequently deteriorating access to health care. Another aspect is the possibility to get support for working in these areas, which is currently not widely used, and could undoubtedly encourage people to settle in the underserved areas.

In Croatia, there are significant disparities in the demand for medical assistance depending on the season. For example, on the Adriatic coast during the summer season, a significant influx of people can be observed, in contrast to the almost negligible population during the winter. This situation poses a serious challenge to the Croatian healthcare system, especially in regions where the number of patients seeking medical help fluctuates drastically. For example, some regions are faced with the difficult task of providing a primary care physician to meet the medical needs of 10,000 residents in peak season, while the demand drops to only 1,000 patients in the off-season, leading to what can be called “medical deserts”. One doctor will be enough for a thousand people, but not 10 times as many patients⁸.

The study *Satisfaction of Young Doctors in Croatia: Are We Heading in The Right Direction?* is the first research conducted in 2016 in Croatia to evaluate contentment of young doctors (Babacanli et al., 2016). Authors investigated physician satisfaction level in several Croatian hospitals and health centers. **More than a half (58%) of the respondents expressed the willingness to**

⁸ Based on information from the interview with country informant; 20/07/2023. There is a significant difference between the two sources of data on the number of doctors working in primary care – Coordination of the Croatian Family Physicians (KoHOM; *Koordinacija hrvatskih liječnika obiteljske medicine*; Croatian association of family physicians) and Croatian Medical Chamber. The data in the Doctor's Chamber is new and constantly updated, while the data from the KoHOM shows that the doctor's positions in many cities and villages are occupied, and in fact, in some health stations, there is no working doctor.

leave Croatia, move and continue their career abroad. This percentage is not at all surprising, because after the country joined the EU, the emigration of young Croatian doctors intensified. Based on this study, the most common reason for leaving Croatia were better working conditions followed by a better regulation of health system, higher salary, greater possibilities for professional training and advancement. Things that should be improved in Croatia are dissatisfaction with personal relationships at the current working place, and dissatisfaction with the current situation in Croatia. The worrying fact is that only nine percent were not considering leaving Croatia (Babacanli et al., 2016).

Due to shortages of doctors, the number of admissions to medical studies has been changed several times in recent years (starting from 2017). Currently, there is much higher “production” of doctors in Croatia - about 700 young doctors a year. Looking at the statistics since 2017, the net rate of new doctors and emigrating doctors is favorable for Croatia⁹.

Another reason for the occurrence of medical deserts and the difficulty in mitigating them is the reluctance of young doctors to work in remote rural areas driven by **the distance from major academic healthcare centers**. This may be due to uncertainty about their abilities, lack of ability to work independently as general practitioners or a sense of lack of mentor support as well as poorer access to various specialist diagnostic tests.

The lack of comprehensive regulatory frameworks poses significant challenges in addressing medical deserts in Croatia. To effectively combat this issue and improve healthcare access in underserved areas, it is essential for policymakers and stakeholders to prioritize the development and implementation of clear and supportive regulations. By doing so, Croatia can empower healthcare professionals, promote task-shifting and skill-mix initiatives, and ultimately make significant strides in bridging the healthcare gap between urban and rural regions. Challenges of Regulatory Gaps have been described below:

- ***Inadequate Scope of Practice***: The absence of clear regulations defining the scope of practice for various healthcare professionals, such as pharmacists and nurses, impedes their ability to take on expanded roles. Without defined boundaries, these professionals might face legal barriers and reluctance from traditional medical practitioners to collaborate to alleviate medical deserts.

⁹ Based on information from the interview with country informant; 20/07/2023; HLK Atlas also presents an overview of the emigration of medical professionals. The overview shows the dynamics of departures after the entry of Croatia into the EU (2013) and contains the following sheets: year of departure and work experience (the number of doctors according to year and work experience at the time of departure); medical specializations at the time of departure. Leaving after graduation shows the number of doctors who left the Republic of Croatia after graduation without working or becoming a member of the Medical Chamber.

- ***Unclear Responsibilities.*** Regulatory gaps often result in ambiguous responsibilities for healthcare workers in addressing medical desert regions. This lack of clarity may lead to confusion, inefficiency, and hesitancy among healthcare providers, hindering their engagement in outreach and primary care initiatives.
- ***Insufficient Preparedness.*** The absence of well-defined requirements for training and education may leave healthcare professionals ill prepared to handle the challenges of working in underserved areas. This inadequacy may affect the quality of care provided and potentially compromise patient safety.
- ***Limited Accountability.*** Without well-established regulations outlining accountability and liability, healthcare professionals may be discouraged from participating in initiatives to address medical deserts.

4.3. HWF policies and approaches to mitigate medical deserts

4.3.1. Policy perspective on medical deserts in a country

The National Health Development Plan for 2021-2027¹⁰ is an umbrella sectoral planning document that defines specific goals, activities, projects, and activities that will be implemented under the direction of the Ministry of Health. Its primary objective is improving the health care system and health outcomes of the population. It is based on the National Development Strategy of the Republic of Croatia until 2030, which, as part of strategic objective 5. “Healthy, active and quality life”, envisages the improvement of the healthcare system and care outcomes as a key national priority. Within its framework, five special objectives are planned, of which two are related to the mitigation of the medical desert: (1) Improvement of the healthcare system and (2) Making the healthcare system a desirable workplace. The National Health Development Plan 2021-2027 **aims to ensure equal geographical distribution and accessibility of healthcare**, improve system and health outcomes. The document emphasizes the need of coordinated, bold and ambitious actions to be taken from the ground up, including through change management of healthcare facilities. Experience of under-implementation of previous health strategies and plans, including i.e.,: not fully successful implementation of reforms, resulting in uneven care outcomes, financial instability of some forms of care or part of the system, time and geographically poor availability of care, disconnection of service providers resulting in patients wandering around the system or the lack of a system for quality management **indicate the need for implementation changing the principles of strategic planning and paying even more**

¹⁰ Nacionalni plan razvoja zdravstva za razdoblje od 2021. do 2027. godine <https://zdravlje.gov.hr/> [online access 22.01.2023]

attention to the continuous evaluation of implementation planned activities and monitoring health outcomes, which are the key outcome of all efforts.

During the ROUTE-HWF Croatian stakeholders' workshop, experts indicated few potential approaches and policies that could be implemented to mitigate the occurrence of medical deserts:

- Financial support for medical students who come from the underserved areas if they also settle back in the area.
- Stipends, endorsements for residency programs and allowances for physicians who decide to work in underserved areas.
- More cooperation and communication between healthcare institutions, for example through telemedicine.
- Increased flexibility for locum positions
- Increased reliance on nurses and pharmacists (for example as prescribers) in underserved areas.
- Support for specialist physicians who work in urban areas to go and work one day per week in underserved areas.

The subject of activities aimed at leveling medical deserts was also presented in the project of the [European Commission called Recovery and Resilience Facility](#). In 2020, all 27 Member States received a number of country-specific recommendations to improve the functioning of the health sector. The reforms and investments in the Recovery and Resilience Plan for Croatia were as follows:

- Improve access to pharmacies in remote and rural areas through mobile pharmacies;
- improving access to cardiologist care in remote and rural areas through digitalization of cardiology services;
- mobile primary outpatient system in rural and remote areas; specialist training to address shortages of specialists in underserved areas.

The active involvement of various entities and organizations in supporting doctors and other healthcare professionals has a significant impact on mitigating the consequences of medical deserts. The Medical Chamber in Croatia has demonstrated commendable dedication and proactive engagement in addressing medical deserts. The chamber has been a driving force in advocating for the welfare of doctors and healthcare professionals, offering educational programs, and lobbying for improved working conditions and remuneration. Its efforts to bridge the gap in medical services have been visible and commendable. On the other hand, other stakeholders' responses to medical deserts are insufficient. Attractive programs and initiatives have been planned, yet implementation and concrete actions have been lacking. As a result, the targeted solutions have often remained mostly 'theoretical' and ineffective in addressing the root causes of medical workforce shortages. Close cooperation of all stakeholders is required to

implement practical solutions and improve access to healthcare services in medical deserts areas.

According to national experts that completed the ROUTE-HWF survey **there are no wage incentives or other means of supporting greater health workforce mobility and flexibility with regards to mitigating medical deserts**. As well as there are no incentives to support improved outcomes in health care, primary care physicians tend to make too many referrals to secondary or even tertiary care specialists/centers instead of acting as gate keepers, so they contribute to the formation of long waiting lists for the appointment to the specialists.

An Interesting study was conducted at the Zagreb Medical School sought to investigate final-year medical student" attitudes towards working in medical deserts in Croatia and identify factors that influence their willingness to work in these areas (Marcec et al., 2023). The findings showed that the majority of both male and female students were willing to work in medical deserts for a limited time, while a smaller percentage preferred to avoid or never work in these areas. Factors like gender, parental profession, and the geographic environment of student" upbringing played a significant role in shaping their perspectives on serving in medical deserts. Specifically, male students showed a heightened likelihood of considering positions on islands, while those whose parents were not affiliated with healthcare displayed a greater readiness to contribute in remote regions. Moreover, students hailing from distant locales or islands exhibited a more favourable predisposition towards working in medical deserts compared to their counterparts from smaller urban centres.

4.3.2. Policies and approaches to mitigate medical deserts

4.3.2.1. Improving access to primary care

In 2008, activity based payment reforms in primary care were implemented¹¹. Back then, 20 percent of payments were activity-based, and 80 percent were accounted for capitalization. **This reform was introduced to incentivize preventive services and increase service delivery at primary care.** The Croatian Health Insurance Fund (HZZO) reimburses transport for insured people whom live more than 50 km from the health care facility, so that transport costs-- which can constitute a disproportionate barrier for the poor - are not a significant constraint. In addition, the national network of primary care providers is organized to promote geographic and demographic standards so that populations in less developed and remote areas have equal access to care. The contractually required minimum number of insured persons per general practitioner is lower in these areas.

In 2013, Croatian Health Insurance Fund (HZZO) tried to improve patient satisfaction and access to medical services by stimulating physicians to develop group practices and provide telephone consultations, appointments, and other e-health services. Good performance on “Key Performance Indicators and Quality Indicators” and other contractual options was encouraged. Given that participation in the new contracting model was optional, it was well received, and the vast majority of primary care practices chose to participate.

In 2018, HRK 82.2 million in grants was awarded under the Operational Program for effective human resources for Croatia in 2014-2020, financed by the European Social Fund. The main purpose of this grant was to improve access to primary healthcare in poor and remote parts of Croatia through financing the training of 76 specialists in emergency medicine, family medicine and pediatrics, clinical radiology, as well as gynecology and obstetrics in these areas (Ministry of Health 2018).

The healthcare Act that came into force on December 31, 2020, states that the Healthcare Plan in Croatia is an up-to-date document that includes the following information¹²:

- tasks and goals of healthcare;
- **priority areas of action;**
- foundations for the development of the healthcare system;
- health needs of the population of particular importance for the Republic of Croatia;

¹¹ Act on activities in health care NN 87/09 from 2009 <https://www.zakon.hr/z/442/Zakon-o-djelatnostima-u-zdravstvu> [online access 22.01.2023]

¹² Article 9 of the Healthcare Act NN 100/18, 125/19, 147/20 is valid from December 31, 2020 <https://www.zakon.hr/z/190/Zakon-o-zdravstvenoj-za%C5%A1titi>

- **specific needs and opportunities for receiving care in an assisted area or an area with developmental features;**
- principles and dates of health plan implementation;
- foundations for the development of health care activities, including training and development of employees in the health care system;
- **criteria for designating a network of public health services, taking into account the availability of health care by area.**

Patients who come from the provinces of Croatia or live on the islands, often due to waiting times, skip the first stage of treatment, which is a visit to a general practitioner, and go straight to the hospital emergency department. In order to provide Croatian citizens with better access to emergency healthcare, the Croatian government introduces an innovation in the Health Protection Act in 2022. It stipulates that all family medicine doctors may be assigned to work in a hospital emergency department (single emergency department – OHBP) if one of the directors – either of the clinic or the Emergency Department of Medicine or the hospital decides to do so.

In areas where there is no doctor temporarily, different solutions are used to provide patients with access to primary health care. These include¹³:

- Provision of medical services **by a nurse (skill-mix)** this is the most common solution.
- Provision of medical services by a “**mobile doctor**” between 3-4 villages every day, then she/he can see patients on selected days of the week, e.g., twice a week in each village or every day, but only for a few hours.
- **Full-time work in two different ambulances** - it is not very popular and occurs only in rich cities that can afford it and usually applies to young doctors and then **they are extra paid**, e.g., they get double salary. Such a doctor works 10-12 hours a day, but this is usually a short-term solution, for 3-6 months, and there must be a justification why the position of a general practitioner in this area is not permanently filled in.

4.3.2.2. Support for young doctors

Croatia stands out among other countries in its **efforts to retain young doctors** and address medical workforce shortages. The **initiative to encourage young doctors (up to 30 years of age) by offering them a tax-free salary** sets it apart from many other nations. This distinctive approach has proven effective in enticing young medical professionals to work in the country and has resulted in a higher earning potential for these individuals compared to doctors with more extensive experience.

¹³ Based on information from the interview with country informant; 20/07/2023

There are also interesting local initiatives, e.g., the county government in Bjelovar-Bilogora offers **young doctors very favorable mortgage/credit line with only 1% rates**, so young doctors have better conditions to start easier family in this county.

4.3.2.3. Active recruitment policy

The healthcare system in Croatia is decentralized, so each county can have its own individual policy of encouraging doctors to work in unattractive, remote, or rural places. Some regions, i.e. Dubrovnik and South Croatia offer doctors **additional salaries covered by the local city, local village or county and organized accommodation as well as other benefits** for doctors in these villages. Nevertheless, it is not very popular and is not a standard solution. Many primary care facilities do not function well and do not have enough financial resources to offer additional, higher salaries or additional benefits to doctors who have decided to work in these facilities. In some regions that are not very attractive to work as a doctor, support in accommodation is offered.

For instance, in the city of Makarska, there was a pressing need for a pediatrician. To address this, a large-scale marketing campaign was organized in multiple newspapers, aimed at enticing qualified doctors to apply for the position. Across the entire Croatia, the scarcity of pediatricians made the situation challenging, but eventually, a solution was found when a doctor from Bosnia and Herzegovina applied and filled the vacant position. This example highlights how creative recruitment efforts can have a profound impact on filling vacancies, ultimately contributing to increased accessibility to healthcare services and reducing the occurrence of medical deserts¹⁴.

Another good example is Dubrovnik, which, through its innovative initiative, is a commendable example of encouraging doctors to work in the region. To encourage their dedication, the city offers 50 euros and two-day accommodation in Dubrovnik, fully covered by the local government, for a 24-hour shift. In addition, the city has signed agreements with top-class hotels that provide doctors with attractive accommodation conditions. This initiative not only provides a strong incentive for doctors, but also shows the city's commitment to supporting and retaining healthcare professionals, thus contributing to the improvement of healthcare services in the region.

A popular and frequently used solution in Croatia is also to **re-employ recently retired doctors** to provide part-time services to fill the gaps in access to healthcare in selected regions, especially during the summertime.

Occasionally, there are initiatives where a proactive city mayor takes innovative measures to support healthcare professionals. Such initiatives may include organizing free parking spaces,

¹⁴ Based on information from the interview with country informant; 20/07/2023

securing places in nurseries or kindergartens for doctor' children and providing additional benefits like theater/cinema tickets. However, unfortunately, these endeavors remain relatively scarce across the board. The presence of such a proactive city mayor can have a positive impact on the morale and retention of medical professionals, but the widespread implementation of these initiatives is yet to become a common occurrence.

4.3.2.4. Skill-mix solutions

Another solution aimed at minimizing the effects of physician shortages at the primary healthcare level in Croatia is the use of **skill-mix/task-shifting**. In this case, it is necessary to introduce legal regulations to increase the competence and scope of tasks, as well as the responsibility of medical employees, mainly nurses and oral health specialists (not being dentists). For example, a highly educated nurse may care for a patient with a chronic disease if there are no complications. In addition, in the treatment and prophylaxis of patients, masters of pharmacy are intensively involved - they can measure blood pressure and sugar levels, or perform vaccinations. In this case, pharmacies try to get a contract with health insurance to be paid for these medical activities. The main argument for increasing the scope of competencies of other medical professions is tasks compensation, because in certain regions of Croatia, there are not enough doctors, and their tasks could be taken over by a nurse or pharmacist, who is easier to get to and whose work is less costly. There is also another problem in Croatia - different attitudes to task shifting depending on the place of work and geographical location.

4.3.2.5. Local training for GPs

After joining the EU, the Croatian Ministry of Health adopted an EU directive according to which medical students admitted after July 1, 2013, did not have to take an internship and state examination after completing their studies. Instead, young doctors are to be given a work permit immediately after graduation and can either specialize or work as a deputy general practitioner or in an ambulatory ambulance service. The license can be granted by the Croatian Medical Chamber upon request. During the transitional period, the period between graduation and specialization, the Government introduced an optional form of internship called "work under supervision", which should last from six months to two years. In addition to general practitioners, there is a lack of emergency physicians, so the service provision is increasingly relying on nurses (Džakula et al., 2021).

4.3.2.6. Implementation of digital solutions

[The Atlas of Medicine HLK \(Atlas liječništva\)](#) is an online platform developed in 2020 by the Croatian Medical Chamber and contains a **comprehensive overview of healthcare providers** in Croatia. Healthcare facilities presented in the Atlas are divided according to: Type of ownership, type of institution, level of healthcare. The data regarding doctors are gathered by

specialization, gender, age structure, geographical distribution (an overview of individual counties).

