

# Distribution of Selected Health Technology in Regions of Slovakia

**Beata Gavurova**

*Technical University of Košice, Slovakia*

**Matus Kubak**

*Technical University of Kosice, Slovakia*

## INTRODUCTION

Demographic aging processes in the countries have a major impact on the financial sustainability of healthcare systems. In Slovakia, as in many other countries, the proportion of the economically inactive population is increasing. The financial sustainability of the health system is very sensitive not only to aging society, but also to economic shocks. Demographic shift - increasing the share of the economically inactive population causes wage-dependent premiums to fall, while health spending may increase due to higher healthcare costs for older citizens. Therefore, the resilience and sustainability of the health system need to be ensured on an ongoing basis and prepared for changes in demographic structures in the countries. Attention is drawn to the role of ensuring more efficient use of available resources, and also maximizing health and well-being of the population (Dlouhý, 2009; Fragkiadakis et al., 2016). The health system's performance consists of three components: efficiency, availability and resilience. These three economic categories are also influenced by the distribution of medical devices and equipment, both by the quality of satisfaction of medical needs, by geographical availability and by the cost - the degree of financial burden on the health system. However, only few research studies deal with the issue of regional disparities in the use of selected medical technology. It is especially caused by problematic access to the data base, as well as insufficient attention to examining the impact of prevention programs on the effectiveness of the health system and their connectivity to early diagnosis and treatment. These facts present the main cause for executing this study. It aims in investigating regional disparities in the use of magnetic resonance imaging (MRI) in Slovakia during the years of 2008 – 2017, and their importance for assessing the availability and quality of healthcare in the Slovak health system.

## BACKGROUND

Many foreign research studies examine the use and distribution of health technology in the regions of their country to explore different aspects of health care systems. Some research studies investigate health technology as a subject of a research, other than as a part of the methods in which they act as variables. As early as 1988, Stephan (1988) conducted a number of technology assessments in his study to help policy makers in decision making. The author states that despite the efforts, a certain degree of uncertainty in the assessment of health technology will always persist, so decision-makers must also accept the level of arbitrariness. Many authors have examined the distribution of health technology to ensure equal access to healthcare and eliminate regional disparities in their studies. Xing and Dyama (2016)

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explored the burden of local public hospitals and their impact on the health care system. They identify a number of issues related to higher quality of healthcare and also the connection to technological innovation. Winchester and King (2018) analyse an uneven approach to healthcare in their study, declaring that decentralization cannot resolve this uneven approach in the country. Seymour et al. (2006) examined geographical aspects of imaging diagnostic equipment (IDE) for stroke suspected patients in Scotland. They used geographic information systems and analysed the availability of these health services. The authors point to the limited availability of stroke scanning services during weekends in the individual regions, and identify a number of recommendations for health policy makers. The macroeconomic view of this issue was the result of a study by Suzuki et al. (2018). Their study examined and analysed the relationship between the economic conditions of the OECD member countries and available resources in the health systems. The authors primarily focused on exploring the factors of implementation and use of the IDE. Altogether, 29 countries were classified into four groups according to medical environment and economic indicators. The number of hospital beds has been shown to have the greatest impact on CT and MRI numbers. The authors also plan to clarify other factors influencing the implementation and use of the IDEs by investigating high-growth medical equipment market. One of the causes of regional disparities in implementing of new IDEs may be an increasing complexity of health technologies. Also, it is proved by the results of Liljegren et al. (2006) study. The authors analyse the reasons of all the obstacles in implementing complex IDEs and look for appropriate methods to monitor these reasons. Marinic and Varga (2016) analysed diagnostic procedures and equipment for healthcare facilities in the context of the use of human resources in specialized fields: anesthesiology, gastroenterology, neurosurgery, pathology, microbiology, electrophysiology, neurology and cardiology. Data for analysis were obtained from all hospitals in Croatia in 2013 and the results were compared with available international recommendations. The results of the analyses pointed to significant differences between Croatian hospitals as well as international standards in Cost Utilization. The study has brought many implications to health policy. The research of organisational impact in the field of medical devices was researched by Roussel et al. (2016). Health Technology Assessment (HTA) is a rapidly developing area. Non-clinical areas have also been assessed in recent years. The authors emphasize the health-economic aspect, which has been the most prominent in the assessment of health technologies, while the organisational impact assessment has hardly been explored. Shah et al. (2015) investigated in their study an availability of health technology in particular types of healthcare - in injuries in Nepal. Their aim was to identify the factors causing regional disparities in the availability of health technology. The authors propose solutions to be cost effective and sustainable, linking them to an optimal planning process. The methodological aspect in relation to the use of health technology is examined in the study of, e.g. de Moraes et al. (2010). The authors investigated whether the Multicriteria Decision Aid methodology supports the creation of performance benchmarks within health technology processes. Also, the authors emphasize the need for multidisciplinary cooperation in the field of healthcare as well as cooperation between the different levels of management: operational and strategic. As authors state, the assessment of health technologies may only be successful with a multidisciplinary team approach. Similarly, the economic categories frequently appear in the studies as the target aspects of the IDE's research and use besides the technological processes. For instance, Wei et al. (2018) studied the relationship between hospital efficacy, and CT and Magnetic Resonance Imaging (MRI) in their study. They selected a random sample of 131 hospitals in China and conducted a questionnaire survey. Hospital efficiencies were measured by SFA, and subsequently planned to use DEA. A sample of hospitals was not chosen equally from a geographical perspective. The study also did not analyse inappropriate and appropriate use of CT and MRI, which the authors also report as a limitation of their study. Many authors used medical equipment

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