Dalibor Stanimirović*, Radivoje Pribaković Brinovec**

MANAGEMENT OF HEALTH CARE WORKFORCE: CONCEPTUALIZING A STRUCTURAL MODEL OF HUMAN RESOURCE PLANNING IN HEALTHCARE IN SLOVENIA

ABSTRACT

The healthcare system's effectiveness depends mainly on healthcare workers' knowledge, skills, and motivation, particularly during the COVID-19 pandemic. Systematic planning of human resources is, therefore, an essential prerequisite for ensuring the sustainability and efficiency of the health care system. This article outlines a structural human resource planning model in health care and explores the complexities involved. A detailed analytical framework is proposed, drawing on various materials and evidence to outline the factors that influence human resource planning in health care. The in-depth analytical process employs an extensive literature review to provide greater credibility to research findings. It investigates numerous sources and materials, both in national and international contexts. The purpose of human resource planning initiatives in healthcare is to calculate the needed number of healthcare workers in the future based on past and current data and assumptions about future supply and demand trends. The research findings reveal this is a very challenging task, as there are typically many unknowns when planning for the future. In addition, planners often need more reliable data and systemic deficiencies. Furthermore, the study shows that unplanned and delayed solutions concerning human resource needs in healthcare can only alleviate problems. Still, they cannot replace effective strategic measures and timely structural changes within the healthcare ecosystem.

KEYWORDS: *Human resource management, health care system, structural model, planning, health care workforce, analysis, Slovenia*

1. INTRODUCTION***

The healthcare sector is one of the most important economic sectors in the EU, with substantial employment potential due to the aging population and the increasing demand for healthcare services (European Commission, 2012; Liu et al., 2017; Getzen & Ko-bernick, 2022). The current global health crisis and the problems of healthcare systems worldwide due to the COVID-19 pandemic confirm the important socioeconomic role of healthcare systems (Galanis & Hanieh, 2021; An et al., 2022; Shiffman & Shawar, 2022). In 2020 in Slovenia, health care generated 7.9% of the GDP and employed 6.8% of the active population (Statistical

*   Dalibor Stanimirović (corresponding author), Ph.D., University of Ljubljana, Faculty of Public Administration, 1000 Ljubljana, Slovenia, E-mail: dalibor.stanimirovic@fu.uni-lj.si

**   Radivoje Pribaković Brinovec, National Institute of Public Health, 1000 Ljubljana, Slovenia, E-mail: rade.pribakovic@nijz.si

Office of the Republic of Slovenia, 2022). According to the National Institute of Public Health (NIJZ) (2020), 60,862 people were employed in the healthcare sector in 2020. The Slovenian healthcare sector includes some of the largest enterprises in the country, namely the University Medical Centre Ljubljana, which had 8,498 employees and an annual budget of EUR 658 million in 2020 (University Medical Centre Ljubljana, 2020).

The provision of health care requires the combination and coordination of numerous resources, with human resources, (physical) capital, and (consumable) goods being crucial. Human resources (various medical and non-medical professionals) are primarily the most significant contributors to the delivery of health care services. The effectiveness of the healthcare system mainly depends on the knowledge, skills, and motivation of the healthcare workforce. Salaries and other remuneration of the healthcare workforce represent the highest single cost in healthcare (Hu et al., 2016; Foley & Luz, 2021). For this reason, human resources planning in health care is a critical and complex process involving many stakeholders. This process includes defining the purpose and goals, selecting relevant and obtainable data, defining assumptions and scenarios, producing and maintaining a predictive model, establishing continuous re-evaluation, and optimizing the process.

Policymakers and healthcare system managers face numerous difficulties when planning healthcare workforce. Due to the aging population, the number of people 65 and over in the EU is projected to increase by 66.9 million by 2060, out of a current population of approximately 450 million (European Commission, 2008; Gorman, 2015). In Slovenia, the population aged 60 and over will grow by 260,000 and the population aged 80 and over by 140,000 by 2060, out of a current population of approximately 2.1 million. By 2060, the population aged 65 and over in Slovenia will account for 31.3% of the total, and the population aged 80 and over for 12.8% of the total population (Statistical Office of the Republic of Slovenia, 2019). New technologies bring improvements to diagnostics and the prevention and treatment of diseases. Introducing new digital tools requires that healthcare workers are adequately trained and skilled, resulting in additional costs.

On the other hand, new health risks are emerging due to lifestyle changes, pollution, and epidemiological threats (Viher Hrženjak et al., 2020; Gori & Rakhimov, 2020; Excler et al., 2021). All this leads to a continuous increase in healthcare workers and healthcare spending, raising serious concerns for the organization and sustainability of healthcare systems in many countries (Scheffler et al., 2018; Asamani et al.,

2021; Getzen & Kobernick, 2022). To this end, the primary purpose of human resources planning models is to calculate the future number of healthcare workers based on past and current data and based on the assumptions and premises regarding the future trends in workforce supply and demand. Accordingly, this article outlines a structural human resource planning model in health care and explores the complexities involved.

2. LITERATURE REVIEW

Over the last three decades, healthcare systems worldwide have balanced the growing demand for healthcare services with limited supply. In addition, healthcare systems must carefully consider individual patient healthcare needs and simultaneously address national or transnational public health threats. The aging population and poor demographic trends in the coming decades, including rapid increases in the number of older people, various chronic diseases and morbidities, the introduction of new technologies that require specialized knowledge and skills, communicable diseases, climate change, and other emerging health threats are just some of the significant challenges facing health care systems (Chambers et al., 2020; Viegi et al., 2020; Pendrey et al., 2021; Laukkanen, 2021; O'Dell, 2022). Under these deteriorating and uncertain conditions, the need for an adequate, competent, and appropriately trained healthcare workforce has become increasingly important. This is supported by several national and international strategic and development documents, which emphasize that countries must adopt appropriate policies and implement all systemic measures that could help tackle challenges such as health threats, the burden of lifestyle-related diseases, pandemics, health inequalities, pollution, and climate change. One of the critical measures highlighted is strengthening healthcare systems, which includes the provision of a sufficient and adequately trained healthcare workforce.

The growing need for additional healthcare workforce triggered the research interest in studying the factors that influence the supply and demand for the workforce and other aspects that impact human resource management and planning specifics in healthcare. As a result, the research in the field is relatively extensive today. Given the complex nature of human resource planning initiatives in health care, research focuses on various aspects concerning this phenomenon. Research thus addresses educational, professional, social, organizational, legal, geographic, cultural, gender, financial, technological, and other factors and concepts that demonstrate any impact on human resource planning in

Dalibor Stanimirović
Radivoje Pribaković Brinovec

MANAGEMENT OF HEALTH CARE WORKFORCE: CONCEPTUALIZING A STRUCTURAL MODEL OF
HUMAN RESOURCE PLANNING IN HEALTHCARE IN SLOVENIA

health care. Studies sometimes need to be more general on the one hand and narrow and particularised on the other, making it difficult to build an overall picture and gain a broader sense of the significant material determinants in the field, their characteristics, and underlying issues. However, despite numerous aspects of human resource planning in health care that have been the subject of previous research, including those that are more peripheral, the research can be divided into several larger groups with common characteristics, presented below.

A large body of research is focused on the demographic characteristics, gender, and sustainability of the healthcare workforce. As the population ages, so does the healthcare workforce. Because of that, career advancement opportunities, job retention conditions, and recruiting young healthcare professionals are crucial (Mantler et al., 2015; Terhune et al., 2020; Cleland et al., 2020; Mok et al., 2020; Chang, 2022). Women represent the vast majority (more than 75%) of healthcare workers in EU Member States (more than 75%), and this continues to increase (European Commission, 2008). Accordingly, the issues of gender equality are significant since they touch upon the essential relationships between healthcare workers.