Croatia started implementing an e-health information system linking healthcare providers, public health institutes and HZZOs in 2001. Health Information System of Croatia (CEZIH) is operated by HZZO. CEZIH is an integrated information system that connects and controls all peripheral information systems in primary care offices, biochemical laboratories and pharmacies as well as IT systems in hospitals for centralized planning of outpatient consultations and diagnostic tests. Only authorized users, i.e. healthcare providers commissioned by HZZO to provide services in the field of compulsory health insurance, have access to CEZIH. IT efforts to date have focused primarily on primary care. In 2011, local patient e-cards were introduced, and all physicians have access to them – as well as full nationwide coverage of e-prescriptions and e-referrals to biochemical products and laboratories. Then, in 2012, e-waiting lists were implemented, and a year later (in 2013), e-referrals for hospital consultations were implemented. Nevertheless, most hospitals still have independent clinical IT systems that are not fully integrated and compatible with the national information of the system, although they exchange relevant data with HZZO.

The Act on data and information on health was adopted in February 2019. It aims to improve the protection of personal data in health care in the management, collection, and removal of patient records in the Central Health Information System. The act also provides foundations for the creation of a central body for e-Health, which was established within the Ministry of Health. The IT system was launched to improve and simplify the provision of care. For example, patients no longer need to collect laboratory test results because they are directly available (in real time) to doctors, and they also do not need to travel to a medical facility to collect the results because they can view them online. In addition, physicians can access information on the dispensing of prescribed medications and thus monitor compliance, and patients can be seamlessly scheduled for outpatient hospital visits. The main benefits for healthcare professionals include better communication with other stakeholders in the system and significant relief from largely automated administrative tasks. In addition, healthcare providers and institutions that cooperate with them benefit from the savings generated by the lack of the need to print prescriptions and referrals, increased efficiency, and quick and automated checking of insurance data. Most importantly, **quick, and direct access to information can enable better monitoring of provider performance and informed decision-making to increase efficiency and equity in healthcare delivery** (for example, through monitoring of medical services performed and outsourced, and prescribing patterns).

As part of the implementation of Goal 2 of The National Health Development Plan for 2021-2027, e-health will be an integral element of reform processes¹⁵ aimed at ensuring quality and efficiency of health care for the entire population. They are in the Republic of Croatia projects and activities in the field of e-health, which have been a priority for the health care system for over 15 years (Kern et al. 2022). Despite a plan, that meets the needs of society, professional human resources for the development and management of these systems are not sufficiently developed. In addition, the healthcare system has so far lacked the flexibility to accept all necessary changes and possible improvements, given the rapid technological progress. Although, **IT systems and digital solutions are still not fully integrated, reforms and plans are aiming to enable the provision of comprehensive healthcare where patients are at the center of attention.** If the existing obstacles (listed above) can be eliminated, **the developed digital solutions will allow for minimizing the effects of medical deserts in rural areas, on islands and in areas away from large urban centers.**

4.3.2.7. Emergency medicine reform

Under the National Health Program for 2021-2027, activities related to the development of a more efficient system of medical rescue and transport of patients or health protection measures, including helicopter medical rescue services are planned. Even before the start of the program, already in December 2020, the Ministry of Health launched market research and the process of informing stakeholders. In the first phase, it was planned to obtain services from operators with whom the Ministry will sign an agreement for a period of not less than 5 years¹⁶. In this case, the operator would take care of its own personnel and equipment, while the health resort would acquire medical personnel – e.g. doctors, nurses and other medical professionals. From July 1, 2022, EMS helicopters were to be deployed at four bases, located in Split, Zagreb, Osijek and Rijeka. **Investments were made in emergency medical equipment and faster and more efficient transport of patients or health resources, which was aimed at increasing the accessibility and quality of health care for the inhabitants of remote, isolated, and rural areas.** Because of the implementation of the air ambulance and other related medical services and their continuous improvement, health outcomes will improve, primarily in the area of cardiovascular and cerebrovascular diseases, which are the leading cause of mortality in the Republic of Croatia. This will allow for a faster and more effective intervention, and consequently

¹⁵ The Act on Data and Information in Healthcare NN 14/19 is valid from February 15, 2019.

<https://www.zakon.hr/z/1883/Zakon-o-podacima-i-informacijama-u-zdravstvu>

¹⁶ Nacionalni plan razvoja zdravstva za razdoblje od 2021. do 2027. godine <https://zdravlje.gov.hr/> [online access 22.01.2023]

will positively affect the reduction of healthcare costs, mainly related to the treatment of complications and rehabilitation.

4.4. Analysis of successful and sustainable HWF policies in medical deserts

The majority of the identified programs were implemented at the national level as systemic solutions, e.g., training primary care physicians, emergency medicine or using technological solutions. Moreover, in underserved and isolated areas in Croatia various regional approaches are employed to ensure patient's access to primary health care. These approaches included:

- **Employment of nurses to deliver medical services**, which stands as the most prevalent solution.
- **Engagement of a "mobile doctor"** who rotates among 3-4 villages daily, attending patients on designated days, such as twice a week in each village, or every day albeit for a limited timeframe.
- **Full-time work in two different ambulances** - it is not very popular and occurs only in rich cities that can afford it and usually applies to young doctors and then **they are extra paid**, e.g., they get double salary. Such a doctor works 10-12 hours per day, but this is usually a short-term solution (contract for 3-6 months), and there must be a justification why the position of a general practitioner in this area is not permanently filled.

Furthermore, the provision of housing or assistance in finding it and renting/buying a house, the presence of schools or universities in the area and scholarships or other financial allowances for additional education could have a real impact on the decision to work in the area of medical desert. In addition, the possibility of remote consultations – telemedicine in complex cases, access to the emergency room, or the number of patients per day, are also factors that vary greatly depending on the workplace and are extremely important for medical workers who take up work in underserved areas.

The Medical Chamber in Croatia stands out as a proactive advocate in addressing medical deserts, demonstrating commitment to healthcare professionals and the communities they serve. However, the government and other stakeholder's perceived inaction leaves an attractive programs as mere promises. To effectively tackle medical deserts, collaborative efforts are crucial.

Involvement of major stakeholders, including government and local authorities is especially important to bridge the healthcare gap and ensure accessible and quality medical services for all Croatian citizens.

4.5. Evaluation of the applicability of the ROUTE-HWF roadmap in the particular national / regional context

The application of the [ROUTE-HWF Project taxonomy](#) in the Croatian context indicated that two regions can be defined as medical deserts: **Panonska Hrvatska** (medical desert type 3) and **Jadranska Hrvatska** (medical desert type 4). The main reasons/causes are similar: due to Croatian geographical topography and a significant number of islands, ensuring accessibility to healthcare poses a particular challenge. Moreover, in Croatia, significant disparities exist in the demand for medical assistance depending on the season. This phenomenon is particularly evident along the Adriatic coast during the summer season, where a substantial influx of people contrasts sharply with the nearly negligible population during the winter. This situation presents a serious challenge to the Croatian healthcare system, especially in regions where the number of patients seeking medical help fluctuates drastically. For instance, in certain regions, we are confronted with the daunting task of providing primary care physicians to meet the medical needs of 10,000 inhabitants at the peak of the season.

The application of the ROUTE-HWF Project taxonomy helped to identify some regional (specific) factors and proposals of approaches to mitigate their consequences. As a summary in Table 4, the different types of Croatian medical deserts are presented and the regional factors/causes for desertification are aligned with the proposed solution.

Table 4. Mapping factors and solutions per type of medical desert

Medical desert type	Area / region / province / county	Factors driving desertification	Solutions / policies / actions
Medical desert type 3 Areas that deal with: - a relative high proportion of population aged 65 years and more - a relative high proportion of population below poverty line - a relative low ratio of medical doctors per 100,000 inhabitants	Panonska Hrvatska (County of Bjelovar-Bilogora; County of Virovitica-Podravina and County of Požega-Slavonia i.e., Caglin, Kaptol or Brestoval)	– Aging – Poverty – Area characteristics (distance, islands and mountains) – HWF shortages – lack of comprehensive regulatory frameworks	– “Dom zdravlja Osijek”– Specialist training for doctors of medicine – Specialist training for doctors– Vukovar Health Center– “Sustained improvement of access to healthcare in underdeveloped areas and for vulnerable groups and promotion of health” – Specialization vocational training of pediatric doctors at the Petrinja Health Center (Sisak-Moslavina County) – The project aimed to improve access to health care in less attractive, rural and underdeveloped areas. – Provision of medical services by “mobile doctor” between 3-4 villages – More flexible working conditions and work organization – Offering accommodation for doctors willing to work in rural/isolated areas – Active promoting employment in rural/isolated areas (scholarship for students) – Skill-mix solutions – Favorable mortgage/credit line for young doctors with only 1% rates – Re-employment of recently retired doctors to provide part-time services to fill the gaps in access to healthcare in selected regions.
Medical desert type 4 Areas that deal with: a relative high proportion of population aged 65 years and more	Jadranska Hrvatska (County of Lika-Senj e.g., Gospić)	– Aging – Area characteristics (distance, islands, and mountains) – HWF shortages	– Specialist training of family doctors at the Gospić Health Center-- improving access to health care in less attractive and neglected areas, operation of the Gospić health center by increasing the number of specialists at primary care and one specialist in family medicine.

• a relative small proportion of population within 15 minutes from a hospital • a relative low ratio of medical doctors per 100,000 inhabitants		– lack of comprehensive regulatory frameworks	– Specialization training of medical doctors in the field of emergency medicine for ZHM Šibenik-Knin County under the National Health Development Strategy 2012-2020 – Provision of medical services by "mobile doctor" between 3-4 villages – More flexible working conditions and work organization – Offering accommodation for medical doctors willing to work in rural/isolated areas – Active promoting employment in rural/isolated areas (scholarship for students) – Skill-mix solutions
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5. Germany

5.1. General country context

5.1.1. Geography and sociodemographic characteristics of the country and its regions

The Federal Republic of Germany is a federal country located in western and central Europe. It consists of 16 states ('*Bundesländer*') (Figure 1), and its capital and largest city is Berlin. Germany has an area of 357,578 square kilometers. With a population of about 83 million, it is the most populous Member State of the European Union. It is the leading country in Europe economically and politically.

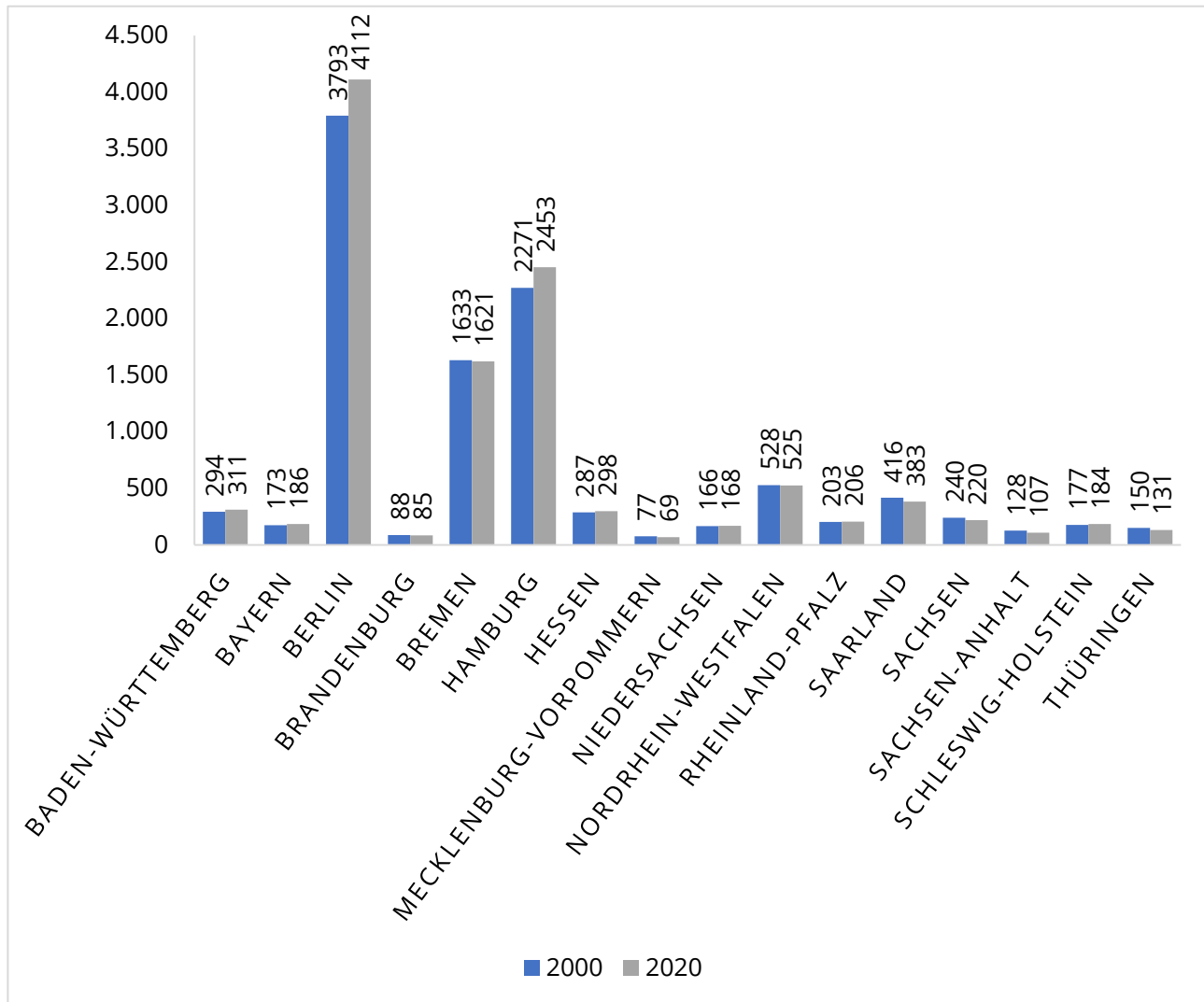
Figure 1. States in Germany



Source: based on www.mapchart.net

The population density in Germany is 240 inhabitants per km². In 2020, the population density ranged regionally from 69 in Mecklenburg to 4,112 in Berlin (Destatis 2023) (Figure 2). In most states, the population density remained stable between 2000 and 2020, except from Berlin and Hamburg where density has increased.

Figure 2. Population density per state in 2000 and 2020 (persons per km²)



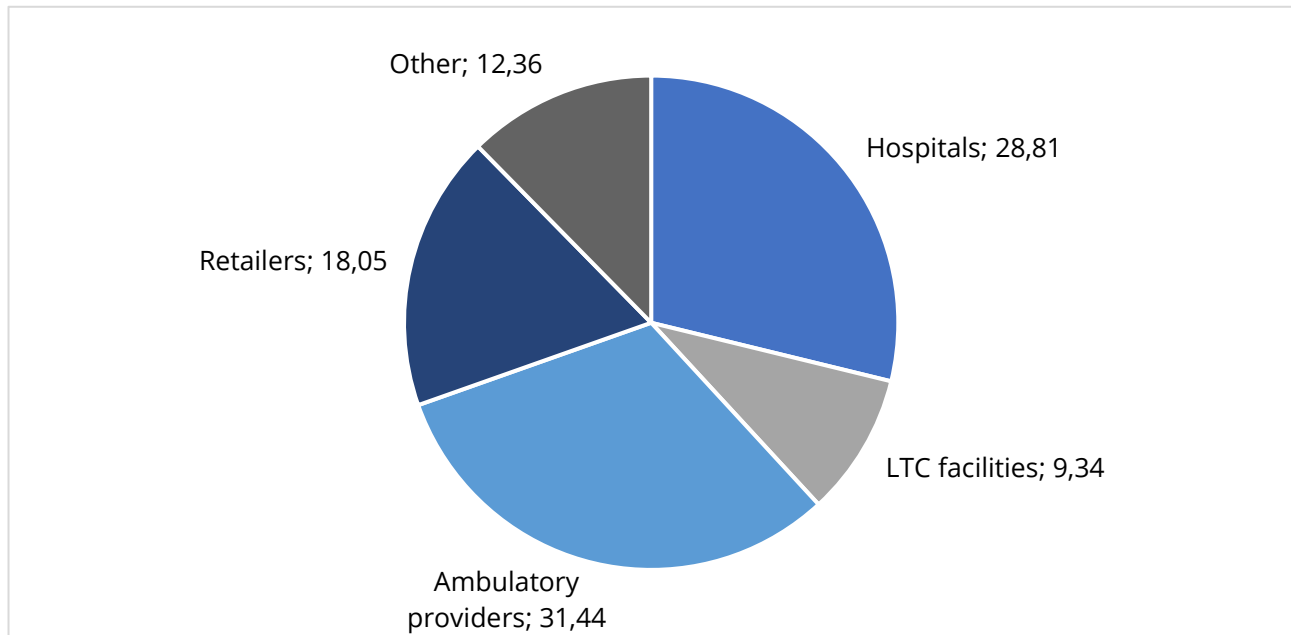
Source: based on Federal Statistical Office (Destatis), 2023

5.1.2. Health system organization and financing

In 2020, the country spent 12.8 % of its GDP on health (the highest share among the EU countries). Per capita, health spending was at the level of 5192.4 euros, which was also the highest among the EU countries (OECD 2023). The country spends approximately 28.81 % of its current health expenditures on hospitals; 9.34 % on long-term care; and 31.44% in ambulatory care providers (Figure 3). In 2019, Germany spent 4,505 euro on health per capita (adjusted for

differences in purchasing power). The majority of healthcare expenditure is publicly funded: 84.6 % of total health expenditure was public in 2019. Additional public funding was approved in 2020 and 2021 to support the health sector during the COVID-19 pandemic (Country Health Profile, Germany 2021).

