VALUE IN HEALTH REGIONAL ISSUES 19 (2019) 92–98

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/vhri

Health Policy Analysis

Structural Changes in the Hungarian Healthcare System Between 2000 and 2017

Csaba Dózsa, MSc, PhD [1,2,*], *Katalin Jankus, MSc* [2,3], *Timea Mariann Helter, MSc, MSc, MRes* [4]

[1]*Faculty of Health Care, University of Miskolc, Hungary;* [2]*Med-Econ Human Service Ltd, Hungary;* [3]*National Institute of Neurosciences, Budapest, Hungary;* [4]*Department of Health Economics, Medical University of Vienna, Austria*

ABSTRACT

Background: The rigid and old-fashioned structure of the Hungarian healthcare system has been discussed since the mid-1990s and is at the center of professional and policy debates. It is characterized by the too high number of acute care hospital beds in international comparison; access is regionally unequal; levels of progressive care are mixed; and there is a nonuniform emergency service system with unequal access to the emergency room, heterogeneous quality of care, and unexploited opportunities of modern health technology (eg, 1-day surgery, minimally invasive procedures, telemedicine). **Objectives:** The aim of this study is to analyze the indicators of ongoing structural changes of the Hungarian healthcare system between 2000 and 2017. **Methods:** Data are derived from the Organisation for Economic Co-operation and Development Heath Statistics, Hungarian National Statistical Office, National Health Insurance Fund Administration and the database of the European Structural Funds. The methods used for the analysis are descriptive statistics, trend analysis, and longitudinal data. **Results:** The total number of hospitals beds showed a 32% reduction between 2005 and 2017. Parallel with this subsequent reduction of hospital bed capacities, we can see a moderate reduction (22.3%) in the number of discharged patients from hospitals: from 2005 to 2017, 2.55 million to 1.95 million. The average length of stay in acute hospital care has decreased from 6.3 to 5.1 days. About 25 to 27 small local hospitals lost their acute or short-term care profile (mainly intensive care units, internal medicine, surgery, and pediatric care wards) and became long-term care, chronic care, or rehabilitation profile hospitals. **Conclusion:** Structural change is in progress in the Hungarian healthcare system, and some efficiency gains have been reached. Nevertheless, still there are significant potential efficiency gains in the better organization and management of health services in addition to the dissemination and better incorporation of modern healthcare technologies.

Keywords: hospital capacity, hungary, indicators, structural change.

Introduction: The Contextual Framework of Structural Changes in the Healthcare System

During the last decade, European healthcare systems (HCSs) have been challenged by aging societies, decreasing fertility rates, growing need for long-term care for older people, and the increasing number of chronic illnesses. Moreover, pharmaceutical, medical, surgical, and diagnostic technologies have been rapidly developing and thereby broadening opportunities for minimally invasive treatments, 1-day surgery, ambulance care, and telemedicine. Meanwhile, the HCSs are facing a significant shortage of human resources (mainly general practitioners and nurses) and governments are implementing effective cost-containment policies.[1] The effective management of these problems, in our view, will require deep structural changes in the HCSs.

Dissemination materials of international organizations (World Health Organization, Organisation for Economic Co-operation and Development [OECD] reports and European Observatory on Health Systems and Policies series) regularly deal with the structural problems and efficient allocation of public resources. On one hand, health policy analysts and researchers state that HCSs with strong primary care are "associated with better population health, lower rates of unnecessary hospitalizations and relatively lower socioeconomic inequality,"[2] and moreover appear to be better able to control costs.[3]

On the other hand, since the early 2000s the World Bank (WB) developed and implemented comprehensive methods for hospital

Conflict of interest: The authors have indicated that they have no conflicts of interest with regard to the content of this article.

* Address correspondence to: Csaba Dózsa, MSc, PhD, Faculty of Health Care, University of Miskolc, 3515 Miskolc-Egyetemváros, Hungary.

Email: csaba.dozsa@invitel.hu

2212-1099/$36.00 - see front matter © 2019 ISPOR–The professional society for health economics and outcomes research. Published by Elsevier Inc.

https://doi.org/10.1016/j.vhri.2019.05.002

Table 1 – Structural change indicators at 3 levels and 4 dimensions.