Another large block of research centers on the healthcare system's capacity and production of healthcare services, training new and existing professionals, and the role and importance of healthcare professional entrepreneurs. This segment of the research usually deals with the organizational, procedural, and financial aspects of human resource planning in health care on the one hand and the efficiency, effectiveness, and productivity of the health care workforce on the other (Valdmanis et al., 2015; Sinisammal et al., 2016; Rees et al., 2020; Duong et al., 2021; Tudor Car et al., 2022). Typically, the healthcare needs of the entire population in the country are highlighted as a substantive basis for studying the above constructs. Sometimes the research focuses on narrower areas, such as a medical specialty or a specific disease or health condition. In this context, much attention is usually paid to the labor intensity in health care systems, a large number of employees, and the budget funds allocated to salaries and other compensation of health care workers (approximately 70% of the health care budgets in the EU) (European Commission, 2014; Sangji & Telem, 2020; WHO, 2021).

The following important area of increasing research interest is the global migration of the healthcare workforce and the mobility of healthcare workers within the EU. The global shortage of healthcare workers has prompted some studies addressing brain drain from third countries, the migration of healthcare workers from poorer to more prosperous EU countries and consequent health inequalities, and the mi-gration of healthcare workers in and out of the EU Member States (Sheldon, 2006; Scheffler, 2018; Zerpa, 2020; Gerchow et al., 2021; Coates et al., 2021). Most of this type of research highlights the dramatic consequences of migration trends and the great need to stabilize the situation in the labor market of health-care workers through various measures, including financial incentives.

According to our literature review, the last large group of studies addresses the impacts of new technologies, organizational restructuring, and business processes on human resource planning in health care. Well-implemented human resource planning initiatives combined with organizational changes, process reengineering, and the introduction of new technologies can act as critical enablers facilitating considerable enhancements in access to health care, quality of health care, as well as efficiency and productivity of the health care system (Nazeha et al., 2020; De Ramón Fernández, 2020; Smith et al., 2022; Montemurro et al., 2022).

As noticed by several authors, the terms and concepts concerning human resource planning initiatives and forecasting models are used arbitrarily and interchangeably, significantly hindering their functional characterization and differentiation from other related concepts. In addition, there are hardly any compelling empirical studies that systematically assess the overall value of such human resource planning initiatives in the actual healthcare environment, their impact on public health and public finance aspects, and issues related to the long-term development of healthcare systems. Most studies in the field focus on the selected aspects of human resource planning initiatives and their implications on particular healthcare domains. The latter reasons substantially hamper the research in this vital field and prevent evaluating the actual effects of human resource planning initiatives on health outcomes and the business aspects of health care systems.

Regardless of their research perspective, virtually all authors underscore that the main goals of all human resource planning initiatives in health care should be focused on the health benefits of patients and the effectiveness of the health care system.

3. METHODS

This article relies on a methodological framework for an in-depth analysis to achieve the research objectives. Outlining a structural model of human resource planning in health care requires multilateral and detailed insight beyond the superficial layers to explore the complexities involved.

As defined in the literature review, research addressing this topic or at least touching on a segment of workforce planning in health care is scattered across many different and possibly even weakly related areas. In such cases, narrowly focused systemic reviews based on keywords, concepts, or classic meta-analyses are not the most appropriate, as they cannot cover a wide range of relevant topics. This study, therefore, required a broad exploration of social, professional, educational, demographic, health, managerial, business, organizational, and other dimensions that are closely intertwined in this field and are sometimes difficult to separate from each other and evaluate independently. Accordingly, this study is mainly exploratory; therefore, quantitative research methods and related techniques could not yield dependable results. The selection of the methodological approach was adapted to the research matter's particularities, the evidence's availability, and the overall societal significance of human resource planning for the entire healthcare system (Yin, 2017; Mohajan, 2018). Given all the above, an in-depth analysis is the most reasonable methodological approach to addressing this issue.

The in-depth analysis was conducted from November 2021 to May 2022. During that time, we conducted extensive document analysis and information retrieval through the exhaustive investigation of primary and secondary sources, policy papers, EU and national strategies, project reports and records, interviews, action plans, and other materials containing subjects related to human resource planning in health care. The in-depth analytical process used content of various theoretical, practical, and legal nature from national and international contexts to provide better insight and greater credibility to the research results (Zhao et al., 2022; Köhler et al., 2022). In this sense, international experiences, testimonies from healthcare stakeholders, evidence from the field, statistical data, and records from the national healthcare databases were essential. An all-encompassing methodological approach should ensure the greater consistency of the research results and provide a more suitable platform for drawing sensible conclusions (Renjith et al., 2021; Thomas, 2021).

Following recommendations and methodological guidelines, the in-depth analysis was conducted by combining different techniques of qualitative research methods (Yin, 2017; Brennen, 2021; LaMarre & Chamberlain, 2022). The initial part of the study focused on thoroughly examining relevant sources, whereas, deriving from the investigation results, the concluding part strives to integrate the theoretical and practical aspects of the research subject. In addition, the concluding section provides starting points for deriving reasonable conclusions and opens up questions and

dilemmas for potential future research in this area. To ensure the integrity of the research results and eliminate bias, the interpretative process was independently repeated several times, and any discrepancies identified were reassessed collaboratively by the authors (Mohajan, 2018; Lindgren et al., 2020).

Applying the proposed methodological approach and the respective data collection technique was instrumental in the overall success of the in-depth analysis. The latter provided a functional platform for synthesizing and interpreting the data obtained, ultimately enabling credible conclusions.

4. RESULTS

Health care is one of the most critical sectors in the EU economy, with growing employment potential due to the increased demand for health care services, which is driven by numerous causes that directly affect human resource planning initiatives in health care (Astolfi et al., 2012; de la Maisonneuve & Oliveira Martins, 2013; Dow et al., 2020; Getzen & Kobernick, 2022). The conducted research revealed that the following factors have the most significant impact on the health care workforce planning (European Commission, 2014; Hu et al., 2016; Lipstein & Kellermann, 2016; Fraher et al., 2020; Asamani et al., 2021; WHO, 2021; An et al., 2022; Shiffman et al., 2022):

- the demographic trends, multiple chronic conditions and morbidities, infectious diseases, the spread of diseases due to increased mobility, and other healthcare needs and expectations of the population;
- the aging and gender structure of the health care workforce, working and financial conditions;
- the capacity of educational institutions, the migration of health care workforce;
- the required new knowledge and skills, new technologies, the transfer of competencies among occupational groups and health care levels, and the need for continuous professional development.