Figure 3. Share of different types of providers in total current health expenditures (2020)



Source: based on Eurostat 2022.

The German health system is decentralized and divided between the federal, state, and corporate local government levels. The federal government is responsible for creating the legal framework of the system, while the Federal Joint Committee ('*Gemeinsamer Bundesausschuss*', 'G-BA', the highest self-governing decision-making body) is responsible for detailed regulation. The Federal Joint Committee consists of representatives of the associations of health insurance companies, doctors, dentists and hospitals, as well as three independent members (plus non-voting patient representatives). The main responsibilities of the G-BA include defining which specific healthcare services are paid for by statutory health insurance (SHI). The Federal Joint Committee is also responsible for quality of management and assurance of SHI with regard to medical, dental, and inpatient care. Regarding hospitals in Germany, the responsibility for planning and ensuring accessibility lies primarily with the individual Bundesländer (states). They control the local government units at a regional level and are responsible for planning and investment in hospitals and medical education. The Federal Government does not possess direct authority to intervene in the planning responsibilities of the Bundesländer. In international comparison, Germany stands out as a country with a higher than average density of hospitals

and hospital beds, indicating a relatively well-developed healthcare infrastructure (Statistisches Bundesamt, 2023).

The level of unmet health needs is relatively low. Self-reported unmet needs for medical and dental care are among the lowest in the EU. Germany had one of the lowest levels of unmet medical care due to financial reasons, distance, or waiting times in the EU. Only 0.3 % of the population reported having forgone needed care in 2019. Historically low rates for unmet needs rose during the COVID-19 pandemic when many non-urgent services were canceled or postponed. One in seven people reported that they had to forgo needed care in 2020 (Country Health Profile, Germany 2021).

5.1.3. Overall picture of the HWF trends in the country and its regions

In 2019, there were on average 439.29 practicing medical doctors per 100,000 inhabitants, yet the ratio varied between the twelve regions from 375.9 in Brandenburg to 640.27 in Hamburg. The lowest indicator of the number of doctors per 100,000 inhabitants are characteristic of the regions belonging to the former German Democratic Republic, including Brandenburg, Sachsen and Sachsen-Anhalt. Another region, Baden-Württemberg is one of the most densely populated states in Germany. High population density can put pressure on healthcare resources, making it challenging to maintain a high doctor-to-patient ratio. Additionally, the state's diverse geography, which includes extensive forests and rural areas, poses a unique challenge in healthcare provision. At the country level, the number of practicing medical doctors per 100,000 inhabitants increased by 35% between 2000 and 2019 (Table 1).

Table 1. Medical doctors per 100.000 inhabitants, by state (Bundesland)

State	2000	2005	2010	2015	2019	2019/2000
GERMANY	324.61	339.53	374.81	413.93	439.39	135.36%
Baden-Württemberg	338.40	338.69	370.60	399.45	415.36	122.74%
Bayern	347.39	359.02	395.24	433.21	455.82	131.21%
Berlin	457.15	438.62	464.16	524.73	551.47	120.63%
Brandenburg	258.42	288.62	318.62	358.18	375.98	145.49%
Bremen	438.45	442.31	490.26	521.08	557.40	127.13%
Hamburg	457.59	468.94	549.61	611.85	640.27	139.92%
Hessen	333.10	336.70	369.43	395.61	426.53	128.05%
Mecklenburg-Vorpommern	302.21	328.75	364.67	415.57	439.99	145.59%
Niedersachsen	281.95	297.11	326.91	365.54	384.86	136.50%
Nordrhein-Westfalen	310.92	338.00	376.16	417.28	451.29	145.15%
Rheinland-Pfalz	298.12	320.57	348.70	377.93	402.14	134.89%
Saarland	350.90	372.05	408.70	453.38	485.99	138.50%

Sachsen	285.01	308.19	347.83	392.62	413.28	145.01%
Sachsen-Anhalt	286.77	305.95	334.24	379.24	409.12	142.66%
Schleswig-Holstein	328.58	337.71	367.85	403.62	431.14	131.21%
Thüringen	289.49	312.21	350.85	399.86	418.14	144.44%

Source: Eurostat 2022

Over 15 years, from 2000 to 2015, there has been a notable increase in the number of dentists per 100,000 inhabitants in Germany across all states (Eurostat 2022). The highest ratios are observed in the two largest cities of Germany, Berlin and Hamburg. The highest dentist-to-population ratio in these regions is primarily due to the higher population density and better accessibility to advanced medical facilities in these urban centers. Similarly, to the doctor-to-population ratio, the regions with the lowest dentist-to-population ratios in Germany were areas that were part of the former German Democratic Republic.

Trends in changes in the number of other practicing medical professionals per 100,000 inhabitants in the years 2000-2019 are presented in Table 2. The numbers of practicing professionals have increased in case of all analyzed occupations.

Table 2. Practicing medical professionals per 100,000 inhabitants (Bundesland)

Medical professionals	2000	2005	2010	2015	2019	2019/2000
Nurses and midwives	878.22	940.95	1,022.07	1,100.55	1,209.49	137.72%
Nurses	857.54	917.92	996.15	1 072.39	1,179.40	137.53%
Pharmacists	58.27	58.27	62.46	64.35	66.69	114.45%
Physiotherapists	94.88	133.38	182.69	-	-	

Source: Eurostat 2022

Germany has one of the highest ratios of hospital beds (7.9 hospital beds per 10,000 population), as well as of doctors and nurses in Europe. However, given the high number of hospital beds, the physician-to-bed ratio is comparatively low, and the nurse-to-bed ratio is one of the lowest in the EU (Country Health Profile, Germany 2021). In addition, the distribution of physicians is uneven between urban and rural areas. Meklenburg-Western Pomerania, Brandenburg, and Saxony-Anhalt have the highest proportion of rural areas.

5.2. Types of medical deserts in the country and factors driving decertification

5.2.1. Definition and examples

‘Medical deserts’ in the German context are primarily associated with sparsely populated areas. Although no standardized definitions of medical deserts in Germany can be found in literature

(Flinterman et al., 2023), a number of characteristics of so-called '*unterversorgte Gebiete*' comply with the common definition of medical deserts, being:

- distance or arrival/ walking time (based on the road network) from the place of residence to the medical facility;
- characteristics of the area;
- population characteristics;
- population size;
- accessibility to basic health services assessed in terms of both social provision and public (regulated) effectiveness in addressing social inequalities.

The country informants who were consulted for this case study object to the use of the term 'medical deserts' for Germany. They emphasize that access to care can vary between regions, but healthcare is generally easily accessible in Germany. Statistical data on the number and distribution of physicians clearly demonstrate that there is no national shortage of medical professionals in Germany. However, in rural and economically challenged areas recruiting physicians, especially for general practitioner positions, is a challenging task. This is a challenge especially for the so-called "new federal states" with the highest proportion of rural area (**Brandenburg, Mecklenburg-Western Pomerania, Saxony-Anhalt, Thuringia and Saxony**).

5.2.1.1. Regional accessibility of selected medical services in Germany

One of the foremost priorities in Germany's health policy is to ensure that universal medical care is easily accessible, particularly in rural regions and nearby residential areas. Accessibility of health services is equally important for location decisions and regional development as well as for the individual life situation of citizens. For regional development, quality and provision of services is of general interest. Considering the normative political claim to provide comparable living conditions in all German regions, the real-life, empirically sound information about the accessibility of services of general interest are important. This information is needed to get an objective and realistic impression about the current situation and can be used as an input for future policy actions and interventions. The study of Neumeier (2017 A) focuses on the estimation of the regional availability of physicians, hospitals, public pharmacies and ambulatory nursing services according to the Social Security Code, Book Eleven ('SGB XI') by analysing the accessibility based on a raster GIS accessibility analysis. Therefore, the study focuses especially on the availability of such services in rural areas.

Table 3. Average distance to the nearest location of a GP, by state (Bundesland) and non-rural (nR) and rural (R) regions within each state

State	Average distance in metres		
	total	nR	R
GERMANY	2.977	1.469	3.301
Baden-Württemberg	2.302	1.338	2.559
Bayern	3.149	1.208	3.303
Berlin	805	805	-
Brandenburg	4.489	1.950	4.535
Bremen	1.642	1.642	-
Hamburg	1.238	1.238	-
Hessen	2.223	1.109	2.498
Mecklenburg-Vorpommern	4.881	1.370	4.971
Niedersachsen	3.490	1.846	3.633
Nordrhein-Westfalen	2.239	1.641	2.742
Rheinland-Pfalz	2.802	1.099	2,953
Saarland	1.817	1.346	1.955
Sachsen	2.729	1.138	2.922
Sachsen-Anhalt	3.969	1.102	4.161
Schleswig-Holstein	3.307	1.859	3.483
Thüringen	3.003	1.990	3.061

nR – not rural areas; R – rural areas

Source: [Neumeier, 2017A) <https://www.econstor.eu/handle/10419/171249>

Overall, the availability of GPs is relatively decent in almost all Länder. However, it should be noted that residents of Mecklenburg-Vorpommern, Brandenburg, Saxony-Anhalt and Rhineland-Palatinate are affected by relatively longer travel times. Although good accessibility dominates in rural settlement centers, the average distances to travel in rural areas are longer than in non-rural regions. However, it is also clear that only a small proportion of the population has to travel by car for 30 minutes or more to reach the nearest GP. In addition, it is important to note the relatively low rate of doctors per 100,000 population in Brandenburg (375.98), Sachsen-Anhalt (409.14) and Rheinland-Pfalz (402.14) compared to the national average of medical doctors per 100.000 population (439.39) in 2019. These regions are characterized by relatively low population densities (with the exception of Rheinland-Pfalz).

The indicators related to the time to reach a health professional and the accessibility of health services are naturally linked. They touch upon the problem of the distance to the provider, which is in turn related to the place of residence and the difficulty of access, mainly for those living in rural areas. Germany has a health needs planning system as an instrument to ensure equal access to healthcare services (SEPEN, 2022). Demand planning takes place at the federal, state and local levels. For the purposes of the system, relevant tools and measures were proposed, such as an indicator describing the target level of care (population per doctor [for a specialist group of doctors]). In 2019, a demand planning reform was introduced, in which target indicators of the level of care were defined. The indicators were established based on a historical reference date at which the level of supply was assessed as adequate. Currently, these indicators are updated every two years. The update concerns the demographic situation and morbidity rates using correction factors. Another indicator is the coverage of care in the region, determined by comparing the number of residents to the target level of care. The coverage level is expressed as a percentage and is used to assess the level of coverage in the region.

As defined by The National Association of Statutory Health Insurance Physicians (NASHIP), an undersupply area is to be assumed if **the degree of supply in a planning area is below 75% in the general practitioner area or below 50% in the specialist area**. Moreover, according to this definition, the state committee can declare an impending undersupply for a region if there is no undersupply yet, but this is to be expected in the future (for example, due to the age structure of the doctors working there). In order to prevent insufficient coverage in regions, the following acts were introduced: *GKV Supply Structure Act of 1 December 2011* and *GKV Care Strengthening Act of 15 June 2015* (4.2.1.). These laws describe the various tools that are to be used to eliminate the danger of insufficient supply. If the level of care in a planning area¹⁷ **is less than 110%**, the planning area is open and new doctors can establish themselves. Since the Statutory Health Insurance Care Improvement Act of 2015, if the coverage of care is 140% or higher, the KV should not allow the practice to be filled if it is not necessary (KVB, 2022).

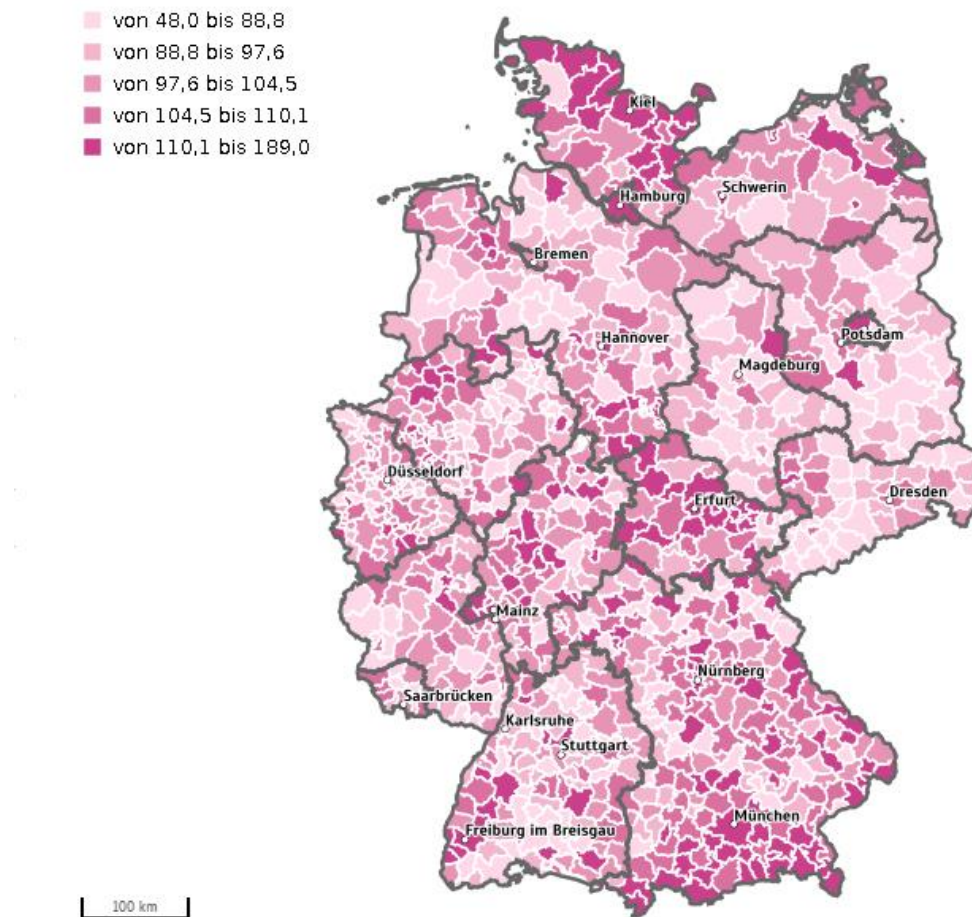
The responsibility for ensuring outpatient care for individuals covered by statutory health insurance (SHI) in Germany lies with the 17 associations of statutory health insurance physicians (*Kassenärztliche Vereinigungen* - KVs) and the National Association of SHI Physicians (*Kassenärztliche Bundesvereinigung* - KBV). These KVs have a wide range of tools available to them to proactively improve healthcare access in underserved areas from an early stage. For

¹ Planning areas are divided depending on the type of doctors. Each group of doctors is assigned to one of four levels of care: general medical care (family doctors); general specialized care (ophthalmologists, surgeons, gynecologists, laryngologists, dermatologists, neurologists, psychotherapists, orthopedists, urologists, pediatricians); level I specialized care (internists, anesthesiologists, radiologists, child and adolescent psychiatrists, and level II specialized care (nuclear medicine specialists, radiation therapists, neurosurgeons, human geneticists, laboratory physicians, pathologists, transfusionists).

example, they have been assigned the task of establishing a structural fund to finance initiatives that enhance the availability of SHI-based care. This fund can be used for various purposes, including providing subsidies to cover investment expenses to take over or establish new medical practices, as well as financing fee supplements, training allowances, and scholarships. **An interactive KBV map is available that provides an overview of the various measures taken to ensure the availability of outpatient care by region.**

Figure 4 shows the coverage of primary care physicians to determine the relative oversupply and undersupply regions for this health profession. **Most undersupply regions are located in the eastern part of Germany (the former DDR) in rural area** (please see Table 1 and Table 3).

Figure 4. Primary care physicians, coverage in % by county (ger. Landkreis)



Source: KBV, <https://gesundheitsdaten.kbv.de/cms/html/17016.php> [online access: 08.08.2023]

5.2.1.2. Model for accessibility to GPs and specialists in German states

In 2017, Neumeier published an article, that described a model to measure the accessibility to GPs and specialists in German states for which an integral accessibility index was calculated. The index was based on the distance or arrival/ walking time (based on the road network) from the place of residence to the medical facility (Neumeier 2017B). The pattern of accessibility to general practitioners (GPs) and specialists was examined across Germany (in all states). The model of access to primary care physicians and specialist doctors in German states was based on the data from 2016. The analysis has shown that there are differences in availability between rural and nonrural areas. The average distance to the primary care physician in rural regions is 3.3 km while in non-rural regions it is 1.5 km. Furthermore, there is a significant difference in accessibility to the medical specialist between rural and non-rural regions (3.6 km vs 9.5 km). Despite these differences, it should be noted that the average availability of primary healthcare in Germany is at a high level.

Data presented by Neumeier (2017B) relate also to the proportion of inhabitants that can reach a GP or medical specialist within 15 minutes, either by car or on foot. **As indicated in the analysis, 99% of German citizens can reach a primary care physician (GP) by car within 15 minutes** (100% of the population in non-rural areas and 98% of the population in rural areas) (Table 4).

