



# Medical staff in Poland in 2012–2022 – challenges related to the distribution of human resources

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## Abstract

**Introduction and Objective.** Today's shortage of medical staff is a global healthcare issue. This leads to unfulfilled, growing health needs and rising wage pressure. The aim of the study is to evaluate employment trends among medical professionals in Poland from 2012–2022, paying particular attention to the employment sector, forms of employment, age, gender, and geographic distribution.

**Materials and Method.** A quantitative analysis was carried out using public records and documents to identify trends over a decade, by the desk research method. Sources included: Organisation for Economic Co-operation and Development databases, Central Statistical Office databases and Ministry of Health Statistical Bulletins.

**Results.** The observed increasing trend of physicians and nurses ratio after 2019, was caused mainly by a change in the methodology of calculating the indicator. There was a notable increase in the number of contracted medical professionals – 303% for nurses and 312% for midwives, and a decrease in the number of employed professionals. The number of contractors and employers in in-patient and long-term care has increased across all professional medical groups, while in outpatient care, the number has decreased. A definite ageing of medical staff was noted, with the percentage of midwives over 65 rising from 5.7% to 19.1%, and nurses over 65 rising from 5.4% to 22.3%.

**Conclusions.** The demand for health services has increased, but the supply of medical staff has not kept pace with this demand. In addition to strategies related to increasing the number of human resources, solutions to better match resources to sectors of healthcare and better regional distribution should be considered. Solutions related to the skill-mix concept and the admission of new professions to the health sector may also be an opportunity for consideration.

## Key words

nurses, healthcare, doctors, medical staff, health workforce

## INTRODUCTION

Despite enormous development in medical technology, better facilities and medical equipment, human resources are of key importance in access to healthcare and patient satisfaction. Poland, like many other countries, faces significant challenges related to a shortage in the health workforce [1, 2, 3].

Recently, several steps have been taken to increase the availability of medical staff. Between 2014–2023, the admission limit on medical and dental students has been raised from 6,784 to 11,062. Potentially, such a rapid increase in the number of medical students carries the risk of deterioration in the quality of education [4, 5]. In turn, past experience with the education of foreign medical students in Poland suggests that the majority of international students leave Poland after completing their studies and return to their home countries [6]. Similarly, nostrification diplomas of doctors from Eastern Europe, including Ukraine, has not significantly and sustainably enhanced the number of medical professionals practising within the country. Poland ranks last out of all OECD (Organization for Economic

and Cooperation and Development) countries, with only 2.7% of all its doctors and 0.2% of all its nurses having received training abroad [7]. Although the precise number of Polish doctors who have left the country is unknown, it can be estimated from the number of recognised certificates attesting to the right to practice as a physician within the EU [8]. The total number of certificates issued annually was 279 in 2020 and 887 in 2022 [9]. The shortage of medical staff is not only limited to the Polish healthcare system. According to the WHO, the current situation is a global health workforce crisis affecting both developing and developed countries [10]. What is more, in the upcoming years, it might not be sufficient for countries like Poland to merely reach the EU average health workforce levels. There is a growing need for medical personnel due to the ageing of the population, the prevalence of chronic illness, and the need to cover the post-pandemic medical debt. The Global Burden of Disease Study suggests that the health worker density would need to increase from a global average of 5.9 physicians, nurses and midwives per 1,000 population in 2015, to 10.9 in 2030 [11].

Other strategies for meeting growing demands for medical staff include re-allocating tasks, adding new tasks and roles, introducing or changing teamwork. These three steps are a component of the skill-mix strategy which, in recent years,

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has been used to mainstream health policies onto the agendas of the European Commission (EC), the Organisation for Economic Co-operation and Development (OECD), and the World Health Organization (WHO) [12].

A more optimal use of resources in health care should be taken into consideration if there are no simple ways to increase the number of medical professionals in the country and in the competitive EU market. It is crucial to consider the type of healthcare industry in which the medical staff works (outpatient, inpatient, or long-term care), the geographic distribution (regional variation across the country and urban vs. rural), and the form of employment (employed workers vs. self-employed contractors). In addition, there is the matter of the age and gender of medical professionals, which in female-dominated fields like nursing, dictates an early retirement age (60 vs. 65 in Poland), and early exit from the labour market. Given that medical staff costs make up approximately 75% of the healthcare providers costs, and that service expenditures are rising in every country, it is even more crucial to make appropriate use of the limited human resources in health and their competencies [13].