Levels of care Dimensions of structure	I. Marco level National or federal level	II. Mezzo level Regional or county as territorial level	III. Micro level Institutional, organizational level
(1) Capacities infrastructure	Acute (STC) beds /total number of beds Number of hospitals, other health facilities Technology changes (eg, number of invasive cardiac centers	Regional or county distribution of STC and LTC capacities between hospitals Share of work of local/ county hospitals N. of integrations, fusions	Concentration of blocks and pavilion system; new wards less inpatient more outpatient services Better inner organization like matrixes
(2) Utilization flow of patients	Development of primary care/secondary care cases proportion, ODS cases, home healthcare cases, telemedicine services, etc.	Changes of the flow of patients between hospitals, outpatient care centers, home care Per-capita spending by regions, counties	Number of outpatient, ODS, inpatient cases within hospitals Number of screened cases, etc.
(3) Financing—allocation flow of money	Changes of allocation between different health settings, forms of care: primary, secondary, tertiary; inpatient, outpatient Funds for prevention, health promotion	Distribution of public financing among local, county, and national health organizations, between different forms of care at regional or county level	Distribution of yearly budget between different settings, main activities, and wards of healthcare organizations
(4) Structure of human resources, healthcare workforce	Total number of physicians and a ratio/1000 habitants Number of GPs and ratio/1000 habitants Doctor-to-nurse ratio Rearrangement and number of professionals in developing areas (eg, home care, rehabilitation, emergency care)	Number and distribution of HR, physicians, nurses between inpatient, outpatient, home care, primary care facilities within the regions, counties	Number of shifts Changes of inner organizational distribution of HR between different professions (ER, ICU, manual, internal professions, prevention, etc.)
(4 + 1) Outcome—efficiency gains	Increasing life expectancy Reducing mortality rates Patient satisfaction Reducing practice variations	Equal access to care according to established standards Shorter patient pathways	• Nosocomial infection rate • Short term mortality rate • Readmission rate because of complication • Patient satisfaction

ER indicates emergency room; HR, human resources; ICU, intensive care unit; LTC, long-term care; ODS, one-day surgery; STC, short-term care.

restructuring in the form of long-term master plans (the best examples are Estonia, Latvia, and Austria).[4,5] The so-called master plans deal with the restructuring and modernization of mainly the hospital sector in several countries in Europe (including former Soviet countries) to achieve a more concentrated and more efficient structure.[6] The Observatory also analyzed the effects of the economic crises[7] in 19 countries and highlighted the importance of hospital restructuring, closures, reduction of beds, fusions, and concentration (eg, Belgium, Bulgaria, Portugal, Hungary). According to Saltman, the structural change is not only about creating a new organizational structure, but also about learning new ways of doing things, creating new routines, and implementing new values.[8]

We highlight that the rigid and old-fashioned structure of the Hungarian HCS has been discussed since the mid-1990s and is at the center of professional and policy debates. Health policy experts have expressed a number of criticisms related to the structure and efficiency of the Hungarian HCS.[9–15] It is characterized by the too high number of acute care hospital beds in international comparison; access is regionally unequal; levels of progressive care are mixed; and there is a nonuniform emergency service system with unequal access to the emergency room (ER), heterogeneous quality of care, and unexploited opportunities of modern health technology (eg, 1-day surgery, minimally invasive procedures, telemedicine).

Regardless of these problems during the last decade, the former Hungarian governments did not require the elaboration of such a professional master plan supported by the WB. Finally, a top-down midterm strategic plan was elaborated and implemented from 2006 with the financial aid of European Structural Funds to support the development of health system priority disease areas—including hospital infrastructure, equipment, technology, and human resources.[11,16,17] In 2011, a new constitution entered into force by the conservative leading parties, and as a consequence the Hungarian healthcare system partly moved toward a state-based National Health Service; meanwhile, it has preserved some important elements of the former Bismarckian compulsory health insurance scheme. Since the approach and method of the hospital structural reform had not been modified after the changes of this political and regulatory framework, the main aims of this study are still to develop a set of indicators that enable the analysis of ongoing structural changes and to test the indicator set in the case of the Hungarian HCS between 2000 and 2017.