Table 4. Accessibility of general practitioners and medical specialist by transportation, state (Bundesland) and non-rural (nR) and rural (R) regions within each state

State	General Practitioner						Medical specialist					
	Up to 15 minutes on foot			Up to 15 minutes by car			Up to 15 minutes on foot			Up to 15 minutes by car		
	total	nR	R	total	nR	R	total	nR	R	total	nR	R
Percentage of population												
GERMANY	68	85	56	31	15	42	27	46	13	62	54	69
Baden-Württemberg	73	87	65	26	13	35	22	35	13	70	65	73
Bayern	64	90	55	35	10	44	23	54	12	59	46	64
Berlin	93	93	-	7	7	-	78	78	-	22	22	-
Brandenburg	51	82	49	43	18	45	11	40	9	61	60	61
Bremen	71	71	-	29	29	-	49	49	-	51	51	-
Hamburg	90	90	-	9	9	-	64	64	-	35	35	-3
Hessen	73	90	62	27	10	38	23	38	12	69	62	73
Mecklenburg-Vorpommern	56	83	52	37	17	40	21	53	16	45	47	45
Niedersachsen	56	75	50	42	24	48	18	35	13	65	63	66
Nordrhein-Westfalen	74	80	59	26	20	41	30	37	13	68	63	81
Rheinland-Pfalz	63	88	56	36	12	43	16	35	11	70	65	71

Saarland	63	72	59	37	28	41	15	30	9	81	70	86
Sachsen	66	89	56	33	11	43	33	66	18	61	34	74
Sachsen-Anhalt	52	90	43	42	10	50	20	60	10	61	40	66
Schleswig-Holstein	62	77	56	37	23	43	19	36	12	65	63	66
Thüringen	58	80	54	40	20	43	23	45	19	59	54	60

nR – not rural areas; R – rural areas

Source: Neumeier, 2017B

When examining the pattern of accessibility to general practitioners (GPs) and medical specialists over all states, it shows that there is a high density of GPs and a much lower density in specialist care, with clear differences in access to GPs and medical specialists (Table 4). Unlike specialists, GPs can be easily reached by foot and car, although the situation differs between urban and rural areas. States with lower access to specialists are identified, i.e., **Mecklenburg-Vorpommern, Brandenburg, and Saxony-Anhalt** (states with the highest proportion of rural and sparsely populated areas). In contrast, only 89% of the national population (100% of the population in non-rural areas and 81% in rural areas) can, on average, reach the nearest specialist within a 15-minutes by car. If outpatient care is closed down, this will negatively affect the availability of services close to where people live and will be particularly burdensome for vulnerable groups such as seniors (Neumeier, 2017B).

5.2.1.3. Regional disparities in specialized palliative care and long-term care in Germany

The unequal territorial distribution of medical professionals was also shown in 2022 by a retrospective cross-sectional study based on a district data for palliative care facilities in Germany (Gessel et al., 2022). The analysis included 673 specialized palliative care facilities shows that there are no facilities for palliative care in 110 of the 401 districts that can be distinguished within Germany. The limited availability of palliative care is particularly visible in rural districts and the areas with low or medium population density.

The Federal Ministry of the Interior and the Community has published a guideline that addresses the issue of strengthening **long-term care in rural areas**. The guideline provides information and recommendations on how to improve and enhance long-term care services for people living in rural regions (Federal Ministry of the Interior and the Community, 2022). In 2016, the Bertelsmann Stiftung published a comprehensive study that examined the geographical distribution of long-term care services in Germany and the corresponding challenges that arise from it. The study explores the disparities and difficulties faced in providing long-term care in different regions in the country (Rotgang et al., 2016). [The Seventh report on the Elderly](#) emphasises the crucial importance of a needs-based supply in planning long-term care. It includes an analysis of regional disparities and recognises the significance of the living

environment in shaping the living conditions of older people (Federal Ministry for Family Affairs, Senior Citizens, Women and Youth, 2017).

Regional access to local hospital care, on the other hand, can be considered as well balanced. The nearest local hospital (hospitals up to 250 beds, and at least one specialist department) can be generally reached by car in 16 minutes. For about 78 percent of the population this is a maximum of 15 minutes and for a further 14 percent a maximum of 20 minutes by car. Around 8 percent need more than 20 minutes. The relatively dense network of locations of such hospitals in North Rhine-Westphalia is noteworthy. The best accessibility of hospitals by car is found in Berlin, where it takes an average of seven minutes to reach the nearest primary care hospital. The longest distances are found in rural peripheral areas, especially in Brandenburg, Mecklenburg-Vorpommern, Thuringia and Bavaria¹⁸, which is in line with the accessibility differences presented before (Deutschlandatlas, 2023).

5.2.2. Application of the ROUTE-HWF taxonomy to identify and measure medical deserts

The [ROUTE-HWF Project](#) approach to define and measure medical deserts (see the Deliverables 4.2. and 5.2) is based on a set of four objects/elements: two that address the level of health care demand and two that address the health care supply in a given area. These demand-related objects are indicated by (1) % of population 65+ and (2) economic resources of the population, while the supply-related objects are indicated by (3) travel times to public health facilities and (4) population-provider ratio. These four indications are measured in terms of the relative value for a certain area, being either above or below the country average. Combining these four dichotomous variables, the framework results in five exclusive types of medical deserts, where at least three of the four objects of a medical desert apply (Table 5).

¹⁸ The average accessibility indicates the time in which half of the population can reach a primary care hospital. The accessibility was determined in a 250x250 metre grid.

Table 5. Objects used in the ROUTE-HWF Project taxonomy of medical deserts

Type of medical desert	POPULATION AND HEALTHCARE DEMAND OBJECTS		AREA AND HEALTHCARE SUPPLY OBJECTS	
	Object 1: Percentage population aged 65 and over	Object 2: Economic resources of the population	Object 3: Travel time to public health facilities	Object 4: Population-provider ratio
	<i>The proportion of inhabitants aged 65 and over living in this area, is <u>higher</u> than the proportion of all inhabitants in a country living in this area</i>	<i>The proportion of inhabitants below the poverty line living in this area, is <u>higher</u> than the proportion of all inhabitants in a country living in this area</i>	<i>The percentage of the population that lives within 15 minutes by car from a hospital in this area is <u>smaller</u> than the average percentage at the national level of the country</i>	<i>The proportion of health professionals working in this area, is <u>lower</u> than the proportion of all inhabitants in a country living in this area</i>
↓				
1	x	x	x	x
2	x	x	x	
3	x	x		x
4	x		x	x
5		x	x	x

Source: Deliverable 4.2. Second version of the ROUTE-HWF taxonomy on medical deserts.

As mentioned above, the country informants consulted for this case study text were against using the term 'medical deserts' for Germany and emphasize that access to healthcare is generally easily accessible in Germany. Nevertheless, when we applied the ROUTE-HWF taxonomy using EUROSTAT and national data at the NUTS-2 (i.e., Bundesland level), **a substantial number of areas with the most disadvantaged values** (compared to the national average) were identified based on the selected four dimensions.

The application of the ROUTE-HWF taxonomy in the German context showed that seven regions can be considered as one of the five types of medical deserts. Niedersachsen, Sachsen-Anhalt

and Thüringen are medical deserts type 1 (full medical deserts). Mecklenburg-Vorpommern is medical desert type 2; Sachsen is medical desert type 3. Brandenburg and Schleswig-Holstein/ are medical deserts type 4.

Table 6. Germany – application of the ROUTE-HWF taxonomy

NUTS-2 region	Proportion of population aged 65 years and more (2021)	At-risk-of-poverty rate in Germany (2021) *	Percentage of population within 15 minutes from a hospital (Eurostat data for 2020)	Medical doctors per 100,000 inhabitants (Eurostat data 2020)
GERMANY	22.0	16.6	91.4	439.4
Baden-Württemberg	20.6	13.9	92.2	415.4
Bayern	20.7	12.6	92.5	455.8
Berlin	19.3	19.6	100	551.5
Brandenburg	25.2	14.5	87.2	376
Bremen	21.2	28.0	100	557.4
Hamburg	18.2	17.3	99.9	640.3
Hessen	21.0	18.3	93.7	426.5
Mecklenburg-Vorpommern	25.8	18.1	79.6	440
Niedersachsen	22.3	17.9	86.2	384.9
Nordrhein-Westfalen	21.4	18.7	98	451.3
Rheinland-Pfalz	22.3	16.5	91.7	402.1
Saarland	24.4	16.1	96.2	486
Sachsen	26.7	17.1	93.5	413.3
Sachsen-Anhalt	27.4	19.5	84.3	409.1
Schleswig-Holstein	23.4	15.0	88.4	431.1
Thüringen	26.7	18.9	86.6	418.1

The numbers in red colours indicate that the regional value is below or above the country average, implying that it adheres to the particular object/element indicator of the ROUTE-HWF taxonomy of medical deserts.

Sources: Eurostat 2023, except for the at-risk-of-poverty rate indicator: Statistica

<https://de.statista.com/statistik/daten/studie/164203/umfrage/armutsgefaehrungsquoten-in-den-bundeslaendern>

Figure 5 shows in a map of Germany which NUTS-2 regions (Bundesländer) are identified as medical desert type 1,2, 3 and 4.

Figure 5. Location of medical deserts types 1-4 after application of the ROUTE-HWF taxonomy



Source: based on www.mapchart.net

5.2.3. Factors contributing to medical deserts

A mixture of factors contribute to the existence of medical deserts in Germany. This includes:

- an ageing population,
- geographical accessibility,
- shortages of staff to support medical activities (e.g., medical caregivers, physician assistants),
- problems with the territorial allocation of medical professionals, and
- the proper allocation of competencies, and the working conditions of health care professionals.

Demographic problems (aging population) are among the most influential factors contributing to the emergence of medical deserts. The unfavourable age structure of the German population contributes to the growing problem of increased health needs and staff

shortages in the health sector. There is a clear lack of health workforce capacity to serve the older population in the German healthcare system. These factors have contributed to implementation of diverse policies, e.g. encouraging nursing staff from abroad to work in Germany. The importance of effective migration management principles and appropriate professional and social assimilation of foreign staff has grown. The proportion of population aged 65 and over is lower in Germany than in the European Union, but it is increasing over the years. The states in Germany with the highest percentage of people aged 65 and above are located in the eastern regions, such as Mecklenburg-Western Pomerania, Saxony and Saxony-Anhalt. Conversely, states like Hamburg and Bremen in the north tend to have the lowest proportion of elderly residents. The unfavourable age structure of the population also has a negative impact on the growing problem of staff shortages in the healthcare sector. As estimated by Neumeier: 69% of physicians are over 50 years old and as next year's more doctors will retire it can lead to the inability to replace retired doctors with new ones, especially in rural areas (Neumeier, 2017A).

According to Kuhn et al., in Germany there is not a widespread lack of doctors, rather a **lopsided distribution** of them. Certain metropolitan regions and specialized medical fields actually have too many doctors. Since there are opportunities to establish practices in more desirable areas, there is not much motivation for doctors to work in remote rural regions. Family doctors, specifically, encounter challenges finding colleagues to take over their practices in rural areas. As of 2019, over half of all German doctors were above the age of 55. Additionally, the rising number of female doctors is causing a decline in full-time positions (Kuhn et al., 2017).

Empirical research in Germany supports that health professionals' decisions to establish a medical practice are not only influenced by financial incentives, but also by broader relationship structures (Lübking, 2020). To ensure the availability of healthcare services in areas facing a shortage of medical professionals, state-owned practices such as medical care centres are organized as registered cooperatives. This can play a significant role in improving general practitioner (GP) care in rural regions. The Cabinet Committee on Rural Affairs of the Baden-Württemberg state government is currently exploring the potential and opportunities of cooperative GP models (Lübking, 2020).

The shortage of staff to deliver medical services in Germany is a complex issue, influenced by a range of factors including an aging population, low birth rates, and the migration of healthcare professionals to other countries. Some of the key shortages in this area include (Günther et al, 2019):

1. Nursing medical staff: There is a shortage of medical staff, including nurses and nursing assistants. This shortage is partly due to an aging population and an increase in chronic conditions that require ongoing care.
2. Physician assistants: Physician assistants are increasingly being trained in Germany to execute medical activities. Physician assistants work alongside doctors and can perform

many tasks, such as taking medical histories, conducting physical exams, and providing patient education. There is, however, also a shortage of qualified professionals in this profession.

3. Allied health professionals: There is also a shortage of allied health professionals including physical therapists, occupational therapists, and speech therapists. These professionals play a crucial role in helping patients recover from injuries or manage chronic conditions

In medical deserts, healthcare professionals face a **heavier workload** due to a shortage of staff. They also have to work longer hours to provide care to a larger number of patients. Additionally, they have to travel long distances to reach patients, especially in rural areas where the population is dispersed. Working in medical deserts can also be isolating, as healthcare professionals may not have access to the same level of professional development opportunities or collaboration as colleagues in more urban areas (Bundesärztekammer, 2022).

5.3. HWF policies and approaches to mitigate medical deserts

5.3.1. Stakeholders that develop policy perspectives on medical deserts in Germany

The most important and key stakeholder involved in health workforce policy is at the federal level – the Federal Ministry of Health (*Bundesministerium für Gesundheit* – BMG). BMG is responsible for the registration of health professionals and for the supervision of the main corporatist bodies at the federal level, such as the Federal Joint Committee and the Federal Association of statutory health insurance (SHI) Physicians.

In Germany, human resource planning mechanisms in the health system are only in place for controlling the training inflow for SHI doctors and psychotherapists in outpatient care and some degree programmes. Individual universities decide themselves on the available places for medical, dental, or pharmacy studies. The number of training schools and the number of training places in allied professions is not limited.

The federal states are responsible for the regulation and financing of education, as well as for the registration and supervision of medical professions. The regional ministries of health are responsible for the registration of health professionals and the granting of professional licences (approbation) for doctors, psychotherapists, pharmacists, and dentists. They also approve the use of professional titles for other health professions.

The German Medical Association (*Bundesärztekammer*) represents the professional interests of doctors in Germany. The German Chamber of Physicians actively participates in the opinion-forming process in the field of health policy in society and develops perspectives for a citizen-oriented and responsible health and social policy. It defines the content, duration and objectives

of further training and specialist titles. This organisation is also responsible for regulations for professional development and acceptance of examinations (e.g., specialist examinations) and plays a significant role in granting qualifications and professional titles.

The German Association of Sickness Funds Physicians is committed to guarantee an adequate number of physicians to meet local needs. These include, for example, **promoting the opening of new medical practices in rural areas**, as well as in large urban areas with a difficult social structure, **providing scholarships to students** who settle in areas with poor infrastructure after completing their studies. The German Association of Sickness Funds Physicians works together with the municipalities to attract doctors by, for example, **taking action plans for practices** that are in danger of closing, granting scholarships to students with subsequent settlement obligations, loans, support in finding employment for members of the doctor's family, assistance with childcare, enabling part-time work. Allocation of competencies in interprofessional teams (skill-mix) – i.e., the doctor-nurse line like setting up nursing practises in areas without doctors is also a popular policy example. This relates also to policies focused on introducing new professions, e.g., physician assistant. Another example is the development of telecommunication services (and their inclusion in the statutory health insurance standard) and so-called **mobile medical practises** in underserved areas (Landberg, 2014).

The chambers of doctors, psychotherapists, dentists, pharmacists, and nurses are also responsible for the organisation, implementation, and supervision of training activities. Membership is mandatory.

5.3.2. Policies and approaches to mitigate different types of medical deserts

In Germany, a variety of policies have been implemented or proposed, both at the federal and regional level, aimed at reducing the phenomenon of medical deserts or at least mitigating the factors that contribute to their occurrence. These policies have faced different challenges and have not always been effective.

The largest shortages of medical professionals (mainly GPs) are found in underdeveloped rural areas, but also in districts of large cities with a so-called difficult social structure. In order to strengthen the care by GPs in the long term, the minimum number of general medical training jobs to be funded has been increased from 5,000 to 7,500. In addition, the further training of primary care professionals with up to 1,000 additional training positions is to be promoted. Outpatient trainees should receive the same salary as an assistant physician in a hospital. During education, medical students have to complete an internship in primary care (Landberg, 2014).

The different policies and approaches of medical desserts mitigation are presented below:

5.3.2.1. Health workforce planning and territorial allocation

Important legal regulations have been implemented to improve HWF planning and territorial allocation. These include:

- The GKV Supply Structure Act (1 December 2011) brought about several changes to the healthcare system in Germany. It removed the requirement for doctors to reside in the area where they practice and made it easier for them to open a second practice. Contract doctors and healthcare centres can now hire doctors without limitations on their specialty. Additionally, a non-full-time employment model was introduced to help balance work and career. The Act also made changes to the reimbursement system, allowing subsidies to be agreed upon for service prices, and enabling municipalities to run their own medical facilities. Furthermore, the Act extended the possibilities for delegating medical services and using telemedicine.
- The Health Care Strengthening Act (11 July 2015) introduced a structural fund to promote healthcare settlement and expanded funding options. The Associations of Statutory Health Insurance Physicians were required to establish appointment service points, and since January 2016, insured persons have been able to contact these points with referrals to specialists.
- To address the issue of proper territorial allocation of medical doctors, several measures have already been taken. For instance, the "[2020 Medical Studies Master Plan](#)" ([Masterplan Medizinstudium 2020](#)), agreed upon by the Federal Government and the Länder, allows the reservation of up to 10% of all study places for applicants who commit to working as a general practitioner in underserved or at-risk regions for at least 10 years after completing their studies and specialised training (known as the rural doctor quota or 'Landarztquote'). Except for Schleswig-Holstein and Brandenburg, all larger Federal Länder have already implemented this quota, and Thuringia is planning to do so. However, implementing this quota is not feasible for the city states of Berlin, Bremen, and Hamburg (Stiftung für Hochschulzulassung, 2023).
- Demand planning is considered a crucial measure to guarantee access to outpatient care. The responsibility for creating a national planning framework for demand planning lies with the Federal Joint Committee (G-BA). As a result, both the federal and state governments have various interconnected roles and management choices regarding demand planning. A special [online tool: BEDARFSPLANUNG](#) (Demand planning) provides an overview on this topic and regulates how many doctors there are in a region and how are they distributed¹⁹.