## OBJECTIVE

The aim of the study was to examine trends in the employment of physicians, nurses, and midwives in Poland between 2012–2022, with particular attention to changes in the employment distribution of these professionals by sector of care (outpatient, inpatient, long-term), form of employment (employed workers vs. contractors), demographic factors (province, age, and gender). Additionally, the study aims to assess the impact of changes in the methodology for counting medical staff, introduced in 2019 in Poland. By applying quantitative analysis of available databases and documents, the study strives for a comprehensive understanding of employment dynamics in the healthcare sector.

## MATERIALS AND METHODS

A quantitative analysis was conducted by the desk research method using public records and documents to identify trends over a decade [14]. Sources included: OECD databases, Central Statistical Office (CSO) databases and Ministry of Health Statistical Bulletins. Analysis of OECD data focused on the period 2012–2021. The EU average was calculated for only 20 countries for which data were available, allowing for a comparison of Poland's position within the European context [15, 16]. CSO database were analysed for the period 2012–2021 [17], while the Statistical Bulletins from the Ministry of Health provided information for the years 2012–2022, enabling an up-to-date assessment of employment trends in the context of changes in the healthcare system in Poland [18]. The most reliable and most up-to-date data available at the time were used in the preparation of the manuscript. The purpose of comparing several data sources was to increase the objectivity of the analysis and demonstrate methodological differences. In doubtful cases, the Department of Statistics at the Centre for e-Health, Ministry of Health, we contacted directly to ensure the highest quality of the data. Special attention was given to discrepancies observed in the 2012 statistical data, particularly regarding the total number of

nurses and gender distribution among midwives, which showed significant variations in subsequent years.

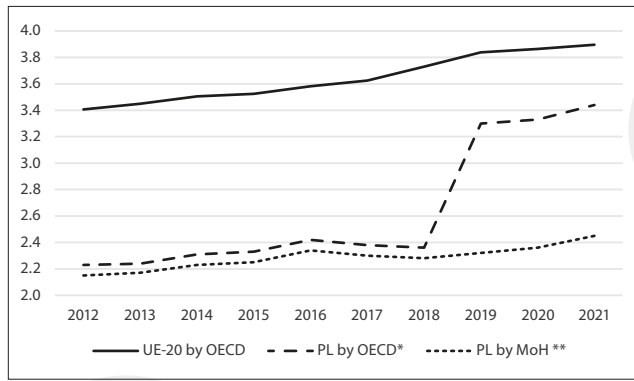
A critical aspect of the analysis included addressing the impact of methodological changes introduced in Poland in 2019 for counting medical staff. These changes were meticulously assessed to ascertain their influence on the observed employment trends, thereby ensuring that the conclusions reached in the study accurately reflect the underlying data realities [19].

## RESULTS

**Density of physicians and nurses.** According to data that Poland reported to the OECD, the ratio of physicians-and nurses-to-population increased significantly at the beginning of 2019, bringing Poland's indicator closer to the EU average (Figure 1, Figure 2). However, the trend shown is only the outcome of a modification in the data calculation methodology and does not represent a real increase in the number of medical professionals. Until 2018, data reported to the OECD by the Central Statistical Office was based solely on the employers reports on staff involvement. In fact, approximately 70% of these reports were complete, and how the missing data was extrapolated is unknown. As of 2019, there has been a significant change in the methodology counting of medical staff numbers.