Structural models of human resource planning in health care must consider the above and more specific factors to enable comprehensive and credible modeling. Based on the specified assumptions, the structural model estimates future scenarios as a function of past and present data (cross-sectional, time series, or longitudinal). Naturally, past and present data must be available. The initiatives for human resource planning in health care typically have quantitative foundations (the listed factors and derived indicators require the collection of quantitative data for the designated time series); however, it is evident that future quantitative

Dalibor Stanimirović
Radivoje Pribaković Brinovec

MANAGEMENT OF HEALTH CARE WORKFORCE: CONCEPTUALIZING A STRUCTURAL MODEL OF
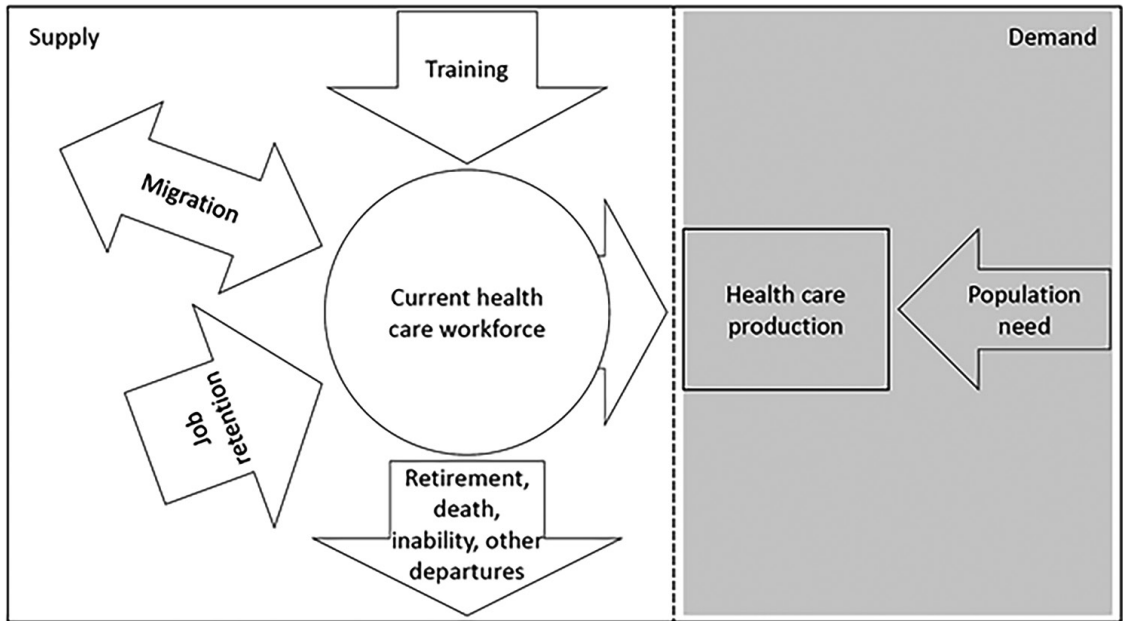HUMAN RESOURCE PLANNING IN HEALTHCARE IN SLOVENIA

FIGURE 1. The structural model of human resource planning in health care.

estimates are also dependent on qualitative forecasting in terms of expert opinions and predictions (Gorman, 2015; Rees et al., 2020; Coates et al., 2021). Based on previous research and strategic guidelines for the development of health care systems, the structural model of human resource planning in health care presented in Figure 1 incorporates seven factors classified into two categories (European Commission, 2014; Liu et al., 2017; Scheffler et al., 2018; Rees et al., 2020; WHO, 2021), i.e., supply and demand of the health care workforce.

On the supply side, "*Training*" refers to the number of new healthcare professionals produced each year by the education system in the field. As a starting point, it is recommended to forecast the first years based on the present number of healthcare students enrolled in the educational system and the following years based on the average of the first years. Most existing forecasting models have been based on the premise that the quantity of healthcare students is essential in balancing healthcare workers' supply and demand (Wu et al., 2020). "*Current health care workforce*" refers to health care workers already working in the public health care system and external health care not directly employed in the system but provide health care services (e.g., retired health care workers in private practices working on a self-paying basis). The number of professionals not employed by the health care system but involved in delivering health care services can be expected to remain constant over time.

Accordingly, they are unlikely to impact supply changes in this situation. The relevance of "*Migration*" varies depending on the weight of this social phenomenon in each country. As the integration of EU Member States progresses, and the importation of healthcare workforce from outside the EU continues to increase, the effect of migration on human resource planning in healthcare is likely to increase. "*Retirement*" is determined by individual choices and regulations governing the right to retire. Other groups within this category, i.e., death, disability, and other departures, significantly impact the number of healthcare workers and reflect the workers' movement and working conditions in the field (Behera et al., 2020). This category significantly impacts the number of health care workers, so the normative framework and sectoral regulations need to be thoroughly discussed with healthcare policymakers. "*Job retention*" addresses the parameters and occupations (e.g., nurses) in the health care system that may be more closely related to job retention than others. The relevance of this category varies by the EU Member States and is also influenced by early retirements due to family reasons. Policymakers could also manage this category, including professional consensus, stakeholder coordination, and adequate legislation. Factors on the supply side and related complexities are primarily the results of national strategic orientations, development goals, and underlying political/policy decisions.

On the demand side, several research studies

consider various factors influencing the demand for healthcare services (Segal & Bolton, 2009; Foley & Luz, 2021; Fraher et al., 2020; Coates et al., 2021; Shiffman & Shawar, 2022). These factors typically include sociodemographic dimensions such as age distribution and education; geographic and environmental dimensions; cultural dimensions such as social norms, behavior, and self-efficacy; and economic dimensions such as income, productivity, wealth, and other non-health-related categories. "*Population need*" refers to the demand based on the population's underlying needs, where the need for the number and competencies of healthcare workers meets the societal health- and health-care-related objectives, such as ensuring better health, reducing inequalities, securing fairness, and the accessibility of the health care system as well as practical, high-quality, and safe health care (Ministry of Health, 2016; Asamani et al., 2021). The second factor determining the demand for healthcare workers is "*Health care production*," which could also be called system capacity and expresses the ratio between the total current healthcare spending (or the current number of all services) and the number of healthcare workers. "*Health care production*" indicates the maximum number of services with current non/human resources. New technologies are an essential element that can affect "*Population need*" and

"*Health care production*" on the demand side, especially in diagnostics and treatment, as well as in the efficiency and quality of healthcare services. The demand side can be influenced by political decisions, e.g., prioritization of health care issues, promotional campaigns, decision-makers commitment, advocacy and prevention campaigns, etc. However, unlike the supply-side factors, the demand-side factors and their related dimensions are relatively more challenging to measure and, consequently, harder to predict.

For the operational use of the above structural model, it is necessary to create an appropriate data set to calculate individual factors and the specific dimensions contained within. The EU Joint Action on Health Care Workforce Planning and Forecasting has proposed a scheme of the minimum data set for calculating the healthcare workforce needs, which can be roughly paired with the presented structural model, as individual dimensions within the outlined factors remain undefined (European Commission, 2014) (Table 1). Nevertheless, this table displays the amount of data and the number of reliable data sources needed (excluding qualitative estimates), highlighting the complexity of applying such structural models of human resource planning in health care.

The table is divided into two significant data sets. The data about the healthcare workforce sup-

TABLE 1. Minimum data set for human resources planning in health care.

Areas	Supply					Demand	
Category / Characterization	Current health-care work-force	Training	Retire-ment, death, etc.	Migra-tion (outflow)	Migra-tion (inflow)	Popula-tion	Health care con-sump-tion
Profession	✕	✕	✕	✕	✕		
Age	✕	✕	✕	✕	✕	✕	✕
Headcount	✕	✕	✕	✕	✕	✕	✕
FTE	✕						
Geographical area	✕	✕	✕	✕	✕	✕	✕
Specialization (where relevant)	✕	✕	✕	✕	✕		
Country of the first qualification	✕	✕	✕	✕	✕		
Gender	✕						

Dalibor Stanimirović
Radivoje Pribaković Brinovec

MANAGEMENT OF HEALTH CARE WORKFORCE: CONCEPTUALIZING A STRUCTURAL MODEL OF
HUMAN RESOURCE PLANNING IN HEALTHCARE IN SLOVENIA

ply includes all the information influencing the number of healthcare workers available at a specific future time if the current number is increased by the numbers of those who will complete training and become part of the healthcare workforce, by the returnees in the profession, and by those who will migrate to Slovenia from other countries. The result is reduced by the number of healthcare workers who will retire, decrease, leave the profession, or migrate out of Slovenia. The current healthcare workforce consists of workers in the healthcare sector.