¹⁹ More information is available at: www.gba.de/themen/bedarfsplanung/bedarfsplanungsrichtlinie/ and <https://www.g-ba.de/richtlinien/4>

- There is also [a dedicated website/platform - *GESUNDHEITSDATEN*](#) – (Health Data, Degrees of supply in the planning areas) showing an overview of the levels of access to healthcare in each planning area.

5.3.2.2. Integration of Migrant Health Professionals in Germany

In 2021, Germany was one of the countries with highest dependency of foreign-trained nurses (9.2% of the nurse workforce). In the period 2010-2021, the dependency of foreign-trained physicians increased significantly from 6.6% to 13.8% (Report Pillars in Health, 2023). Germany is a receiving country mainly for health professionals from Romania, Italy, Hungary and Croatia (for nurses) and Romania, Hungary and Greece (for physicians). Germany recognized 10,476 internationally obtained qualifications for nurses and 12,782 for physicians. Within the same period, 9,693 nurses and 18,361 physicians with German qualifications were recognised to practice abroad (including Austria, Luxembourg, the UK and Norway). The majority of all physicians practicing abroad (n=10,087 doctors, 54.9%) and about half of all nurses (n= 4,464 nurses, 46.1%) decided to immigrate to Switzerland. Germany is a sending country for physicians to neighbouring countries (Report Pillars for Health, 2023). Migrant health workers help reduce staff deficit and problems of the health labour market, but a systemic approach, support and proper adaptation process is needed (Kuhlmann, 2020).

There is a clear shortage of caregivers for the older population in the German health system. These factors have led to measures to encourage nursing staff from abroad to work in Germany. Research notes a shift in German migration policy towards utilitarian control of migration processes, taking into account the concerns of the labour market on the one hand and isolationist, politico-cultural seclusion on the other (Kordes et al., 2020). Based on the collected material, Kordes et al. (2020) distinguished four strands of research on migration management in relation to the recruitment of qualified nurses in the German health system: 1) Defining problem areas, mainly in relation to the legitimacy of migration in German society; 2) Classification of migration processes; 3) Change the role of the state in the management of migration policy in favour of new actors often coming from the private sector; 4) Identification of instruments (legal, political) and procedures for the daily management of migration (Kordes et al., 2020).

5.3.2.3. Changes in the graduate allocation processes

Attracting doctors to work in rural areas requires the implementation of incentive systems that encourage such choices already at the stage of their studies. In Germany, such a policy is pursued by the Joint Admissions Office (StV), which plays a crucial role in allocating places in medical schools. StV decides on the allocation of two-tenths of the available places for two categories of candidates:

1. candidates who have committed to practicing in areas of special public need in accordance with the relevant regulations;
 2. medical students from rural areas who commit to settling as family doctors in areas with insufficient medical care for a period specified in a public law contract after completing their training (German Bundestag, 2015).
- To attract more medical students to work as physicians in rural areas, the Federal Ministry of Health has provided funding for several initiatives. One of these initiatives is the **Central German Concept for the Longitudinal Integration of rural medical training content and Experience in Medical Studies** (*‘Mitteldeutsches Konzept zur longitudinal integration Landärztlicher Ausbildungsinhalte und Erfahrungen in das Medizinstudium’*), known as [MiLaMed](#). Additionally, the ministry is currently supporting the "[MEDiC](#)" model course Physicians for the Free State of Saxony (*‘Ärztinnen und Ärzte für den Freistaat Sachsen’*) as well as the "[LOCALHERO](#) - Longitudinal Curriculum in General Medicine to Strengthen Family Medicine Care in Rural Regions" (*‘Longitudinales Curriculum Allgemeinmedizin zur Stärkung der Hausärztlichen Versorgung in ländlichen Regionen’*) project. Total funding for these initiatives amounts to more than 23 million euros.
 - As part of the Master Plan's implementation, the Federal Ministry of Health has been providing funding for the "[RegioMed](#)" project at the University of Leipzig since January 1, 2021. This project focusses on medical studies in small towns and rural areas (*‘Regionales Medizinstudium in Kleinstadt und Land’*). It involves the creation, testing, and evaluation of a national virtual information platform, aimed at highlighting existing training programmes and support options available to medical students in rural regions. Additionally, the Master Plan includes measures to reinforce the significance of general medicine and the broader field of outpatient care in medical studies. The goal is to attract more young professionals, ensuring universal access to general practitioners.

5.3.2.4. Local training for GPs in German states

In many German states with severe shortages and low provider-population ratio, dedicated local trainings for general practitioners are organized. One of the examples of such programme was conducted in [Hessen Region](#). A specialised course for doctors in specialisation training in family medicine was established at the beginning of 2013. The courses were established in connection with the “Pact to guarantee the availability of health care” in view of the shortage of family doctors initiated by the Hessian Ministry of Social Affairs. The Centres of Excellence for Specialist Training in Family Medicine were established at the Universities of Marburg and Frankfurt am Main. The courses include a programme of seminars and mentoring (Broemann, 2015).

Another example is a new post-graduate medical training in general practise in Baden-Württemberg Region. In 2009, the postgraduate programme Verbundweiterbildungplus Baden-Württemberg (VWBplus BW) was developed by the Competence Centre for General Practise in Baden-Württemberg with the aim of ensuring access to primary care in the future by making general medicine more attractive. The continuously increasing number of participants over the years shows that the programme is relevant for medical graduates and contributes to the attractiveness of general practise. Evaluation of the training programme and trainer course confirm that it focusses on the needs of the target groups. The VWBplus BW postgraduate programme supports structured, competence-based and quality-oriented specialist training and fosters professional exchange between doctors (Schwill and Magez, 2017).

Further example is training for doctors in North Rhine Region. The goal of this programme was the establishment of a regional competence centre for postgraduate training in family medicine in the German region of the North Rhine in 2017. It was a joint effort conducted by the regional medical association, the hospital association and five university departments of family practise. The programme is funded and established within the framework of the German Social Act SGB V 75a, which has been supplemented by a package of strategies to increase the number of primary care professionals. The programme offers voluntary seminars combining practical medical content and practice management advice with mentoring, networking opportunities and career planning support. These seminars are held in small groups, are interactive and are a place to make new contacts and network for future collaborations (Wild, Linden and Welchowski, 2022).

5.3.2.5. Task – shifting / skill-mix

In Germany, the reforms undertaken towards a skill mix were mainly driven by the desire to overcome the fragmentation of services by introducing teamwork factors and service integration. However, significant barriers to change are still noted in the system, such as the existing fragmentation of services, the lack of uniform regulation of provider organisations and poor coordination between different sectors and professional groups. The strong polarisation by the association of doctors and health insurance providers is noticeable, constituting a strong barrier to the entry of new professions or the sharing of tasks and competences (European Commission, 2019). Regulation and organisation of health care in Germany is strongly focused on doctors. The situation in the availability of health services determined by the number of medical professionals is different within Germany as well: the western part of the country has a large number of doctors in various settings, while the shortage in the eastern part of Germany (mainly in rural areas), is a concern for the medical professionals and policy-makers. It is important for the implementation of skill-mix reforms that the medical associations or unions most affected by skill-mix initiatives are among supporters (or at least not strongly oppose). In Germany, the medical profession lobbies strongly for government, which has given little support to skill-mix initiatives that, affect its traditional scopes of practice (European Commission, 2019).

Skill mix particularly affects nurses, extending competences, tasks that were previously only performed by doctors. Moreover, due to the already existing shortage of doctors, which will continue in the future, medical care can only be guaranteed by the creation of new competence teams. The HWF shortages prognoses require systemic measures towards the introduction of new professions into the systems, e.g., physician assistants, both in the states and at the federal level. One of the main factors supporting the introduction of physician assistants into primary care is the financial factor, in the form of new funding schemes for services to compensate for the additional expenditure on specially trained medical assistants (Freunda et al., 2015). Experts draw attention to this problem and make an urgent appeal to professional associations about the need to create new working and payment models (Günther et al., 2019).

5.3.2.6. Financial support

According to the European report “Mapping of national health workforce planning and policies in the EU-28” (European Commission, 2021) in Germany, efforts are being made to set density targets for primary care doctors, dentists, and psychotherapists. To reach this aim, the States issue settlement permits and insurance funding. To encourage a more even geographical distribution, 11 out of the 16 federal states provide financial incentives to GPs who establish their practices in rural areas for the first time.

According to the SHI Care Structure Act⁴, the amount of the total remuneration for contract doctors is agreed in the regions by the associations of statutory health insurance physicians and the associations of health insurance companies and substitute insurance companies. Morbidity-related medically necessary additional services in the regions lead to higher total remuneration in the subsequent period. The medical services are shown in the contract doctor fee schedule (uniform evaluation standard - EBM) in a more performance-oriented manner ([Ministry of Health, 2023](#)). Those responsible on site have more opportunities to set stronger incentives for doctors to set up practice, especially in underserved or structurally weak areas. The establishment of a structural fund to promote the settlement was made easier, and the funding options were expanded.²⁰

An interesting example of using financial incentives comes from Bavaria. The Bavarian Association of Statutory Health Insurance Physicians (KVB) has increased funding amounts by 25 percent for general practitioners in the planning area of Donauwörth Nord (Swabia) and for ear, nose, and throat (ENT) doctors in the district of Tirschenreuth (Upper Palatinate). To increase the number of doctors, the KVB also offers entry into outpatient care through employment in a KVB practice or the use of a KVB practice for contract doctors in both regions. The responsible state

²⁰ Bundesgesetzblatt:

https://www.bgbl.de/xaver/bgbl/start.xav?startbk=Bundesanzeiger_BGBl&jumpTo=bgbl115s1211.pdf#_bgbl_%2F%2F*%5B%40attr_id%3D%27bgbl115s1211.pdf%27%5D_1663953734381

committee of doctors and health insurance providers, which is independent of the KVB, had already identified a shortage of general practitioners in the Donauwörth Nord district and ENT doctors in the Tirschenreuth district in November 2021. As the previous funding program did not eliminate the undersupply, further measures were decided upon. Establishing a practice in the affected regions will now be subsidized with up to 112,500 euros instead of the previous maximum of 90,000 euros. A branch practice can be subsidized with up to 28,125 euros instead of the previous maximum of 22,500 euros. In addition, the KVB offers interested physicians in the two relevant medical specialties the option of employment in a KVB practice in the two regions. This offer is intended to facilitate the start of a physician's own practice and aims to have the employed physician take over the KVB practice and continue it in their own establishment after no later than two years. This model is being implemented for the first time since July 2022 in the district of Wunsiedel in Upper Franconia with a KVB practice for dermatology. Alternatively, there is the option to use a KVB-equipped practice as a contract doctor in his or her own establishment ([Monitor – Versorgungsforschung, 2022](#)).

The platform offered by the National Association of Statutory Health Insurance Physicians: interactive KBV map – [SICHERSTELLUNGSATLAS](#) - provides an overview of the various measures taken to provide ambulatory care. One can select a place (municipality, district) and receive information about the steps taken, such as financial support given, projects implemented, facilities, etc. ([Kassenärztliche Bundesvereinigung, 2023](#)).

5.3.2.7. Medical Care Centers (Medizinische Versorgungszentren – MVZ)

In Germany, municipalities can actively help in improving access to health care by establishing Medical Care Centers ('*Medizinische Versorgungszentren*' or MVZ in German), especially in rural areas ([Ministry of Health, 2023](#)). On 1 January 2004, the GKV Modernisation Act - GMG - came into force and marked the beginning of a new type of SHI-accredited service provider, the medical care centre or MVZ. Firstly, in line with its basic model, the MVZ was an interdisciplinary institutional service facility staffed by employed physicians. MVZs are important stakeholders of the German healthcare system and have contributed significantly to improving the quality of medical care services and patient outcomes. They are licensed by the state and usually staffed by a team of doctors, nurses, and other healthcare professionals who work together to provide comprehensive medical care. They provide easy access to specialized medical care services and offer a wide range of medical services in one place.

5.4. Analysis of successful and sustainable HWF policies in medical deserts

The policies and measures taken in the German health system to reduce medical deserts are mostly focused on achieving an equal territorial allocation and planning of medical staff at both the federal and federal state level. The German system is often compared with the French

system in this aspect²¹. Other important policies concern changes in the graduate education processes, local training for GP's and task shifting (skill-mix). This last aspect is particularly interesting and involves not only the delegation of competences from physicians to nurses and other medical professionals, but also the creation of new professions such as physician assistants. Important indicated policies and measures to improve the underserved situation in medical deserts are: (1) financial support and integration of providers in rural areas, as well as (2) reaching the appropriate social and professional assimilation of migrant health care workers into Germany.

In conclusion:

- Several activities are undertaken at federal and local level for better planning and territorial distribution of medical staff in the German healthcare system. A feature of the German health system is federalism and corporatism. It is therefore important to properly coordinate federal and local policies, to recognise the importance of local initiatives and to recognise the importance of initiatives by professional chambers, associations and trade unions.
- The policy of securing equal access to health services is mainly of a federal nature. The policies pursued by individual states are more detailed and adapted to identified needs, but a large part of the measures undertaken are funded by the federal government, the European Union, and the states themselves. Ongoing planning measures are being taken to ensure effective and adequate coverage of the necessary number of medical professionals to meet local health needs. There is also a dedicated interactive platform showing an overview of the levels of access to healthcare in each planning area.
- A migration policy is carried out in the spirit of professional and social assimilation of new foreign trained healthcare workers. These policies should be regulated and address the wage and other inequalities in the workplace. This includes adopting principles for effective migration management.
- Changes are introduced in education systems, e.g., reservation of medical school places for candidates declaring their intention to work in rural areas, or preferential free voluntary refresher courses for GPs.
- Financial incentives are introduced for doctors wishing to work in rural areas, e.g., funding for outpatient training in general practise areas, launching training Grant programme, funding of clinical placements, block placements, mentoring projects, reimbursement of

²¹ Two types of new efforts are taken in France: (1) the establishment and empowerment of new actors contributing to territorialization in primary health care (ARS and local government), as well as (2) the development of multitasking work due to the creation of new bottom-up, entrepreneur/manager-inspired modes of organisation of primary health care (Hassenteufel et al. 2020).

- travel expenses during block placements, grant for investment costs in case of acquisition of a new establishment or practise, investment grant to establish a branch practice etc.
- Task shifting, introduction of new professions (physician assistant), building new standards for team work.
 - A large number of initiatives is being taken in terms of getting medical professionals, mainly doctors into work or setting up practises in rural areas, particularly in Sachsen, Mecklenburg-Vorpommern, Thüringen. A variety of financial and educational incentives are used as part of local policy in this area.
 - Noteworthy in the German context are interactive online tools, e.g. [An interactive KBV map \(Sicherstellungsatlas\)](#), offering a comprehensive display of the different actions implemented to guarantee outpatient medical services in different regions.
 - Since medical deserts present a complex problem, a single policy alone cannot be sustainable – instead an intersectoral and multidimensional solution should be applied.

5.5. Evaluation of the applicability of the ROUTE-HWF roadmap in the particular national / regional context

The application of the ROUTE-HWF taxonomy in the German context showed that seven regions can be categorized as a prominent type of medical desert as they deal with three or four objects driving desertification. According to the methodology applied by the ROUTE-HWF project, Niedersachsen, Sachsen-Anhalt and Thüringen are medical deserts type 1 (full medical deserts), meaning that they deal with a disadvantageous position on all 4 objects. Mecklenburg-Vorpommern, Sachsen, Brandenburg and Schleswig-Holstein are medical deserts type 2, 3 and 4, dealing with three out four objects that determine their underserved situation.

However, it is important to emphasize that the taxonomy is applied to Germany at the international standardized geographical level (NUTS2 regions), while at the same time specific situations within each region can vary significantly and the national context must be taken into consideration. It should also be mentioned that the country informants consulted for this case study, were opposed to using the term ‘medical deserts’ in the German context. They highlighted that access to healthcare can vary between regions, but health services are commonly easily accessible in Germany.

Table 7 summarizes the result of the taxonomy application, indicating **the regions with most disadvantaged values** broken down by the four different types of medical deserts. The results presented in chapter 4 and 5 of this **case study, are also included in this overview table to map the adequate factors and solutions** for each type of medical deserts and their German regions.