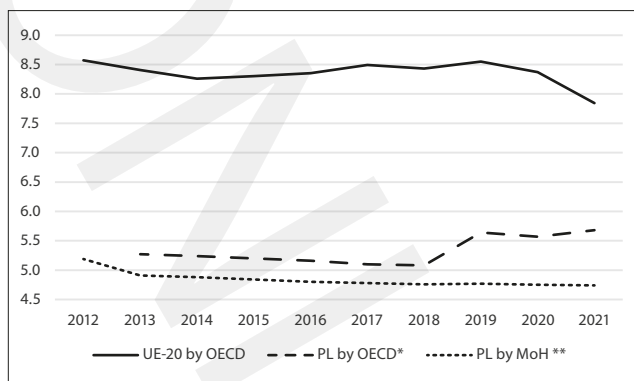
The new calculation was based on the following three steps (ABC). The first step (A), involved estimating the number of professionals with medical licences and deducting those who had left the country, those residing and receiving benefits outside Poland, those having a foreign address, those listed in just one register, and those who had died. The second step (B), involved narrowing-down to those who were directly working with patients, and it was assumed that these individuals were working at one of the following entities: RPWDL (Registry of Health Care Providers), NFZ (National Health Fund), the list of entities that had a contract with the NFZ, BJS (entities from the Database of Statistical Units, operating according to PKD – Polish Classification of Activity) in section Q entitled 'Health care and social assistance', while simultaneously paying mandatory social security contributions as employed persons. In the third step (C), a unique number of people was established from group (B) by using a limit to the same individuals so they were counted only once. According to the second data source – the Ministry of Health, there was no increase in the number of medical staff over the same period as they continued to use data based on the number of actively practising physicians reported by healthcare providers.

**Distribution of medical staff by gender and age.** Based on results, there was an increase in the number of physicians involved in outpatient, inpatient, and long-term care combined (118% from 2014–2022). There was also a significant increase in the number of physicians employed under a civil-law contract with a decrease in the number of physicians employed under an employment relationship. A similar trend was observed for nurses, with hospital nurses employed under a contract experiencing the largest increase (303% from 2012–2022). With regard to midwives, the largest increase in employment was in hospital care, with the number of midwives employed under a contract (312% from 2012–2022) (Tab. 1).



**Figure 1.** Physicians per 1,000 people in Poland and the average in the 20 EU nations.

\*from 2019, CSO reported data to the OECD according to a changed methodology.  
\*\* data from the Ministry of Health based on reports submitted by healthcare providers only



**Figure 2.** Nurses per 1,000 people in Poland and the average 20 EU nations.

\*from 2019, CSO reported data to the OECD according to a changed methodology.  
\*\* data from the Ministry of Health based on reports submitted by healthcare providers only

Analysis based on active medical licence showed there was a minor increase in the proportion of physicians in the youngest age group – under 34 years of age (17.0% – 20.7%), a slight decrease in the middle age groups, and the largest increase in the oldest age group – over 65 years of age (20.4%

– 25.7%). With regard to nurses, the largest decrease was in the 35–44 age group (29.9% – 8.7%), and the largest increase in the oldest age group – over 65 years of age (5.4% – 22.3%). Similarly, midwives showed a decline in the 35–44 age group (26.1% – 10.3%), and an increase in the over 65 age group (5.7% – 19.1%). In terms of gender distribution, the proportion of women among physicians and nurses slightly increased, while the proportion of women among midwives slightly decreased (Tab. 2).

**Distribution of practicing doctors and nurses across provinces.** All Polish provinces saw an increase in employment, according to a provincial analysis of the physician-to-population ratio. The disparities in the distribution of physicians among the provinces, which have not changed in ten years, are concerning. In the Greater Poland Province, the proportion of physicians was 1.43 in 2012 and 1.62 in 2022, while in the Zachodniopomorskie Province, the ratios were still significantly higher during the analysed period (2.11 and 3.03, respectively).

A provincial analysis of the nurse-to-population ratio revealed that, in half of the provinces, the ratio improved over time, while it deteriorated in the other half. In 2022, the largest disparities occurred, with a ratio of 3.26 in the Świętokrzyskie Province and 6.27 in the Wielkopolskie Province. In 2012, there were less disparities, with a ratio of 4.14 in the Woielkopolskie Province and 5.30 in the Świętokrzyskie Province.