4.1. Healthcare workforce in Slovenia

It is necessary to have reliable and up-to-date data sources for these categories of data. They should be entered into properly updated and comprehensive national databases, which have been properly maintained in Slovenia (National Institute of Public Health, 2022; Health Care Databases Act, 2018). Accordingly, Slovenian national databases make it possible to monitor individual health care professionals, their education, their present and past employments, retirements and deaths, and fluctuation to and out of the health care system (Health Care Databases Act, Data Collection IVZ 16, 2018). The number of graduates from medical and health care faculties, pharmacy faculty, higher schools of medical sciences, and secondary

medical schools in Slovenia are tracked through the Record of the number of secondary school and faculty students at secondary schools, colleges, and faculties of medical and pharmaceutical studies (Health Care Databases Act, Data Collection IVZ 68, 2018). Information on the health care workforce who have migrated from or to Slovenia is relatively scarce and unreliable. The register kept by the Medical Chamber of Slovenia, among others, includes doctors and dentists who completed undergraduate or specialist training in other countries and enrolled in specialist training or obtained a license to practice in Slovenia (Medical Services Act, 2006). The Nurses and Midwives Association of Slovenia maintains data on the registered nurses and graduate midwives who completed their undergraduate training in other countries in the Register of Nurses and Midwives (Rules on the register and licences of nursing and midwifery providers, 2020).

At the end of 2020, a total of 6,944 doctors, 1,570 dentists, 9,043 nurses, and 12,959 medical technicians were employed in the Slovenian health care system. Over the past decade, the number of doctors in the health care system has increased by 36%, dentists by 23%, pharmacists by 38%, nurses by 101%, and medical technicians by 3%. In 2020, Slovenia had 331 doctors, 75 dentists, 74 pharmacists, and 1,048 nurses and medical technicians (all per 100,000 inhabitants) (Figure 2).
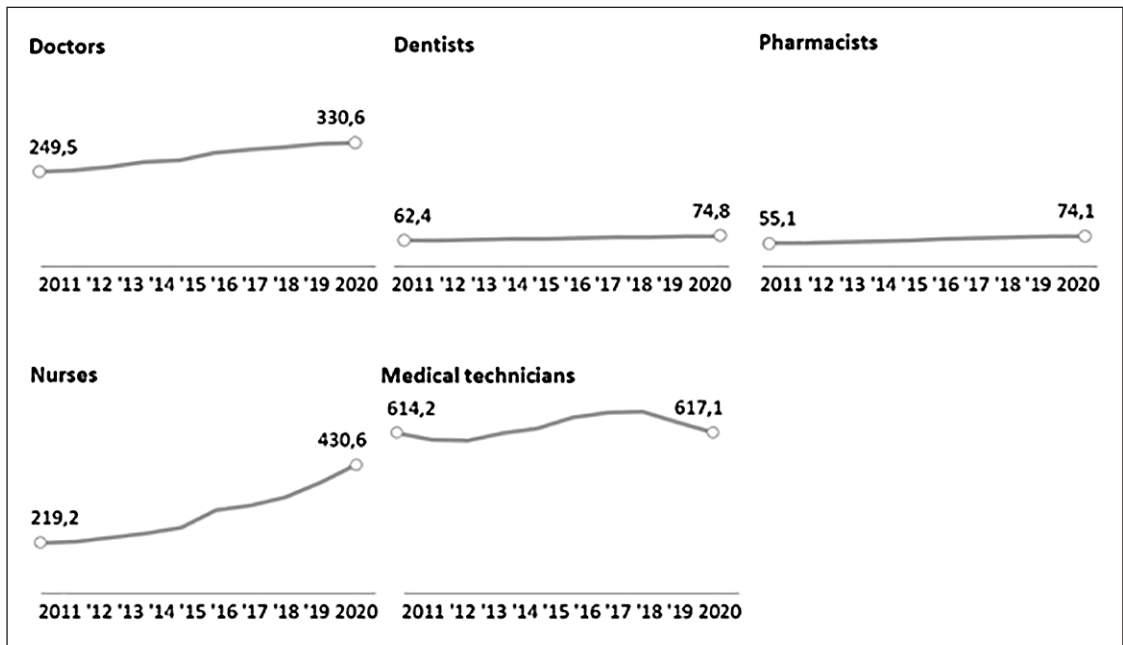
FIGURE 2. Dynamics of growth in the number of healthcare workers in Slovenia, 2011 – 2020
Note: Figures are expressed per 100.000 inhabitants.
Source: NIJZ (2020).

The number of general and family medicine doctors in the healthcare system has increased by 40% over the past decade, while the average annual increase has been 4%. The average annual increase of pharmacists was just under 4%, while the number of nurses grew at an average annual rate of 8% (National Institute of Public Health, 2020). The number of doctors per 100,000 inhabitants in Slovenia is below the average of EU Member States, despite growth over the past 20 years (Figure 3). The gap is huge in the number of general and family medicine doctors.

The number of public health centers, hospitals, and pharmacies has not changed in the last ten years. There are only a few private providers of hospital services, and in total, they perform less than 3% of all hospital treatments. On the other hand, the number of private providers in the outpatient sector continues to grow. A quarter of all doctors in general and family medicine and more than half in dentistry are private providers of outpatient activities.

Women dominate health professions. Nursing has traditionally been a female profession, but the number of men is slowly increasing. Among doctors and dentists, men are the majority only in the oldest age groups. These trends can be attributed, on the one hand, to the general feminization of health and social care professions and, on the other hand, to the improved access to these professions for women in the decades after the Second World War.

The number of medical graduates has been growing since 2002. Still, it increased more significantly after 2010 when graduates from the Faculty of Medicine in Maribor joined graduates from the Faculty of Medicine in Ljubljana. The number of graduates of dental medicine has not changed significantly in the last 20 years. The number of pharmacy graduates since 1995. In monitoring Nursing graduates, we have observed a gradual growth over the past ten years. Due to the intensive establishment of new higher medical schools after 2007, the number of students in these programs has sharply increased.

The number of hospital beds has declined since 1980 when there were 695 beds per 100,000 inhabitants. Regarding the number of beds per inhabitant, Slovenia was 17% below the average of EU Member States in 2019. In 2020, there were 428 beds per 100,000 inhabitants (National Institute of Public Health, 2020).