Table 7. Factors driving desertification and solutions

Medical desert type	Area / region	Factors driving desertification	Solutions / policies / actions
Medical desert type 1 Areas that deal with • a relatively high proportion of population aged 65 years and older • a relatively high proportion of population at-risk-of-poverty rate. • a relatively small proportion of population within 15 minutes from a hospital • a relatively low ratio of medical doctors per 100,000 inhabitants	Niedersachsen Sachsen-Anhalt Thüringen	– Aging – Shortages of medical staff – Unequal distribution of doctors – Inadequate competence allocation of medical and peri-medical professionals and negligence with regard to the creation of new professions (skill mix, task shifting) – Weak regulatory support for the establishment of various forms of practices run by medical professionals – Unattractive working conditions for medical staff (in particular in rural areas).	– Financial incentives: Balanced and motivational salary policy, e.g. equalisation of salaries of trainees in ambulatory care with physician assistants or funding for outpatient training in general practise areas etc. – Measures to increase the efficiency of the territorial allocation of medical staff, e.g. abolishing the requirement of permanent residence for physicians declaring their intention to practise. – Migration policy. Attracting staff from abroad. – Allocation of competences, task-shifting measures, changes in the reimbursement system by excluding doctors from coverage areas from quantitative restrictions etc. – Strengthening coordinated care and practice – Attracting young professionals, e.g. Thuringian Scouts Association – Training Grant Programme "Saxon General Practitioner Scholarship". – Funding of clinical placements, block placements, mentoring projects
Medical desert type 2 Areas that deal with • a relatively high proportion of population aged 65 years and older • a relatively high proportion of population at-risk-of-poverty rate.	Mecklenburg-Vorpommern	– Aging – High proportion of rural area – Shortages of medical staff – Lack of local infrastructure for the establishment of practices by medical professionals	– Financial support for specialized training – Reimbursement of travel expenses during block placements – Financial support for general medical teaching placements – Financial support during the practical year – Financial support for job shadowing – Mentoring programme – Grant for investment costs in case of acquisition of a new establishment or practise

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a relatively small proportion of population within 15 minutes from a hospital			- Grants for the employment of physicians - Wage subsidies for the employment of doctors to take over a practise, assistants and support representatives
Medical desert type 3 Areas that deal with - a relatively high proportion of population aged 65 years and older - a relatively high proportion of population at-risk-of-poverty rate. - a relatively low ratio of medical doctors per 100,000 inhabitants	Sachsen	- Aging - Shortages of medical staff - Inadequate allocation of competencies, lack of new professions (skill mix, task shifting) - Unattractive employment/work conditions for medical professionals, especially in rural areas.	- Allocation of competencies - e.g. creation of nurse practices in areas without a doctor, emergence of new professions e.g. physician assistant - New working models, e.g. part-time employment model, mobile clinics - Funding of outpatient training in primary care specialities - Guarantee surcharge to ensure the operation of a panel doctor (flat-rate surcharge) - Guarantee surcharge to ensure the operation of the practise (minimum turnover) - Allowance for post-graduate doctor's expenses (post-graduate practise subsidy) - Continuing education supplement as a salary supplement for career changers in general practise (lateral entry into general practise) - Salary supplement for probationary general practitioners for self-employment in their own department (probationary general practitioner). - Supplement for further training as non-medical practice assistants (NÄPA funding) - Guarantee surcharge for maintaining the activities of a contract doctor (maintenance fee) - Model project "Studying in Europe - a Future in Saxony" - Training Grant programme "Saxon General Practitioner Scholarship" - Network "Doctors for Saxony"
Medical desert type 4 Areas that deal with	Brandenburg	- Aging - Shortages of medical staff	New employment models: part-time employment model, mobile clinics

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• a relatively high proportion of population aged 65 years and older • a relatively proportion of population within 15 minutes from a hospital • a relatively low ratio of physicians per 100,000 inhabitants	Schleswig-Holstein	– High proportion of rural area – Inefficient allocation of competencies – Fragmentation of service providers and lack of doctors in rural areas – Weak regulatory support for the establishment of different forms of practices run by medical professionals	– Allocation of competencies (skill-mix) – Upgrading qualifications, e.g additional training for physicians in rural areas – Various forms of financial support (including Structural Funds).
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6. Ireland

6.1. General country context

6.1.1. Geography and socio-demographic characteristics of the country and regions

Ireland is an island country located in the North Atlantic Ocean in North-West Europe. The geopolitical division of the island includes the Republic of Ireland (with a total land area of 70,273 km²), which covers five-sixths of the island, and the independent state of Northern Ireland, which is part of United Kingdom. The island is divided into four provinces - Leinster, Munster, Connacht and Ulster, and 32 counties: six of the nine Ulster counties form 'Northern Ireland' and the other **26 counties form 'the state, Ireland'**. The division into provinces and counties within Ireland is primarily of historical and cultural significance, while the NUTS-regions division in three regions (Northern and Western Region, Eastern and Midland Region and Southern Region-Figure 1) aims to facilitate statistical analysis and regional planning.²²

²² The province of Leinster is associated with the NUTS 2 region known as the "Eastern and Midland Region." The province of Munster corresponds to the NUTS 2 region referred to as the "Southern Region." The province of Connacht aligns with the NUTS 2 region: "Northern and Western Region." The province of Ulster, which includes the counties of Cavan, Donegal, and Monaghan, also falls within the NUTS 2 region referred to as the "Northern and Western Region."

Figure 1. Regions (NUTS-2) in Ireland



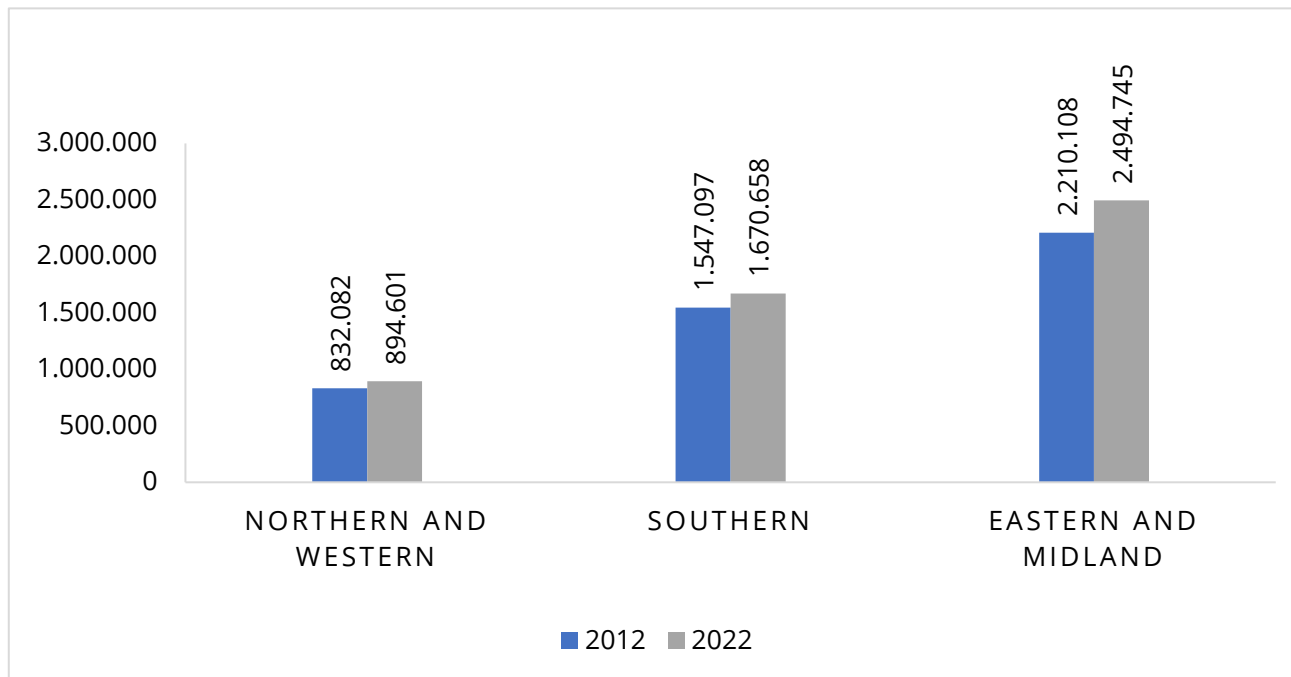
Source: based on www.mapchart.net

The population of the entire island in 2022 was 7 million, of which **5.1 million lived in Ireland** and 1.9 million lived in Northern Ireland. The average density of the population is 72 persons per km². The largest city and capital is Dublin, which has a population of over 1.2 million people. Other major cities in Ireland include Cork, Limerick, and Galway (Eurostat, 2023).

The landscape of Ireland is characterized by rolling hills, lush green fields, and rugged coastlines. In terms of **regional differences**, the Eastern region of Ireland (which includes Dublin), is the most densely populated and economically prosperous, with a high concentration of industry and services. The Western region of the country (which includes the province Connacht), has a lower population density and a more rural economy, with agriculture and tourism being important sectors. The Southern region, which includes the province Munster, is a mix of urban and rural areas, with a diverse economy including agriculture, industry, and services. The Northern region, which includes the province Ulster, is the smallest and least populous of the regions, with a mix of urban and rural areas and a diverse economy including manufacturing, services, and agriculture (Department of Housing, Local Government and Heritage, 2020).

In 2021, the population density ranged regionally (NUTS 2) from 894.6 thousands in Northern and Western region to 2.49 million in Eastern and Midland region. **In all of the three regions, the population density increased within the last decade** (Figure 2). The largest increase in the number of people per square kilometer in 10 years was observed in Eastern and Midland region and was equal to 11.4% while the smallest increase was recorded in Northern and Western and amounted to less than 7% (Eurostat, 2022).

Figure 2. Population density per regions in 2012 and 2022 (persons per km²)



Source: based on Eurostat 2023

Ireland has a **relatively young population**, with a median age of around 37 years. The birth rate in Ireland is currently above the 'replacement level', which has contributed to the country's growing population. According to the Central Statistics Office (CSO) of Ireland, the estimated proportion of the population aged 65 years and over in Ireland was 14.1% in 2020 while in the European Union was around 20.3% (CSO, 2023).

6.1.2. Health system organization and financing

The health care system in Ireland is a complex and decentralized network of public providers, voluntary organizations and private providers, governed by a mix of national and regional regulations. The country has a two-tier system of health care provision. Public health care services are provided by the Health Service Executive (HSE), and private health care services are provided by a variety of private insurers and providers. The Irish health care system is funded

by a combination of general taxation (primarily), social insurance contributions, and out-of-pocket payments by patients (Irish Health Insurance Authority, 2022).

Currently, the health care system in Ireland is undergoing substantial reform with a commitment to implement new Regional Health Areas (RHAs) and a Population Based Resources Allocation (PBRA) funding model by 2024 (IGEES Spending Review, March 2023). The new PBRA approach for healthcare planning, aims to allocate healthcare resources based on the needs of the population to enhance efficiency and equity in both healthcare outcomes and resource allocation. The concept is presented in the governmental document [‘Towards Population Based Funding for Health: Model Proposal’](#).

The Department of Health and the Health Service Executive oversee Ireland’s health system governance. The Department of Health is responsible for the development and implementation of health policies and strategies, leadership, governance and allocating the health budget.

The HSE provides a wide range of services, including hospital care, community care, mental health services, social care services and primary care services. The HSE is responsible for delivering the public healthcare services, the management of healthcare facilities, such as hospitals and clinics, and the recruitment and training of healthcare professionals (Department of Housing, Local Government and Heritage, 2020). The HIQA is an independent statutory body responsible for regulating and monitoring health and social care services. These organizations work together to ensure that healthcare services are delivered effectively and efficiently and that the health needs of the population are met in a fair and equitable manner (Health Service Executive, 2021; Department of Health, 2017).

Private healthcare services are provided by a variety of private insurers and providers. **Private health insurance** is relatively common in Ireland, with over 40% of the population covered by private health insurance plans. Private healthcare providers include hospitals, clinics, and individual self-employed practitioners, who offer a range of services including elective surgery, specialist consultations, and diagnostic tests (Johnston et al., 2020).

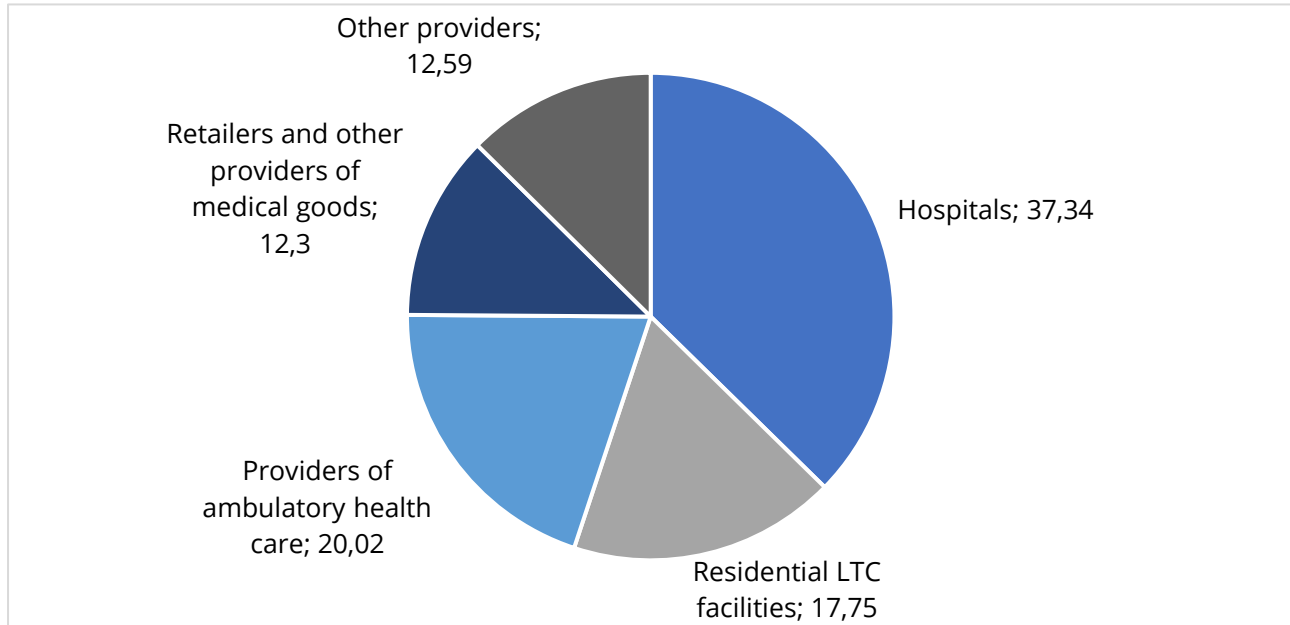
Based on the data from the OECD, in 2019 Ireland spent approximately €4,789 per capita on healthcare. This represents around **6.7% of the country's GDP**. The standard indicator of spending as a share of country's GDP is complicated by the multinational character of the Irish economy. However, when utilizing a measure of national income that accounts for the multinational sector, Ireland emerges as one of the countries with high levels of health spending (OECD, 2022).

In 2019, **out-of-pocket payments** for healthcare in Ireland accounted for around 12% of total healthcare spending (the EU average was 15.9%) (Eurostat, 2023; Johnston et al., 2020).

Ireland spends **more than one third of** its current health expenditures **on hospital care (37.34%)**; the second largest expenditure is on providers of ambulatory health care (20%) and a

little bit less (17.75%) on retailers and other providers of medical goods (e.g. pharmacies, retail sellers and other suppliers of durable medical goods and medical appliances etc.) (Figure 3).

Figure 3. Share of different types of providers in total current health expenditures (2020).



Source: based on Eurostat 2023

Any person, who is accepted by the HSE as being ordinarily resident in Ireland is entitled to either full or limited eligibility for health services. There are two main categories of right to public health services: **Category I (full eligibility)** (medical card holders - 32% of the population) are entitled to free public healthcare services²³ and **category II (limited eligibility)** (those without medical cards) are entitled to subsidized public hospital services (people with full and limited eligibility are eligible for public in-patient services in public hospitals, including consultant services, free of charge) and prescription medicines, but pay the full cost of GPs and other primary care services (Connolly and Wren, 2019). Many studies confirmed that those with a Medical Card or GP Visit Card have higher rates of use of non-acute and acute healthcare services (Smith et al., 2019).

As of 1 September 2023, there are 1,604,327 (31.1%) medical cards and 579,982 (11.3%) GP Visit Cards (Department of Health, 2023).

Unmet medical needs can be due to different reasons, but the main drivers are those concerned to cost, waiting times or travel distance (OECD, 2021). The level of unmet health needs

²³ Medical Card holders have access to: GP care, approved prescribed drugs and medicines inpatient and day patient treatment in public beds in public hospitals, outpatient services in public hospitals, medical and midwifery care for mothers and infants, maternity cash grant for each child born, and dental, ophthalmic and aural services and some personal and social care services (Expert Panel on Medical Need for Medical Card Eligibility, 2014; HSE, 2015).

in Ireland considering the reason "too far to travel" both in rural areas and for the whole country in 2020 was equal to 0% and thus was lower than in other European countries (EU-27 = 0.1% and 0.2% for rural areas). Unmet needs due to 'too expensive or too long travel or waiting list' in Ireland was 2.0% in 2020, slightly higher than the EU-27 average of 1.8%. The gap between Ireland and the EU-27 is even greater in rural areas, where the level of unmet needs for Ireland was 2.4% and for European countries (EU-27) 2.1% (Eurostat 2022). The distribution of unmet care needs among different income groups is unbalanced: 2.8% in the lowest income group and 0.6% in the highest income group. The main reasons for unmet needs reported by people from the lowest income group are waiting lists and costs (Eurostat, 2022).

6.1.3. Overall picture of the HWF trends in the country and its regions

In 2020, there were **3.5 practicing doctors** per 1,000 population in Ireland (the EU-27 average was 4.0). The number of consultant specialists was the lowest among EU countries: 1.44/1,000 population vs. 2.45/1,000 EU average in 2018 and the sixth lowest among all OCED countries. Systemic recruitment and retention issues led to over 700 consultant vacancies in public hospitals and community settings in 2021 (OECD, 2022).

In 2021, 21,680 doctors were registered in Medical Council ([Medical Workforce Intelligence Report, 2021](#)). Of these, 18,424 (84.9% of all registered doctors) are reported **being professionally active**. The majority of clinically active doctors (53%) are male. About 90% of professionally active doctors practiced only in Ireland. 4,461 were general practitioners (GPs) and 7,492 were non-consultant hospital doctors (NCHDs), including 3,758 NCHDs in training (Table 1).

Table 1. Self-reported employment role of doctors retaining on the register in 2021, reporting being clinically active and working in Ireland

Role of doctors	Frequency	Percent
Community Health Doctor	206	1.1%
General practitioner	4,461	24.2%
Healthcare-related management and administration	59	0.3%
Hospital Consultant	4,569	24.8%
Non-consultant hospital doctor, in training	3,758	20.4%
Non-consultant hospital doctor, not in training	3,734	20.3%
Other	389	2.1%
Other Consultant or Specialist	633	3.4%
Public Health Doctor	190	1.0%
Unreported	425	2.3%
Total	18,424	100%

Source: Medical Workforce Intelligence Report, 2021

Between 2017 and 2021, the HSE consultant workforce increased from 2,918 to 3,563. In case of non-consultant hospital doctors, the increase went from 6,466 to 7,923 (Hynes and O' Connor, 2022).