## DISCUSSION

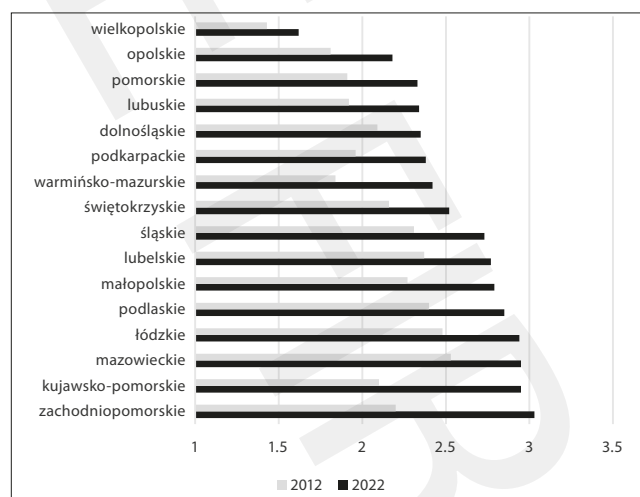
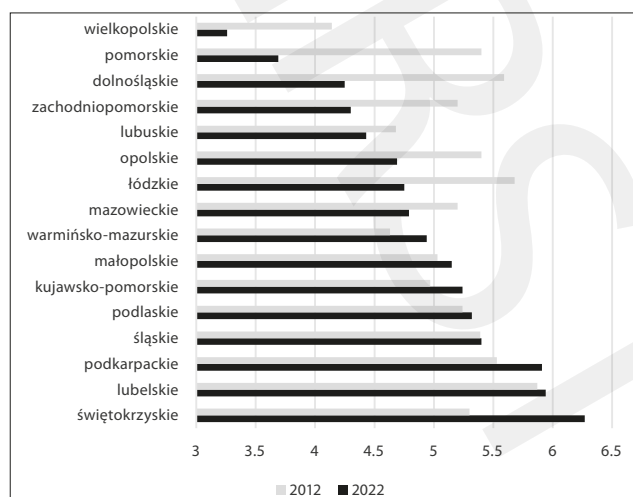
The analysis of the physician-to-population ratio reveals that there is a significant variation across both time periods in Poland and between provinces and other countries. The observed upward trend in Poland starting in 2019 was merely the result of a modification in the methodology employed to calculate the ratio, not a real increase in the medical workforce. This limitation is also shown by the OECD [20]. Practising physicians are most often defined as doctors providing direct care to patients. In some countries, this ratio

**Table 1.** Number of physicians, nurses and midwives – sector of work and form of employment (data reported by employers only).

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	% change	
Physicians	Outpatient care – employed	ND	ND	21176	21165	20343	20474	19573	19443	18666	18643	17811	84%
	Outpatient care – contractors	ND	ND	52499	57780	59725	60966	64837	64265	65581	67089	67434	128%
	In-patient care – employed	43119	42873	41893	42127	41887	40338	39124	39267	38831	39052	38880	90%
	In-patient care – contractors	34443	34443	38572	43428	44220	48909	51596	52909	52429	55189	57483	167%
	Long-term care – employed and contractors	2407	2547	2744	2889	3032	3323	3326	3316	3310	3228	3442	143%
Nurses	Outpatient care – employed	ND	ND	35847	21551	35970	21085	35602	20546	35746	35160	33362	93%
	Outpatient care – contractors	ND	ND	19378	6271	21021	6682	24347	7193	26191	26946	27043	140%
	In-patient care – employed	120509	119559	118890	118432	118096	116936	116700	117622	116070	116102	117209	97%
	In-patient care – contractors	10684	12001	13616	15880	16724	20504	24287	27168	28458	33438	32339	303%
	Long-term care – employed and contractors	9466	10479	10935	11456	11642	12380	12567	12679	12389	12344	13322	141%
Midwives	Outpatient care – employed	ND	ND	4421	4566	4421	4432	4549	4584	4505	4493	4018	91%
	Outpatient care – contractors	ND	ND	2625	2712	2746	2757	2907	2942	2946	3036	3027	115%
	In-patient care – employed	15754	15621	15649	15852	16009	16159	16113	16240	16248	16457	16662	106%
	In-patient care – contractors	1096	744	1504	1769	1906	2313	2673	3096	3218	3405	3423	312%