The above facts and figures show that significant changes have occurred in Slovenia's healthcare workforce and infrastructure over the past decade. To increase the number of medical doctors in Slovenia, an-
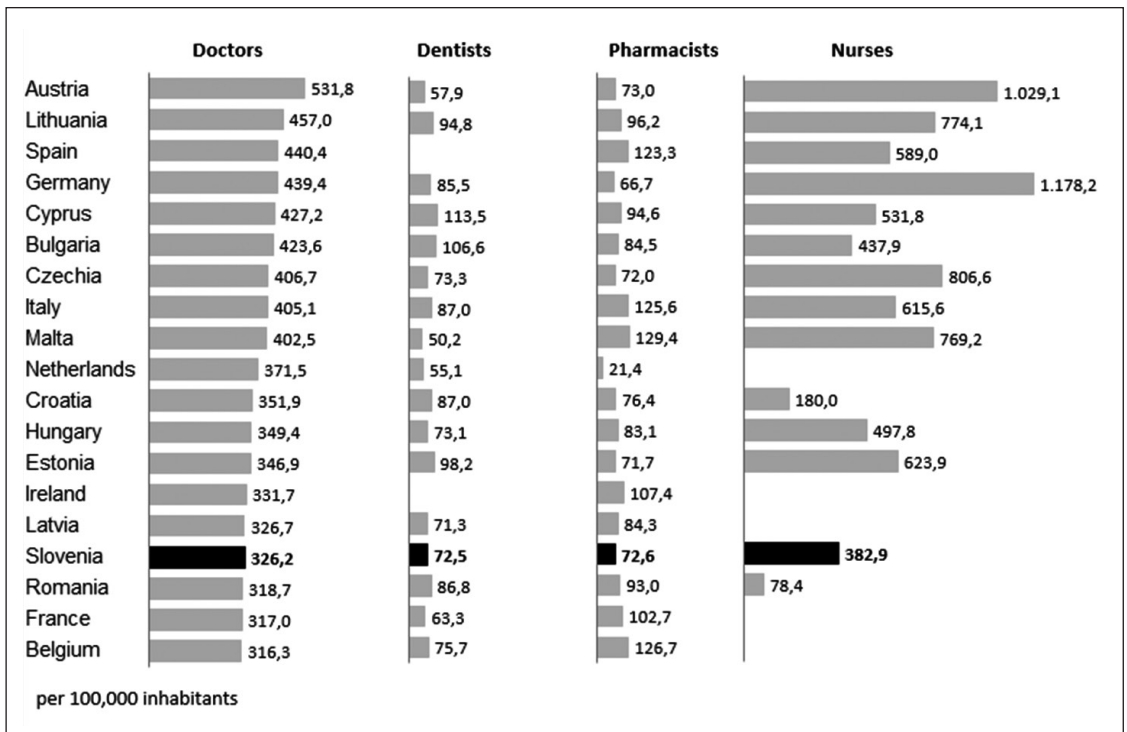

FIGURE 3. Number of health care workers per 100,000 inhabitants in Slovenia and EU member states
Source: NIJZ (2020).

Dalibor Stanimirović
Radivoje Pribaković Brinovec

MANAGEMENT OF HEALTH CARE WORKFORCE: CONCEPTUALIZING A STRUCTURAL MODEL OF
HUMAN RESOURCE PLANNING IN HEALTHCARE IN SLOVENIA

other Faculty of Medicine was established in Maribor in 2003. Various additional stimulus measures were taken to increase the overall number of healthcare workers. Today's situation in the field of health care workers in Slovenia shows that the measures taken were only partially successful. The most worrying situation is at the primary level of health care. The lack of medical doctors does not allow adequate access to health care services, undermining the functioning and quality of the entire health care system. Given the predicted dynamics of the retirement of doctors and nurses, mainly the outflow of nurses to other economic sectors, the situation is expected to worsen in the short term. Healthcare providers often partially resolve the crisis by extending the employment of doctors who meet the conditions for retirement and providing contract work for doctors who have already retired. In addition to objective problems of health care worker shortages, financial resources, and consequently long waiting times for some health care services, the Slovenian health care system also has considerable problems recruiting new workforce. Despite the advertised vacancies at the Employment Service of Slovenia, the influx of job seekers in the healthcare sector is minimal. In the case of healthcare professions, the Employment Service provides active employment programs, but these cannot successfully mitigate discrepancies in the labor market. Healthcare workers repeatedly point out that the labour shortage in the healthcare workforce results from hard and responsible work, unfavorable work schedules, and relatively low salaries. They also highlight overwork, harsh working conditions regarding difficult work with patients, threats, attacks in the media, and insults. The information that a relatively large number of doctors will retire soon and that there is insufficient interest among young people to work in primary health care is a cause for serious concern. For all these reasons, despite the activities to attract suitable workers, healthcare providers cannot find sustainable solutions that will ensure efficient operations in the coming years. In light of this, they expect substantial support and effective measures at the national level (Mestna občina Nova Gorica, 2022).

Both the current situation and projections for the future show that chronic staffing problems seriously threaten the operation of health care providers and the provision of health care services. Ultimately, the citizens are deprived of quality and timely treatment. As the solution to this situation exceeds the capabilities and competencies of individual health care providers, the Government of the Republic of Slovenia and the competent ministries must take action, as it is necessary to adopt, among other things, a national strategy and long-term solutions to address deficient

professions in health care and to simplify and shorten the procedures for the employment of doctors from other countries (work permits, language proficiency, certification of diplomas, etc.).

In recent years, the Government of the Republic of Slovenia has tried to alleviate the problems in the field of the healthcare workforce through various policies and measures. The Ministry of Health enforces specific measures to ease the conditions for the employment of doctors from other countries, financial incentives, attempts to reduce the administrative burden on doctors, promotion of deficit specializations, digitalization, etc. Of course, these measures can only be implemented gradually and cannot take effect quickly. In addition to the previously mentioned time constraints, the Ministry of Health faces numerous systemic, legislative, demographic, organizational, and financial barriers when implementing these measures.

The current situation and the even more alarming forecasts undoubtedly require coordinated and decisive action in all areas that could contribute to more successful human resource planning in health care in Slovenia. However, despite a relatively large number of high-quality data and reliable data sources, Slovenia is facing significant difficulties in human resources planning in health care, which only confirms the complexity of such projects.

5. DISCUSSION

An adequate response to current and all future public health challenges requires healthcare systems to have efficient and effective workforces. To achieve this goal, systematic measures should include training and attracting younger health care workers in the healthcare sector and ensuring better working conditions and adequate salaries for younger and older healthcare workers. These measures, complemented by the more favorable working hours, institutional protection, and a positive public image, could prevent them from moving early to other professions or retirement (Mantler et al., 2015; Chang, 2022). By taking a systematic approach to human resources planning, we can ensure the information needed to assess the baseline state and the information necessary to monitor and evaluate the success of human resource policy measures. The challenges related to human resource planning in healthcare stem from the complex social factors, professional interactions, and dynamics specific to the healthcare sector (Lipstein & Kellermann, 2016; Mok et al., 2020; Cleland et al., 2020). An aging population results in an aging healthcare workforce, while insufficient numbers of younger people are coming

through the system to replace those who retire. Difficult working conditions and limited career development opportunities make healthcare jobs less attractive to the young workforce. The uneven employee mobility in the EU and globally also impacts human resource planning in health care. Typically, some medical experts migrate from poorer (and Third World) countries into the wealthier EU countries. Given the volatile situation in this field, every healthcare system strives to obtain a sufficient and qualified healthcare workforce. Therefore, the issue of employing a sufficient number of healthcare workers is becoming increasingly important at both the national and global levels (Sheldon, 2006; Liu et al., 2017; Scheffler et al., 2018; WHO, 2021; Shiffman & Shawar, 2022). Moreover, systematic planning of human resources is one of the most critical requirements for ensuring the sustainability and successful functioning of the healthcare system (Dow et al., 2020; Fraher et al., 2020).