Secondary and tertiary care in Ireland are predominantly provided in public hospitals. General practitioners are the gatekeepers to secondary care. GPs in Ireland are mostly self-employed private practitioners who provide healthcare for private fee-paying patients or public patients with medical cards (or GP visit cards).

A current report of the **Nursing and Midwifery Board** of Ireland (NMBI) titled: [*State of the Register 2022*](#) informs that, as of 1 June 2022, there are 81,431 nurses and midwives on the NMBI Register, with 75,871 declared as “practicing” and of these 66,471 state, they are patient-facing in their role. Above 90% (68,310) of all registered nurses and midwives are women. General nursing is the most common area of their practice: 54,797 Irish nurses are working as general nurses. The psychiatric nurses are the second highest number of practicing nurses (7,377). There has been a positive upward trend in the number of Irish-educated registrants, with the numbers from 2021 being the highest since the first reported in 2015 (NMBI, 2022).

In 2019, Ireland had the **highest level of medical graduates among OECD** countries: 24.8 new graduates/100,000 of population (OECD, 2022). This high number of medical graduates is mainly due to the large share of international medical students (almost half of all students, mostly from Canada, the USA and the UK). After obtaining their first medical degree, these students often leave Ireland to complete medical study and practice in their home country or due to limited opportunities to complete postgraduate training. Therefore, Ireland needs to recruit foreign-trained doctors (OECD, 2021).

During the covid-19 Pandemic, a series of actions were undertaken to support health workforce capacity. Consequently, the number of HSE full-time employees increased from 119,000 to 130,000. The increase was mainly caused by an increase in the hours of part-time staff, rehiring retired professionals, maximizing agency usage, redeploying staff and encouraging those who left the health labour market (OECD, 2021).

Due to its low per capita rate of acute hospital beds compared to other OECD countries, Ireland needs significant investments in both acute hospital capacity and non-acute care services. This is necessary to address the current and future demand pressures caused by a growing and aging population, even when considering the transition of care to post-acute settings (Smith et al. 2019).

Table 2. Number of general practices; GPs; the estimated number of WTE GPs; WTE publicly employed community nurses (PHNs) and other community nurses (CNs) by geographic area

Geographic area	Number of practices	Number of GPs	Estimated WTE GPs	Estimated WTE GPs per 10,000 population	WTE Publicly employed community nurses PHNs	WTE other CNs	Estimated total CNS per 10,000 population
IRELAND	1,635	2,868	2,624.3	5.7	1,459.8	1,019.9	5.4
Sligo	34	55	50.1	7.7	28.6	15.6	6.8
Cork	217	401	366.4	7.0	155.8	101.7	4.9
Galway	110	190	173.1	6.8	96.9	49.1	5.7
Waterford	38	81	74.4	6.5	36.9	16.8	4.7
Kerry	56	103	93.8	6.5	51.8	49.3	7.0
Mayo	69	89	82.6	6.4	44.5	30.0	5.8
Carlow	19	37	33.9	6.3	18.0	11.5	5.5
Westmeath	33	59	53.6	6.2	34.2	48.7	9.5
Limerick	82	127	115.8	6.0	57.7	33.6	4.7
Dublin South	260	463	421.5	6.0	193.9	157.7	5.0
Louth	40	80	73.0	5.9	39.7	26.3	5.4
Donegal	51	102	94.2	5.9	37.6	51.2	7.5
Tipperary South	29	54	50.1	5.7	33.4	21.5	6.3
Wicklow	40	86	77.9	5.6	38.0	25.4	4.6
Tipperary North	27	42	38.4	5.5	26.6	17.1	6.3
Longford	13	23	20.6	5.5	15.5	22.0	10.0
Offaly	27	43	39.4	5.2	27.6	14.5	5.6
Cavan	22	41	37.4	5.1	27.9	15.3	5.9
Roscommon	24	35	31.6	5.0	24.4	16.5	6.5
Wexford	39	77	70.9	4.9	41.2	20.4	4.3
Dublin North	187	316	288.4	4.0	169.3	125.5	5.0
Clare	48	61	56.9	4.8	35.9	25.8	5.2
Leitrim	10	16	14.6	4.7	13.8	7.8	7.0
Laois	22	41	37.5	4.7	29.0	15.2	5.5
Kilkenny	24	48	44.6	4.6	31.3	18.7	5.2
Monaghan	14	27	24.8	4.2	23.4	13.0	6.1
Kildare	61	97	88.6	4.0	47.5	50.5	4.5
Meath	39	77	70.4	3.7	49.4	19.0	3.6

Source: [Geographic profile of healthcare needs and non-acute healthcare supply in Ireland, 2019.](#)

Notes: WTE- whole time equivalent

Types of medical deserts in the country and factors driving desertification

6.1.4. Definition and examples

In Ireland, there is **no formal definition** of the term 'medical deserts' and this term isn't commonly used or recognized. Medical deserts can be characterized as regions where there is a disparity between the insufficient availability of healthcare services and the demand. In 2019, the Economic and Social Research Institute has developed a report titled: [*Geographic profile of healthcare needs and non-acute healthcare supply in Ireland*](#). Findings of this analysis have significant implications for future planning of the Irish healthcare system (Smith et al., 2019). This report provides comprehensive evidence on the geographic distribution of primary, community and long-term care supply and show significant inequalities in the supply of healthcare services across counties. The analysis was undertaken in the context of current policy priorities to achieve better integration across the Irish health and social care system. **To achieve equity in healthcare services** supply, extensive increases in supply of non-acute care would be required in many Irish counties.

In the report by Smith et al., the most important Irish non-acute healthcare services were examined:

- GPs;
- community nurses (including public health nurses and other registered nurses working in the community);
- allied health professionals (public and private physiotherapists, occupational therapists, speech and language therapists, podiatrists and chiropodists, counsellors and psychologists and social workers);
- long-term care, including long-term residential care beds and public home care.

The analysis provided comprehensive evidence on supply of services in the non-acute sector, and its comparison across regions. To examine inequality in supply, adjustments were made for a range of need indicators (e.g. population 65+, population 85+, mortality, disability rates, Medical Card rates, chronic illness), and relative supply was assessed against the benchmark of national average supply.

As a result, **significant inequalities were observed in the supply of primary, community and long-term care across counties in Ireland**. Counties with a supply of a service 10% lower than the national average are indicated s those in the most difficult situation (**red zones**; please compare Table ES.1, page 19, [*Geographic profile of healthcare needs and non-acute healthcare supply in Ireland*](#)).

The counties located in the Greater Dublin commuter belt and South East regions exhibit relatively lower per-capita levels of service supply across various services. The Kildare and Meath counties have lower relative supply (at least 10 % lower than the national average) for all non-

acute community and primary care services). Wexford and Wicklow have lower relative supply (at least 10% lower than the national average) for seven of the eight non-acute community and primary care services examined. Unlike the low relative supply on the East coast of Ireland, three counties on the West coast (Galway, Sligo and Leitrim) as well as Cork, Westmeath and Tipperary South have higher relative supply for many services, and do not have lower relative supply for more than one of the services analyzed.

6.1.5. Application of the ROUTE-HWF taxonomy to identify and measure medical deserts

The [ROUTE-HWF Project](#) approach to define and measure medical deserts (see the Deliverables 4.2. and 5.2) is based on a set of four objects/elements: two that address the level of health care demand and two that address the health care supply in a given area. These demand-related objects are indicated by (1) % of population 65+ and (2) economic resources of the population, while the supply-related objects are indicated by (3) travel times to public health facilities and (4) population-provider ratio. These four indications are measured in terms of the relative value for a certain area, being either above or below the country average. Combining these four dichotomous variables, the framework results in five exclusive types of medical deserts, where at least three of the four objects of a medical desert apply

Table 3. *The ROUTE-HWF Project taxonomy, defining five exclusive and prominent types of medical deserts*

Type of medical desert	POPULATION AND HEALTHCARE DEMAND OBJECTS		AREA AND HEALTHCARE SUPPLY OBJECTS	
	Object 1: Percentage population aged 65 and over <i>The proportion of inhabitants aged 65 and over living in this area, is <u>higher</u> than the proportion of all inhabitants in a country living in this area</i>	Object 2: Economic resources of the population <i>The proportion of inhabitants below the poverty line living in this area, is <u>higher</u> than the proportion of all inhabitants in a country living in this area</i>	Object 3: Travel time to public health facilities <i>The percentage of the population that lives within 15 minutes from a hospital in this area is <u>smaller</u> than the average percentage at the national level of the country</i>	Object 4: Population-provider ratio <i>The proportion of health professionals working in this area, is <u>lower</u> than the proportion of all inhabitants in a country living in this area</i>
1	x	x	x	x
2	x	x	x	
3	x	x		x
4	x		x	x
5		x	x	x

Source: Deliverable 4.2. Second version of a definition and taxonomy on medical deserts.

The application of the ROUTE-HWF taxonomy is based on Eurostat data. This approach was adopted to obtain comparable data for particular European countries. However, in the case of Ireland there is a limitation in applying this taxonomy, as in Eurostat database one of the indicators used in our methodology (Medical doctors per 100,000 inhabitants) is published solely as a national average (347.09 in 2020). Eurostat does not collect and publish this indicator for Ireland at the NUTS-2 level (see Table 4). In addition, the national statistics does not provide such data as different types of geographical regions are used. As a result, for Ireland, there is no possibility to replace the missing indicator with an equivalent from national sources. Thus, there

is no possibility to directly compare the Irish regions (at NUTS-2 level) to those from other European countries.

Table 4. Ireland – application of the ROUTE-HWF Project taxonomy

NUTS-2 region	Proportion of population aged 65 years and more (2021)	Percentage of population at risk of poverty or social exclusion (2021)	Percentage of population within 15 minutes from a hospital (2020)	Medical doctors per 100,000 inhabitants (2020)
IRELAND	14,8	20,0	70,0	347,09
Northern and Western Region	16,6	26,4	55,1	N/A
Southern Region	16,0	22,3	73,2	N/A
Eastern and Midland Region	13,2	16,4	76,8	N/A

The numbers in *red colours* indicate that the regional value is below or above the country average, implying that it adheres to the particular object/element indicator of the ROUTE-HWF taxonomy of medical deserts.

Source: Eurostat 2023; N/A – not available

6.1.6. Factors contributing to medical deserts

Medical staff shortages and medical deserts in Ireland are the result of a combination of various factors, including those concerning health system organization, working conditions, medical staff migration, demographic changes, and recruitment and retention challenges.

Factors related to the organization of the healthcare system

As mentioned above, Ireland's category system to determine the package of rights is reflected in a slightly narrower share of public spending for several health services relative to other EU countries. Ireland is unique among EU countries in not providing universal equitable access to primary care. 46% of the population are covered by private health insurance, which allows timely access to healthcare services and is mainly used to access private hospital care. This supplementary private health insurance causes inequity in the health system in several ways. To address these inequalities, one of the aims of the Sláintecare reform²⁴ program is the establishment of a universal, single-tier health service, providing universal access to healthcare services (OECD, 2021).

The Irish system features intricate eligibility structures, involving various payment mechanisms that differ depending on different segments of the system and population groups. There has

²⁴ Sláintecare reform: cross-party plan aimed at delivering sustainable and equitable health and social care services in Ireland

been extensive discourse regarding a two-tier access issue in acute care, where privately financed patients receive preferential access to public hospital care, while public patients face long waiting lists. In primary care, individuals without a Medical Card face significant user charges, and although certain community services are theoretically accessible without cost at the point of use, priority is given to Medical Card holders in areas with limited supply (Smith et al., 2019).

Unsatisfied working conditions

Working conditions in Ireland are nationally negotiated via public service sectoral agreements. Current working conditions in the Irish healthcare system are described as **difficult, characterized by understaffing, long working hours, a fast working pace, unsatisfied work-life balance, stressful, with many workers experiencing burnout** (Hayes 2019, Humpries et al., 2019, Creese et al., 2021). This characteristic was confirmed by the results of the national survey ("Your Opinion Counts") conducted by the HSE aimed to measure medical personnel engagement and their experiences (HSE, 2018). Respondents reported relatively high levels of job satisfaction (64%) but only 38% of respondents (sample size of 19,611) felt valued and recognized by their organization, and only 37% of respondents were satisfied with the possibility of professional advancement (HSE, 2018). According to the data from Medical Workforce Intelligence Report (2021) 28,9% of clinically active doctors reported working on average more than 48 hours a week and 61.8% reported working 40 hours or more. Support for mental health and improvements in working conditions are urgently required, or the issue of staff shortages may worsen. There is, therefore, a need to prioritize workforce planning, extra resourcing, training and other recruitment strategies.

Migration of healthcare professionals

As mentioned above, unsatisfied working conditions can lead to high levels of emigration among medical staff. Ireland has a **high rate of doctors who emigrate** seeking better working conditions abroad. The key reasons indicated by doctors are challenging working conditions and work-life imbalance, which affects their wellbeing. Improvement of work-life balance (normalized within hospital settings) must be addressed to retain and motivate healthcare professionals (Humpries et al., 2020). Between 2014 and 2019, there were 5,964 voluntary withdrawals of doctors from the Irish Medical Council register (2.9% - 6.3% of all registrations) and about 43% emigrated to the United Kingdom, 18% to Australia and the other 39% of doctors moved to the USA, Canada and New Zealand (Medical Council, 2020). According to results of survey conducted by Brugha et al. (2021) in 2018, 45% of respondents planned to stay in Ireland, 35% leave but return later, 17% leave and not return; and 3% intended to quit medicine.

Intentions to migrate versus stay in the country was associated with age (being under 30), a non-EU nationality and hospital specialization (especially in anesthesiology).

Emigration is also **common problem among nurses and midwives** (they emigrate mainly to the UK and Australia) and this reached a peak in 2008, following the financial crisis. The number of nurses applying for certificates have remained high and have increased since 2015, with 1,451 requesting such certification in 2019 (Thomas et al., 2023).

Demographic Changes

Ireland is experiencing demographic shifts, including an aging population (despite having a relatively high share of young population), changes in disease prevalence patterns and the population growth. The latter was the third-largest percentage change among European Union countries in the last decade (Eurostat, 2023). According to the Central Statistics Office, Irish population was estimated at 5.1 million in 2022, showing a 10.3 per cent increase within 10 years (CSO, 2023). The substantial growth of the Irish population, poses a significant challenge for addressing medical deserts. This surge in population directly affects the healthcare system, intensifying the demand for services. Despite efforts to shift care from acute care to the community, recruitment remains predominantly hospital-centric. This transition to community-based care is proving to be slower than anticipated, indicating persistent challenges. Additionally, expanding student enrollment in colleges for medical training is constrained by funding and capacity limitations, further complicating the issue. The increasing demand for healthcare services, particularly in specialized areas such as geriatric care and chronic disease management, places additional strain on the healthcare workforce and intensifies workforce shortages. In 2021, 14% of Irish population was 65 years or more (Eurostat 2023). The counties with the highest ratios of the population 65+ include Mayo, Leitrim, Roscommon, Kerry, Sligo, Donegal, Tipperary South, Tipperary North and Waterford. In four counties (Roscommon, Leitrim, Mayo and Sligo) the share of the population over 85 is higher than the national average by more than 50% (Smith et al., 2019).

Geographic Distribution

Ireland's population is unevenly distributed across its regions, with more densely populated urban areas and sparsely populated rural and remote regions. The concentration of healthcare resources in urban centers often leads to limited access to healthcare services in rural and remote areas, creating medical desert regions. On the other hand, **the geographic distribution of doctors** differs across the hospital groups in the number of doctors per capita. This may be a consequence of hospital groups not serving clearly defined geographic areas and patients attending hospitals outside the area where they live. National Doctors Training and Planning

Variations in workforce characteristics are mapped across medical disciplines and specialties, hospital model, healthcare groups and principal clinical sites (Medical Workforce Report, 2021).

Low relative supply of **general practitioners** (whole-equivalent GPs per 10,000 people) were indicated in the following counties: Meath, Kildare, Monaghan, Kilkenny, Laois and Leitrim ([Economic and Social Research Institute](#)). In case of **community nurse** (public health nurses and other community nurses), counties in the north, west and midlands appear to be better supplied (compare the national average) while counties in the east and south seem to be more poorly supplied. Counties in the commuter areas around Dublin have a low number of whole time equivalent of community nurses compared to the national average. The supply of **physiotherapists** in two counties is among the lowest in the country: Meath (2.4/10,000) and Wicklow (2.5/10,000). There are more physiotherapists/10,000 population relative to the national average in the north and North West of the country (with the exception of Donegal), but also in such counties as: Dublin South, Kerry and Limerick (Smith et al., 2019).

Recruitment and Retention Challenges

Recruiting and retaining healthcare professionals in rural and remote areas is often challenging due to factors such as limited career advancement opportunities, inadequate support networks, and the perception of reduced quality of life. These challenges contribute to workforce shortages in these areas. The **health system in Ireland relies largely on foreign-trained healthcare professionals**. Due to the significant increase in demand for health services, the supply of domestically trained personnel will not meet the population's needs. If Ireland cannot retain domestically trained personnel or to attract foreign-trained HWF, the country may face significant staff shortages. Numerous actions are needed, including an increase of undergraduate training places in different health disciplines. These efforts should be supported by dedicated policy and reforms (Thomas et al., 2023). In Ireland, the recruitment of doctors remains a key challenge for the health system (Medical Workforce Report, 2021).