**Table 2.** Medical staff by gender and age groups (based on active medical licence)

Physicians	of which % female	below 34 years of age	35–44	45–54	55–64	over 65 years of age
2012	57.4%	17.0%	19.2%	24.0%	19.4%	20.4%
2013	57.6%	17.5%	18.1%	23.3%	20.1%	21.0%
2014	57.8%	17.7%	17.3%	23.0%	20.7%	21.4%
2015	58.0%	17.9%	16.3%	22.8%	21.1%	22.0%
2016	58.3%	18.7%	15.7%	22.4%	21.1%	22.2%
2017	58.3%	18.9%	15.1%	22.1%	21.3%	22.7%
2018	58.7%	19.0%	15.0%	21.0%	21.0%	23.9%
2019	58.8%	19.7%	14.9%	20.0%	21.0%	24.5%
2020	59.0%	20.1%	15.2%	18.9%	21.0%	25.1%
2021	59.2%	20.7%	15.4%	17.8%	21.0%	25.7%
Nurses	of which % female	below 34 years of age	35–44	45–54	55–64	over 65 years of age
2012	94.3%	8.8%	29.9%	33.5%	22.3%	5.4%
2013	98.2%	8.3%	29.1%	33.9%	23.8%	4.9%
2014	98.2%	8.4%	25.6%	34.1%	26.0%	6.0%
2015	98.1%	8.9%	22.3%	34.1%	27.3%	7.5%
2016	98.0%	9.1%	19.5%	34.1%	27.8%	9.5%
2017	97.9%	9.6%	17.5%	33.7%	28.4%	10.8%
2018	97.7%	9.8%	14.7%	33.2%	29.3%	13.0%
2019	97.6%	10.4%	11.6%	33.2%	29.8%	15.1%
2020	97.5%	10.1%	8.8%	32.8%	30.4%	17.9%
2021	97.3%	10.3%	8.4%	31.0%	30.2%	20.0%
2022	97.2%	10.7%	8.7%	28.4%	29.9%	22.3%
Midwives	of which % female	below 34 years of age	35–44	45–54	55–64	over 65 years of age
2012	98.8%	13.5%	26.1%	35.6%	19.2%	5.7%
2013	99.8%	13.6%	25.3%	34.4%	21.4%	5.4%
2014	99.8%	13.5%	22.9%	34.8%	22.6%	6.2%
2015	99.8%	14.4%	19.7%	34.3%	23.7%	7.8%
2016	99.8%	15.4%	17.7%	33.4%	24.8%	8.9%
2017	99.8%	16.3%	16.2%	32.2%	25.4%	10.0%
2018	99.8%	16.4%	14.9%	30.5%	26.6%	11.6%
2019	99.8%	17.7%	12.8%	28.8%	27.6%	13.1%
2020	99.8%	17.9%	11.4%	26.1%	29.2%	15.4%
2021	99.8%	18.4%	10.7%	24.2%	29.5%	17.2%
2022	96.1%	18.9%	10.3%	22.2%	29.4%	19.1%

**Figure 3.** Distribution of practising physicians (per 1,000) by Polish provinces**Figure 4.** Distribution of practising nurses (per 1,000) by Poland's provinces

includes physicians employed in academic, administrative, research and management positions, which raises the percentage of physicians by roughly 5–10%. In turn, countries like Greece and Portugal record all physicians with a medical licence, resulting in an even higher over-estimation. Most countries include in their statistics, medical interns and resident doctors who provide care under the supervision of other doctors, which is not the case in Belgium and France.

The data in the presented study indicated that as the number of medical professionals generally increases, more and more medics are self-employed or hired under civil law contracts instead of under an employment contract. This trend is especially noticeable among nurses and midwives. This could be the outcome of professionals choosing to work more than one full-time position, for one or more providers, as they are interested in higher salaries. This was confirmed by a survey of a sample of 1,023 nurses, which showed that 44% of those surveyed worked in two workplaces, and the main reason for that was striving for material wealth [21]. The need of employers to reduce employment-related contract costs and provide more flexibility, may also be the driving force for preferring civil-law contracts. In both cases, this leads to an excessive workload which, in turn, adversely affects the quality of health care and patients' safety [22, 23, 24].