The structural model of human resource planning in health care includes critical factors, a suitable set of data, various assumptions and scenarios, and algorithms to calculate the results. The national health care policy, overarching purpose, and strategic goals of the planning project strongly influence the model. Such models typically combine quantitative and qualitative planning and prediction methods and advanced digital solutions (Karahanna et al., 2019). The information used to describe the baseline state and the data used to calculate future trends in healthcare workforce supply and demand serve as the basis for measures in training, education, employment, and migration of healthcare workers. These wide-ranging measures should ensure favorable working conditions for young and older workers and prevent them from moving early into other professions or retiring. Generally, the structural models of human resource planning in health care and the indicators derived from them should enable the recognition of the significant imbalances within the healthcare workforce, an analysis of these imbalances concerning all relevant factors, and identification of potential solutions (Mok et al., 2020; Zerpa, 2020; Shiffman & Shawar, 2022). Preferably, the modeling results should facilitate the assessment of future health care workforce supply and demand, expressed in indicators defined during the planning process. Human resource projections and their measures can contribute to a more efficient and higher-quality healthcare system.

Given multiple challenges identified in the case of Slovenia, practice reveals that human resource planning initiatives are usually fraught with significant difficulties, even in countries with strong and well-developed healthcare systems. To avoid these risks as much as possible, the entire human resource planning initia-

tive, including its long-term implications, must be well thought out. At the same time, the related modeling process must be clearly defined yet flexible and adaptable to *ad hoc* requirements and continuous changes in the healthcare ecosystem and the broader social environment. However, due to various limitations and long prediction periods, such models are not a one-size-fits-all solution and should not be unreasonably imposed on all healthcare systems without regard for their innate circumstances.

The research approach applied in this paper has one particular methodological limitation. Namely, the outlined structural model was conceptualized without actual and formal empirical validation in the Slovenian healthcare environment. Accordingly, the issues related to the substantive definition of the constituent factors and potential implications of the structural model may raise some questions of principle. At the same time, the research results may therefore be arguable. These matters should be appropriately addressed in further studies aimed at comprehensive analyses of the structural models of human resource planning in health care and their implications for the entire healthcare ecosystem. Future research in the field should probably focus on a comprehensive exploration of the applications and implications of the structural models of human resource planning in healthcare, including its material simulation in the healthcare environment. Preferably, future research goals should focus on elaborating applicable guidelines for developing useful structural models of human resource planning in health care and their introduction into health care policy-making processes in all countries where they face similar problems.

Notwithstanding the identified methodological limitations, the presented study reveals the multifaceted dynamics in the healthcare workforce. It illustrates the complex nature of human resource planning initiatives in health care in Slovenia and beyond. Accordingly, the research findings will hopefully expand knowledge and theory-building in this field.

6. CONCLUSION

Developments in recent years and the compelling experience from the Covid-19 pandemic have revealed that the organization of the healthcare system plays a crucial role in managing public health in the country. Consequently, this has further fuelled the already heated debates on human resource planning in health care in Slovenia, suggesting that approaches to this issue should be more carefully considered in the coming period. Any upcoming healthcare workforce planning initiatives in Slovenia, and probably elsewhere, will re-

Dalibor Stanimirović
Radivoje Pribaković Brinovec

MANAGEMENT OF HEALTH CARE WORKFORCE: CONCEPTUALIZING A STRUCTURAL MODEL OF
HUMAN RESOURCE PLANNING IN HEALTHCARE IN SLOVENIA

quire a feasible strategy, well-coordinated actions in the national healthcare ecosystem, an efficient digital infrastructure, a sufficient number of competent domain experts, and, of course, an appropriate normative framework and sufficient funding. Without policy commitment and a wide-ranging approach, such failed projects can lead to long-lasting setbacks, which could seriously threaten patients' access to healthcare services and undermine all efforts to achieve public health goals in the country.

REFERENCES

1. An, X., Xiao, L., Yang, X., Tang, X., Lai, F., & Liang, X. H. (2022). Economic burden of public health care and hospitalisation associated with COVID-19 in China. *Public Health*, *203*, 65-74. https://doi.org/10.1016/j.puhe.2021.12.001

2. Asamani, J. A., Christmals, C. D., & Reitsma, G. M. (2021). The needs-based health workforce planning method: a systematic scoping review of analytical applications. *Health Policy and Planning*, *36*(8), 1325-1343. https://doi.org/10.1093/heapol/czab022

3. Astolfi, R., Lorenzoni, L., & Oderkirk, J. (2012). Informing policy makers about future health spending: a comparative analysis of forecasting methods in OECD countries. *Health Policy*, *107*(1), 1-10. https://doi.org/10.1016/j.healthpol.2012.05.001

4. Behera, B. K., Bhatia, V., Giri, P. P., & Taywade, M. (2020). How healthy is our primary health care workforce? A cross-sectional study. *Journal of family medicine and primary care*, *9*(10), 5212-5217. https://doi.org/10.4103/jfmpc.jfmpc_769_20

5. Brennen, B. S. (2021). *Qualitative research methods for media studies*. Milton Park, Abingdon: Routledge.

6. Chambers, A. C., Dixon, S. W., White, P., Williams, A. C., Thomas, M. G., & Messenger, D. E. (2020). Demographic trends in the incidence of young-on-set colorectal cancer: a population-based study. *The British journal of surgery*, *107*(5), 595-605. https://doi.org/10.1002/bjs.11486

7. Chang B. P. (2022). The Health Care Workforce Under Stress-Clinician Heal Thyself. *JAMA network open*, *5*(1), e2143167. https://doi.org/10.1001/jamanetworkopen.2021.43167

8. Cleland, J., Porteous, T., Ejebu, O. Z., & Skåtun, D. (2020). 'Should I stay or should I go now?': A qualitative study of why UK doctors retire. *Medical education*, *54*(9), 821-831. https://doi.org/10.1111/medu.14157

9. Coates, A., Fuad, A. O., Hodgson, A., & Bourgeault, I. L. (2021). Health workforce strategies in response to major health events: a rapid scoping review with lessons learned for the response to the COVID-19 pandemic. *Human resources for health*, *19*(1), 154. https://doi.org/10.1186/s12960-021-00698-6

10. de la Maisonneuve, C., & Oliveira Martins, J. (2013). *A Projection Method for Public Health and Long-Term Care Expenditures*. OECD Economics Department Working Papers, No. 1048. Paris: OECD Publishing.

11. De Ramón Fernández, A., Ruiz Fernández, D.,

& Sabuco García, Y. (2020). Business Process Management for optimizing clinical processes: A systematic literature review. *Health informatics journal*, *26*(2), 1305-1320. https://doi.org/10.1177/1460458219877092

12. Dow, A. W., DiPiro, J. T., Giddens, J., Buckley, P., & Santen, S. A. (2020). Emerging From the COVID-19 Crisis With a Stronger Health Care Workforce. *Academic medicine: Journal of the Association of American Medical Colleges*, *95*(12), 1823-1826. https://doi.org/10.1097/ACM.0000000000003656

13. Duong, N. E., Kim, D., Hernandez, F. A., Heizman, L. M., Zahn, J., Ball, T., & Stathakos, K. (2021). Value-Based Pay-for-Performance Gaps in the Care Delivery Framework for a Large-Scale Health System. *Population health management*, *24*(6), 691-698. https://doi.org/10.1089/pop.2021.0024

14. European Commission (2008). *Green paper on the European Workforce for Health*. Brussels: European Commission.

15. European Commission (2012). *Commission staff working document on an Action Plan for the EU Health Workforce*. Brussels: European Commission.

16. European Commission (2014). *European Union Joint Action on Health Workforce Planning and Forecasting. Minimum planning data requirements for health workforce planning*. Brussels: European Commission.