6.2. HWF policies and approaches to mitigate medical deserts

6.2.1. National policy perspective on health workforce in Ireland

In 2017 Ireland issued a [National Strategic Framework for Health and Social Care Workforce Planning. Working Together for Health](#), which develops integrated HWF planning projections for the Irish health and social care workforce. The framework outlines the base for systematic workforce planning and collaboration between stakeholders. Annual payroll and staffing targets determine recruitment for the public sector based on an affordability model in compliance with allocated pay budgets, approved by the Department of Health. Planning takes place at the national and at the facility service levels, for physicians, dentists, nurses and midwives.

In recent years, the Irish government has implemented comprehensive strategies to address the challenges of medical workforce shortages. These strategies are reflected in the ["Sláintecare Implementation Strategy and Action Plan 2021-2023"](#) which incorporates key initiatives such as the ["Healthy Ireland Framework 2019-2025"](#). These comprehensive strategies reflect a commitment to fostering a healthier Ireland while ensuring the availability of qualified healthcare professionals and equitable access to healthcare services across the country. The metrics used to monitor progress in addressing medical workforce shortages are crucial in evaluating the impact of healthcare reforms and informing future strategies. These metrics align with the recommendations outlined in the Health Service Capacity Review (2018) and are instrumental in assessing the capacity and performance of the healthcare system. The current Irish plan, Sláintecare, recognizes the significance of these metrics and incorporates them into its monitoring framework. By considering the targets and indicators set by the Health Service Capacity Review, Sláintecare ensures a data-driven approach to addressing medical workforce shortages.

In Ireland a dedicated interactive tool has been developed: [Health Atlas](#), which helps patients to find the needed health services on a map, including general practitioners, pharmacists, dentists or hospitals (postal address, email, phone, map and directions).

6.2.2. National health workforce planning and forecasting

In 2007, the Medical Education and Training Unit (MET) was established in Ireland. In 2013, MET established a Medical Workforce Planning function with the purpose of conducting a comprehensive assessment of the existing medical staffing in Ireland. This initiative aimed to analyze the projected future requirements and to benchmark Ireland's medical workforce against that of other countries. Since 2006, HSE Office of the Nursing and Midwifery Services Director (ONMSD) is responsible for strategic development of nursing and midwifery practices in order to deliver patient-centred care of the highest quality. This includes fostering leadership, promoting excellence and innovation, and enhancing the capacity of nursing and midwifery to improve patient care and service delivery.

The Strategic Workforce Planning and Intelligence functions, along with National Doctors Training and Planning functions and their partners, are collaborating to address capacity issues and plan for the future, while simultaneously managing the challenges posed by increased attrition and the implications of the reversal of the [Public Service Stability Agreement 2013-2016 \(Haddington Road Agreement\)](#). In the 2021 budget, new funding was allocated to support the recruitment of up to 16,000 new staff across the healthcare sector; however, the persistent shortage of staff continues to impede these efforts.

Despite the ongoing staff shortages, the 2022 budget introduced changes to eligibility for free GP care, resulting in over half of the population being eligible for such care for the first time. This change is expected to affect the demand for healthcare services, and it is crucial that all

expansion initiatives can be supported by an adequate workforce capacity. This includes increasing the number of general practitioners and implementing task shifting to other essential members of primary care teams, as envisioned in Sláintecare. Furthermore, Sláintecare aims to augment the number of doctors in public hospitals through a public-only contracting scheme.

6.2.3. Policies and approaches to mitigate medical deserts

One of the strategic actions outlined in the Sláintecare Implementation Strategy 2021-2023 focuses on enhancing workforce capacity in general practice, community nursing, and various non-acute allied health professional roles. These actions aim to strengthen community-based care and support the development of an integrated healthcare system. The findings presented in the report [*Geographic profile of healthcare needs and non-acute healthcare supply in Ireland*](#), have important policy implications, as they reveal significant disparities in the supply of primary, community, and long-term care across different regions in Ireland. This analysis demonstrates the presence of significant regional disparities in the supply of non-acute services, with an important observation that these disparities cannot be attributed solely to the level of need. Considering the national policy objective of shifting care from acute hospitals to the community and the forthcoming establishment of Health Regions, the under-supply of services in certain regions may pose greater challenges to hospitals and healthcare administrators compared to better-resourced areas. To achieve equity in supply, substantial increases in the provision of non-acute care would be necessary in numerous counties throughout Ireland (Smith et al., 2019).

6.2.3.1. National Strategies for more sustainable health care provision in underserved areas

The "[*Sláintecare Oireachtas Report 2017*](#)" outlines fundamental principles that guide the transformation of the Irish healthcare system and address challenges, including medical workforce shortages in rural and underserved areas. In conjunction with the broader government strategy, these plans address the specific challenges of medical workforce shortages, including rural and underserved area. The planned activities are focused on supporting the well-being of healthcare professionals, investing in education and professional development, and implementing recruitment and retention strategies. Furthermore, the strategies recognize the role of technology, such as telemedicine and health innovations, in overcoming barriers to healthcare access in underserved regions.

Sláintecare recognizes the importance of addressing the specific needs of rural and underserved areas in Irish healthcare system transformation to ensure more equitable access to healthcare services for all citizens. It emphasizes the unique challenges faced by people living in rural and remote areas, including limited access to healthcare services, longer travel distances to health facilities, and potential disparities in healthcare outcomes. The report outlines various initiatives to improve healthcare access and services in these underserved areas, including:

- **Enhancing community-based care:** The report emphasizes the need to strengthen primary care and community services to ensure that people can access healthcare locally, reducing the need for long journeys to hospitals.
- **Recruitment and Retention Strategies** - The document highlights the need for targeted recruitment efforts to attract healthcare professionals, especially in areas facing severe shortages. It aims to create an attractive work environment by improving career prospects, offering competitive remuneration, and providing professional development opportunities. In 2021, the budget committed new funding to support the recruitment of additional medical personnel for the Irish healthcare system (16,000 new workers). Moreover, Sláintecare directs to reduce the deficit of doctors in public hospitals through introduction of a public-only contracting scheme (OECD, 2021).
- **Telemedicine and e-health initiatives:** Sláintecare promotes the use of technology to deliver healthcare services remotely, which can be particularly beneficial for those in rural and remote areas who face challenges in reaching healthcare facilities. The plan acknowledges the role of technology and telehealth in overcoming geographic barriers and improving access to healthcare in underserved areas. It includes investments in telemedicine infrastructure, remote monitoring systems, and digital health platforms to enhance service delivery and connect patients with healthcare providers.
- **Multi-disciplinary teams and workforce planning:** The strategy aims to develop a more flexible and responsive healthcare workforce, which can adapt to the needs of different communities, including those in underserved areas.
- **Rural Practice Support** - Recognizing the challenges in recruiting healthcare professionals to remote and rural areas, the Sláintecare plan includes initiatives to incentivize and support healthcare professionals to work in rural and underserved regions. This may involve financial incentives, career advancement opportunities, and enhanced support networks for healthcare providers in these areas. The availability of financial incentives and support programs, such as student loan forgiveness programs, relocation assistance, and professional development opportunities, can influence healthcare professionals' decisions to work in underserved areas.
- **Infrastructure development:** The report highlights the importance of investing in and upgrading healthcare facilities in rural areas to improve their capacity to deliver quality care.

6.2.3.2. Workforce Development Initiatives

In terms of the current HWF development initiatives, the plans outline specific measures to enhance the medical workforce in Ireland. This includes increasing the number of medical training places and expanding postgraduate training programs, particularly in specific underserve areas. It also emphasizes the importance of upskilling and retraining existing healthcare professionals to meet evolving healthcare needs. In 2018 a Framework for Safe Nurse

Staffing and Skill Mix in General and Specialist Medical and Surgical Care Settings in Adult Hospitals in Ireland was published. The Framework provides an evidence-based solution to the age-old problem of how to staff inpatient wards in hospitals. It places the needs of patients at the center and recognises the relationship between nurse staffing arrangement and patient outcomes. Instead of simply matching the number of nurses to the size of a ward, the new Framework takes into account the number of patients on the ward and their specific care needs when allocating nurses and HCAs. The primary objective of the Framework is to support the determination of safe nurse staffing and skill mix levels to meet the needs of patients. However, the policy impact evidence has shown also improvements in job satisfaction and reduction in intention to leave rates.

6.2.3.3. Expanded Training Programs

The availability of training programs and educational institutions plays a significant role in addressing workforce shortages. Insufficient training capacity in certain specialties or geographical areas can contribute to the uneven distribution of healthcare professionals. To address the shortage of specialized healthcare professionals, the plan emphasizes the expansion of specialty training programs. It aims to increase the number of specialists in areas such as geriatric care, palliative care, child and adolescent mental health, and psychiatry to meet the growing demand for these services. The education and training system in Ireland is the responsibility of the Department of Education and Skills (in 2016 a new National Skills Strategy was published).

6.2.3.4. Non-EU Rural GP Programme

The Non-EU Rural GP programme has been undertaken in 2023 and plays a pivotal role within the comprehensive response of the Irish College of General Practitioners (ICGP) to address the shortage of general practitioners in Ireland, particularly in rural regions. This initiative is supported by ICGP, HSE and all the GP indemnity organizations. The programme is designed to support rural GP practices and its primary goal is **to identify, support and integrate a cohort of non-EU GPs into the rural Irish GP workforce**. Non-EU GPs have the opportunity to work in routine, daytime rural GP practice for two years, with some GP out-of-hours work. The ICGP and the 'host' GP practice will provide substantial ongoing education supports and clinical supervision (ICGP, 2023).

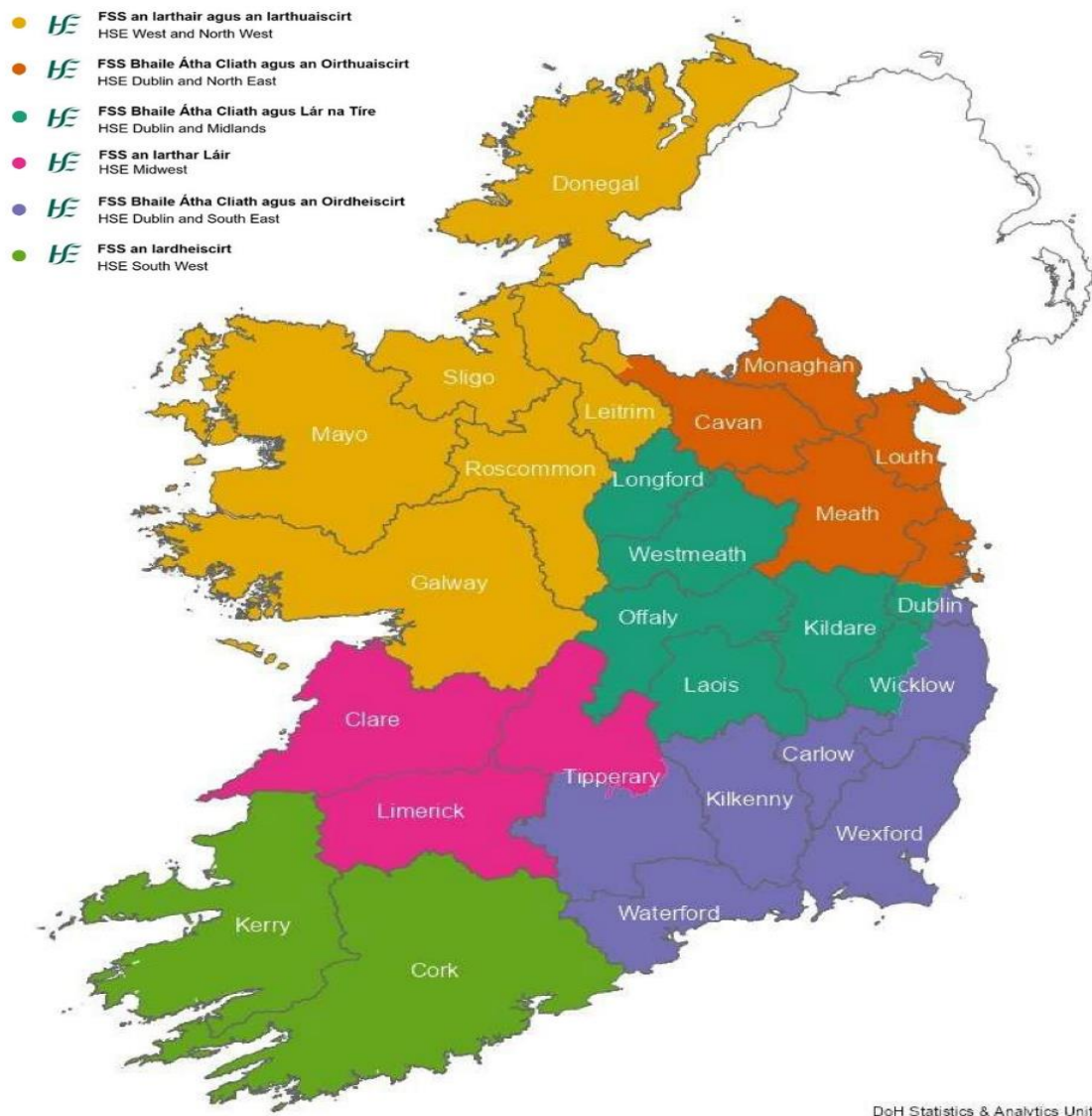
The role of the Non-EU Rural GP Programme is to: 1) identify and recruit non-EU GPs (in accordance with the defined criteria), for rural GP practices; 2) facilitate supported and supervised practice for the non-EU GP candidates; 3) assist the Non-EU GP to undertake the ICGP exam, leading to Specialist Registration with the Irish Medical Council and 4) encourage the retention of the Non-EU Rural GP in the rural Irish GP workforce (ICGP, 2023).

6.2.3.5. New HSE Health Regions

In 2019, the Irish Government approved the geographies of six new HSE Health Regions formerly known as Regional Health Areas (RHAs), in accordance with the recommendations outlined in the Oireachtas Committee on the Future of Healthcare Sláintecare Report (2017). Further to this, in April 2022, Government approved a Business Case for the establishment of Health Regions and a policy direction of travel (Department of Health, 2022). The approach proposed is one that sees Health Regions as the primary service coordination and delivery units for the vast majority of health and social care services provided across Ireland. They will provide the governance and organisational arrangements to enable planning, management, and delivery of integrated care for people and for communities across their region. Integrated care involves the coordination of services, funding, and governance to address the specific requirements of patients, encompassing both acute and community-based care. The implementation of Health Regions aims to achieve the following objectives, which are in line with the overall goals of Sláintecare: 1) Align and integrate hospital-based and community-based services to deliver joined-up, integrated care closer to home; 2) Clarify and strengthen corporate and clinical governance and accountability at all levels; 3) Support a population-based approach to service planning and delivery which aims to address health inequalities and 4) Improve equitable regional investment and balance national consistency with appropriate local autonomy to maintain consistent quality of care across the country (Department of Health, 2023).

In July 2023, Government approved an [Implementation Plan for Health Regions](#). This includes a number of key steps for their establishment. The new Health Regions system will be operational from February 2024 and, divide the country in six new health regions. (Government of Ireland, 2023).

Figure 4. Map of new six HSE Health Regions



Source: Organisational Reform HSE Health Regions. Implementation Plan

<https://assets.gov.ie/266115/7b86800b-934d-4849-88ae-e8fc4b809465.pdf>

The implementation of Health Regions would ensure that **hospital and community healthcare services are geographically aligned at a regional level**, taking into account the populations served and their local needs. This alignment is crucial for achieving the integrated health and social care system envisioned by Sláintecare. In addition to facilitating the integration of community and acute care, Health Regions seek to empower local decision-making and facilitate service planning based on population needs. Ultimately, this will strengthen the healthcare system, enhance the patient experience, and provide improved access to healthcare services in local communities.

Health Regions entail a complete alignment and enhanced integration of health and social care services within each designated region. This plays a pivotal role in how the HSE organizes and delivers integrated health and social care services in the future.

6.3. Analysis of successful and sustainable HWF policies in medical deserts

The actions taken in Ireland in recent years to ensure equal access to healthcare services deserve special appreciation, especially in the context of their comprehensiveness, coherence in the planning process, and active involvement of key decision-makers. Multiple strategies, policies and actions were identified in Ireland that focus on reducing or mitigating the effects of medical deserts existence. They can be delivered at the national, regional and counties levels and focus on both the demand and supply sides. The analysis described in the document titled "*Geographic profile of healthcare needs and non-acute healthcare supply in Ireland*" is comprehensive, multi-indicator data set developed at the counties level, which emphasizes its practical importance. It can be recommended as a good practice in conducting analyses focused on identifying and monitoring geographic areas requiring special attention in terms of ensuring access to healthcare for inhabitants.

6.4. Evaluation of the applicability of the ROUTE-HWF roadmap in the particular national / regional context

In the case of Ireland, there is a limitation in applying the ROUTE-HWF taxonomy, as in Eurostat database one of the ROUTE-HWF methodology indicators (Medical doctors/ 100,000 inhabitants) is published only as a national average. Eurostat does not gather and publish this indicator for Ireland at the NUTS2 level. In addition, the national statistics does not present such indicator as different types of geographical regions are used. Furthermore, new six Health Regions Areas have recently been introduced. As a result, for Ireland, there is no possibility to replace the missing indicator with an equivalent from national sources. In consequence, there is also no possibility to apply the ROUTE-HWF taxonomy and directly compare the Irish regions (at NUTS-2 level) to those from other countries.

Application of the [ROUTE-HWF](#) taxonomy showed the significance of collecting and analyzing the data at the smallest, local level. When data are available, the proposed indicators matrix can be applied to smaller territorial units (counties). Moreover, our analysis helped identify specific factors and actions undertaken to mitigate medical deserts.

6.5. References

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