Polish healthcare continues to primarily focus on inpatient care, as evidenced by a higher employment growth rate in this area than in outpatient care. This is not a positive trend, given that the country's bed ratio (6.2 per 1,000 inhabitants) is 25% higher than the EU average (4.9 per 1,000 inhabitants), and bed occupancy is only 66% [25]. Positively, the growth in medical professionals and nurses in long-term care facilities corresponds with the present and future needs of the population. As evidenced by European trends, where the growing needs of the ageing population are influencing changes in healthcare systems, Poland's age-structured population calls for a greater emphasis on the development of long-term care [26, 27, 28].

An analysis of the age of the medical staff shows that all professional groups are ageing. In the last ten years, there has been a slight increase in the percentage of medical professionals under the age of 35. However, the proportion of physicians over 65 has increased by five percentage points, nurses by fifteen, and midwives by eleven. This phenomenon is especially unfavourable for nurses and midwives, 95% of whom are women and reach retirement age in Poland at the age of 60. In Ireland, the Health Service Executive (HSE) reports that nearly 65% of nurses are over 40, and more than 30% are over 50. The overall HSE workforce shows a similar trend, with only 21% of all employees under 35 and nearly 65% of all employees over 40. An ageing healthcare workforce is a global trend that has been noted in, Australia, Canada, Japan, the UK and USA [26].

According to the authors' research, the proportion of medical staff in the oldest age groups (including those who are at retirement age) has clearly increased. This raises the possibility of greater numbers of medical errors and poorer productivity. Older employees may also suffer from health issues and experience burnout, which has a negative impact on the quality of health care services and patients' safety [30, 31, 32]. The efficiency of the healthcare system may thus be affected by an ageing medical workforce, which could result in longer waiting times for medical services

and poorer patient satisfaction [30]. This situation illustrates the complexity of the challenges confronting the healthcare system, wherein the availability and quality of care are greatly affected by the demographics of the workforce.

**Limitations of the study.** The limitations are mainly due to the data sources used. The analysis of the form of employment in the healthcare sectors was based upon reports from healthcare providers with a completeness rate of around 70%. Unfortunately, there is no methodological explanation of extrapolation the data available from the Ministry of Health to evaluate the reliability of the results. Additionally, it was not possible to explain unusual increases and decreases in some years which could have been the result of incomplete data. However, using multiple sources allowed us to identify and explain variations in the trends, which was a strength of our analysis. Furthermore, only the most reliable official, public statistics sources were employed. The collection of primary data independently would not have been possible or would have only produced a limited or incomplete analysis of the phenomena under study. It should be noted that this is the only analysis of Polish medical staff employment trends over a ten-year period that we are aware of. A comprehensive assessment of medical staff should include not only the analysis of historical trends, but also forecasting [34, 35].

In Poland, a supply and demand model for doctors has been developed, serving as an advanced tool for determining future staffing needs for doctors. The model illustrates that the required number of doctors is closely linked to their average monthly working hours, considering various scenarios about their willingness to work longer hours versus pursuing a work-life balance. Forecasts indicate that the needs for doctors in Poland will be met from 2028. The lack of parallel analyzes for nursing staff highlights the need to expand research in this area, especially since the preliminary findings of the presented analysis may suggest less optimistic forecasts due to the less favourable age structure of nurses and midwives [36].

## CONCLUSIONS

An examination of Poland's physician- and nurse-to-population ratios compared to the EU average uncovers methodological issues in measurement. The apparent increase in ratios since 2019 stems from methodological adjustments, not an actual rise in medical staff. A shift in medical employment trends towards more flexible arrangements like self-employment or civil-law contracts, may affect care quality and patient safety due to potential overwork. The medical workforce is aging, with an increase in those aged 65+ and a slight rise in those under 35, particularly impacting female-dominated professions like nursing and midwifery which are facing earlier retirements. There are also significant regional disparities in medical staff distribution, affecting healthcare access and quality. The findings suggest that organizational changes in healthcare should go beyond merely increasing staff numbers. Strategies for better resource allocation, including incentives for working in underserved areas, promoting medical careers among men, equalizing retirement ages and implementing a skill-mix policy, should be implemented simultaneously.

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