17. Excler, J. L., Saville, M., Berkley, S., & Kim, J. H. (2021). Vaccine development for emerging infectious diseases. *Nature medicine*, *27*(4), 591-600. https://doi.org/10.1038/s41591-021-01301-0

18. Foley, K. T., & Luz, C. C. (2021). Retooling the Health Care Workforce for an Aging America: A Current Perspective. *The Gerontologist*, *61*(4), 487-496. https://doi.org/10.1093/geront/gnaa163

19. Fraher, E. P., Pittman, P., Frogner, B. K., Spetz, J., Moore, J., Beck, A. J., Armstrong, D., & Buerhaus, P. I. (2020). Ensuring and Sustaining a Pandemic Workforce. *The New England journal of medicine*, *382*(23), 2181-2183. https://doi.org/10.1056/NEJMp2006376

20. Galanis, G., & Hanieh, A. (2021). Incorporating social determinants of health into modelling of COVID-19 and other infectious diseases: A baseline socioeconomic compartmental model. *Soc Sci Med*, *274*, 113794. https://doi.org/10.1016/j.socscimed.2021.113794

21. Gerchow, L., Burka, L. R., Miner, S., & Squires, A. (2021). Language barriers between nurses and patients: A scoping review. *Patient education and counseling*, *104*(3), 534-553. https://doi.org/10.1016/j.pec.2020.09.017

22. Getzen, T. E., & Kobernick, M. S. (2022). *Health economics and financing*. Hoboken, NJ: John Wiley & Sons.

23. Gori, T., & Rakhimov, K. (2020). How to re-style your life. *Eur J Prev Cardiol*, *27*(4), 391-393. https://doi.org/10.1177/2047487319876232

24. Gorman, D. (2015). Developing health care workforces for uncertain futures. *Acad Med*, *90*(4), 400-403. https://doi.org/10.1097/ACM.0000000000000644

25. Health Care Databases Act. *Data Collection IVZ 68*. Ljubljana: Official Gazette of the Republic of Slovenia, no. 65/2000, 47/2015, 31/2018.

26. Health Care Databases Act. Ljubljana: Official Gazette of the Republic of Slovenia, no. 65/2000, 47/2015, 31/2018.

27. Healthcare Databases Act. *Data Collection IVZ 16*. Ljubljana: Official Gazette of the Republic of Slovenia, no. 65/2000, 47/2015, 31/2018.

28. Hu, W., Lavieri, M. S., Toriello, A., & Liu, X. (2016). Strategic health workforce planning. *IIE Transactions*, *48*(12), 1127-1138. https://doi.org/10.1080/0740817X.2016.1204488

29. Karahanna, E., Chen, A., Liu, Q. B., & Serrano, C. (2019). Capitalizing on health information technology to enable digital advantage in US hospitals. *MIS Quarterly*, *43*(1), 113-140. https://doi.org/10.25300/MISQ/2019/12743

30. Köhler, T., Smith, A., & Bhakoo, V. (2022). Templates in qualitative research methods: Origins, limitations, and new directions. *Organizational Research Methods*, *25*(2), 183-210. https://doi.org/10.1177/1094428121060710

31. LaMarre, A., & Chamberlain, K. (2022). Innovating qualitative research methods: Proposals and possibilities. *Methods in Psychology*, *6*, 100083. https://doi.org/10.1016/j.metip.2021.100083

32. Laukkanen M. O. (2021). Return of Communicable Diseases as a Result of Antibiotic Resistance?. *Antioxidants & redox signaling*, *34*(6), 439-441. https://doi.org/10.1089/ars.2020.8189

33. Lindgren, B. M., Lundman, B., & Graneheim, U. H. (2020). Abstraction and interpretation during the qualitative content analysis process. *Int J Nurs Stud*, *108*, 103632. https://doi.org/10.1016/j.ijnurstu.2020.103632

34. Lipstein, S. H., & Kellermann, A. L. (2016). Workforce for 21st-Century Health and Health Care. *JAMA*, *316*(16), 1665-1666. https://doi.org/10.1001/jama.2016.13715

35. Liu, J. X., Goryakin, Y., Maeda, A., Bruckner, T., & Scheffler, R. (2017). Global Health Workforce Labor Market Projections for 2030. *Human resources for health*, *15*(1), 11. https://doi.org/10.1186/s12960-017-0187-2

36. Mantler, J., Godin, J., Cameron, S. J., & Horsburgh,

40

Dalibor Stanimirović
Radivoje Pribaković Brinovec

MANAGEMENT OF HEALTH CARE WORKFORCE: CONCEPTUALIZING A STRUCTURAL MODEL OF
HUMAN RESOURCE PLANNING IN HEALTHCARE IN SLOVENIA

M. E. (2015). Cynicism in hospital staff nurses: the effect of intention to leave and job change over time. *Journal of nursing management*, *23*(5), 577-587. https://doi.org/10.1111/jonm.12183

37. Medical Services Act. Ljubljana: Official Gazette of the Republic of Slovenia, no. 72/2006.

38. Mestna občina Nova Gorica (2022). *Akutna kadrovska problematika v zdravstvu*. Mestna občina Nova Gorica**.**

39. Ministry of Health (2016). *Resolution on the National Health Care Plan 2016–2025*. Ljubljana: Ministry of Health of the Republic of Slovenia.

40. Mohajan, H. K. (2018). Qualitative research methodology in social sciences and related subjects. *Journal of Economic Development, Environment and People*, *7*(1), 23-48. https://doi.org/10.26458/jedep.v7i1.571

41. Mok, C., Boneham, W., & Lennon, M. J. (2020). A 'healthy' health care workforce: Insights into satisfaction and retention of doctors. *Medical education*, *54*(9), 781-783. https://doi.org/10.1111/medu.14269

42. Montemurro, N., Condino, S., Carbone, M., Cattari, N., D'Amato, R., Cutolo, F., & Ferrari, V. (2022). Brain Tumor and Augmented Reality: New Technologies for the Future. *International journal of environmental research and public health*, *19*(10), 6347. https://doi.org/10.3390/ijerph19106347

43. National Institute of Public Health (2020). *Health Statistical Yearbook 2020*. Ljubljana: NIJZ.

44. National Institute of Public Health (2022). *Healthcare providers 2022*. Ljubljana: NIJZ.

45. Nazeha, N., Pavagadhi, D., Kyaw, B. M., Car, J., Jimenez, G., & Tudor Car, L. (2020). A Digitally Competent Health Workforce: Scoping Review of Educational Frameworks. *Journal of medical Internet research*, *22*(11), e22706. https://doi.org/10.2196/22706

46. O'Dell, B., Stevens, K., Tomlinson, A., Singh, I., & Cipriani, A. (2022). Building trust in artificial intelligence and new technologies in mental health. *Evidence-based mental health*, *25*(2), 45-46. https://doi.org/10.1136/ebmental-2022-300489

47. Pendrey, C. G., Quilty, S., Gruen, R. L., Weeramanthri, T., & Lucas, R. M. (2021). Is climate change exacerbating healthcare workforce shortages for underserved populations? *The Lancet. Planetary health*, *5*(4), e183-e184. https://doi.org/10.1016/S2542-5196(21)00028-0

48. Rees, G. H., Crampton, P., Gauld, R., & MacDonell, S. (2020). Rethinking workforce planning for integrated care: using scenario analysis to facilitate policy development. *BMC health services research*, *20*(1), 429. https://doi.org/10.1186/s12913-020-05304-4

49. Renjith, V., Yesodharan, R., Noronha, J. A., Ladd, E., & George, A. (2021). Qualitative Methods in Health Care Research. *International journal of preventive medicine*, *12*, 20. https://doi.org/10.4103/ijpvm.IJPVM_321_19

50. Rules on the register and licences of nursing and midwifery providers. Ljubljana: Official Gazette of the Republic of Slovenia, no. 3/2016, 62/2016, 152/2020.

51. Sangji, N. F., & Telem, D. (2020). Time to end the secrecy: Publish salaries to narrow the gender-based wage gap in surgery. *American journal of surgery*, *220*(2), 254-255. https://doi.org/10.1016/j.amjsurg.2020.04.001

52. Scheffler, R. M., Campbell, J., Cometto, G., Maeda, A., Liu, J., Bruckner, T. A., Arnold, D. R., & Evans, T. (2018). Forecasting imbalances in the global health labor market and devising policy responses. *Human resources for health*, *16*(1), 5. https://doi.org/10.1186/s12960-017-0264-6

53. Segal, L., & Bolton, T. (2009). Issues facing the future health care workforce: the importance of demand modelling. *Aust New Zealand Health Policy*, *6*, 12. https://doi.org/10.1186/1743-8462-6-12

54. Sheldon G. F. (2006). Globalization and the health workforce shortage. *Surgery*, *140*(3), 354-358. https://doi.org/10.1016/j.surg.2006.06.012

55. Shiffman, J., & Shawar, Y. R. (2022). Framing and the formation of global health priorities. *Lancet*, *399*(10339), 1977-1990. https://doi.org/10.1016/S0140-6736(22)00584-0

56. Sinisammal, J., Leviäkangas, P., Autio, T., & Hyrkäs, E. (2016). Entrepreneurs ' perspective on public-private partnership in health care and social services. *Journal of health organization and management*, *30*(1), 174-191. https://doi.org/10.1108/JHOM-02-2014-0039

57. Smith, S. E., Huang, W., Tiamani, K., Unterer, M., Khan Mirzaei, M., & Deng, L. (2022). Emerging technologies in the study of the virome. *Current opinion in virology*, *54*, 101231. https://doi.org/10.1016/j.coviro.2022.101231

58. Statistical Office of the Republic of Slovenia (2019). *EUROPOP2019 population projections for Slovenia*. Ljubljana: SURS.

59. Statistical Office of the Republic of Slovenia (2022). *Health and healthcare*. Ljubljana: SURS.

60. Terhune, K. P., Joshi, A., & Choi, J. (2020). Career advancement in surgical education. *Surgery*, *167*(6), 899-902. https://doi.org/10.1016/j.surg.2019.07.036

61. Thomas, G. (2021). *How to do your case study*. Thousand Oaks, CA: Sage Publications.

62. Tudor Car, L., Poon, S., Kyaw, B. M., Cook, D. A., Ward, V., Atun, R., Majeed, A., Johnston, J., van der Kleij, R., Molokhia, M., V Wangenheim, F., Lup-

ton, M., Chavannes, N., Ajuebor, O., Prober, C. G., & Car, J. (2022). Digital Education for Health Professionals: An Evidence Map, Conceptual Framework, and Research Agenda. *Journal of medical Internet research*, *24*(3), e31977. https://doi.org/10.2196/31977

63. University Medical Centre Ljubljana (2020). *Annual Report 2020*. Ljubljana: UMCL.

64. Valdmanis, V., DeNicola, A., & Bernet, P. (2015). Public health capacity in the provision of health care services. *Health care management science*, *18*(4), 475-482. https://doi.org/10.1007/s10729-014-9277-z

65. Viegi, G., Maio, S., Fasola, S., & Baldacci, S. (2020). Global Burden of Chronic Respiratory Diseases. *Journal of aerosol medicine and pulmonary drug delivery*, *33*(4), 171-177. https://doi.org/10.1089/jamp.2019.1576

66. Viher Hrženjak, V., Kukec, A., Eržen, I., & Stanimirović, D. (2020). Effects of Ultrafine Particles in Ambient Air on Primary Health Care Consultations for Diabetes in Children and Elderly Population in Ljubljana, Slovenia: A 5-Year Time-Trend Study. *Int. J. Environ. Res. Public Health*, *17*(14), 4970. https://doi.org/10.3390/ijerph17144970

67. World Health Organization - WHO (2021). *Critical preparedness, readiness and response actions for COVID-19*. Interim guidance. Geneva, Switzerland: World Health Organization.

68. Wu, H., Li, S., Zheng, J., & Guo, J. (2020). Medical students' motivation and academic performance: the mediating roles of self-efficacy and learning engagement. *Medical education online*, *25*(1), 1742964. https://doi.org/10.1080/10872981.2020.1742964

69. Yin, R. K. (2017). *Case study research and applications: Design and methods*. Thousand Oaks, CA: Sage Publications.

70. Zerpa, O. (2020). Migration of doctors and keys to success. *Clinics in dermatology*, *38*(5), 523-528. https://doi.org/10.1016/j.clindermatol.2020.05.007

71. Zhao, J., Zhang, Y., Ding, Y., Yu, Q., & Hu, M. (2022). A novel in-depth analysis approach for domain-specific problems based on multidomain data. *Information Sciences*, *588*, 142-158. https://doi.org/10.1016/j.ins.2021.12.013

Dalibor Stanimirović
Radivoje Pribaković Brinovec

UPRAVLJANJE RADNOM SNAGOM U ZDRAVSTVU: KONCEPTUALIZACIJA
STRUKTURNOG MODELA PLANIRANJA LJUDSKIH RESURSA U ZDRAVSTVU
U SLOVENIJI

SAŽETAK

Učinkovitost zdravstvenog sustava uveliko ovisi o znanju, vještinama i motivaciji zdravstvenih radnika, što je posebno došlo do izražaja tijekom pandemije COVID-a-19. Sustavno planiranje ljudskih resursa stoga je važan uvjet za osiguranje održivosti i učinkovitosti zdravstvenog sustava. Ovaj se rad usredotočuje na prezentaciju strukturnog modela planiranja ljudskih resursa u zdravstvu i istraživanje povezanih čimbenika njegove kompleksnosti. Predlaže se okvir za dubinsku analizu, koji se temelji na različitim izvorima i dokazima, kako bi se utvrdili čimbenici, koji utječu na planiranje ljudskih resursa u zdravstvu. Kako bi se postigla veća vjerodostojnost rezultata istraživanja, dubinski analitički proces uključuje opsežan pregled literature i istraživanje brojnih izvora i dokumenata, kako u nacionalnom tako i u međunarodnom kontekstu. Svrha inicijativa za planiranje ljudskih resursa u zdravstvu je izračunati potreban broj zdravstvenih radnika u budućnosti, na temelju prošlih i sadašnjih podataka te na temelju pretpostavki o budućim trendovima ponude i potražnje. Rezultati istraživanja otkrivaju da je to vrlo izazovan zadatak. Naime, u budućem planiranju obično postoji mnogo nepoznanica, a osim toga, plansko se osoblje često suočava s nedostatkom pouzdanih podataka i nedostacima na razini sustava. Nadalje, rad ukazuje da neplanirana i zakašnjela rješenja za potrebe ljudskih resursa u zdravstvu mogu samo ublažiti probleme, ali nikako ne mogu zamijeniti učinkovite strateške mjere i pravovremene strukturne promjene unutar zdravstvenog ekosustava.

KLJUČNE RIJEČI: *upravljanje ljudskim resursima, zdravstveni sustav, strukturni model, planiranje, zdravstvena radna snaga, analiza, Slovenija*