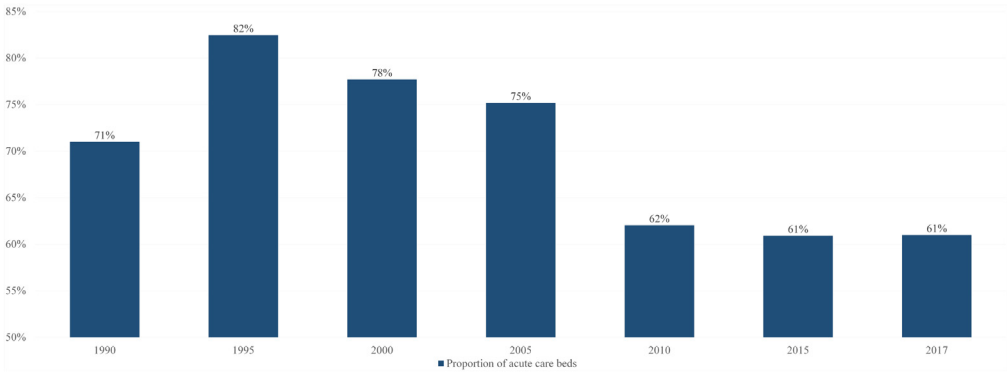

Fig. 1 – Hospital beds in acute care per 1000 population, 2000 and 2015 (source: Organisation for Economic Co-operation and Development).

Data and Methods

Data were derived from OECD Heath Statistics, Hungarian National Statistical Office, National Health Insurance Fund Administration, which is the only healthcare financing agency in Hungary and the database of the European Structural Fund. The analysis methods were mainly based on descriptive statistics and trend analysis.

According to financially and administratively distinguished levels of HCSs,[18,19] the structural change was defined in multiple levels and dimensions: (I) macro level—national level; (II) mezzo level—regional-county level; and (III) micro level (level of institutions). The structural change was also defined at 4 + 1 different dimensions, including (1) service capacity and infrastructure, (2) utilization (patient flow), (3) financing (allocation of resources), (4) human resources, and (4 + 1) outcome, quality improvements.[11] The selected indicators used in this analysis related to the structural change are shown in Table 1 during the period from 2000 or 2008 to 2015 or 2017. Based on the aforementioned structural change approach, this study makes an attempt to test and present the results of some of these structural indicators.

Results

This analysis focuses on some priority areas such as the development of the number of hospital beds, the proportion of acute care beds to total number of beds, the structural and organizational changes of hospitals and their physical infrastructure in territorial context, the number of 1-day surgery procedures, the development of home healthcare, and some figures about human resources of HCS.

Hospital Beds as a Capacity Measure at the Macro Level: The Proportion of Acute Care Beds From Total Number of Hospital Beds

This indicator in level I and dimension 1 provides a measure of the resources available for delivering services to inpatients in hospitals in number of beds.[20–22] Hospital beds include all beds that are regularly maintained and publicly financed, in other words, they include beds in general hospitals; clinics; mental health, hospice, and substance abuse hospitals; and other specialty hospitals.[23,24] Beds in nursing and residential care facilities that belong to the social sector were excluded. A limitation of this indicator is the lack of ability to reflect and incorporate in the technology content of these capacities (eg, the number and proportion of intensive care unit [ICU] and postoperative beds, ER beds).

Since 2000, the number of hospital beds per population has generally decreased in all European Union (EU) countries, sometimes at a rapid pace. On average across EU member states, the number fell from 6.7 beds per 1000 population in 2000 to 5.2 in 2015, a reduction of over 20% on a per-capita basis (Fig. 1). Spain and Sweden recorded the lowest number of hospital beds relative to their population size. In 2014, Germany and Austria still had the highest number of hospital beds (in acute care) per capita, with around 6 beds per 1000 population, and these countries could reduce this rate with a much lower proportion than Hungary could (Fig. 2). Although Hungary had one of the highest ratios of acute care (short-term care) beds at the beginning of the period, the country moved toward the average of EU countries (from 6.2 beds to 4.3 beds per 1000 population) by 2015.

Long-term strategic planning is a common international practice, including the so-called master-plans implementation. Since the mid-1990s, the main focus of Hungarian health policy programs and interventions has been the cost-effective reduction and concentration of the previously expanded short-term care capacities and the timely implementation of missing nursing homes and rehabilitation capacities. The following figure (Fig. 2) shows the changes of acute care to total hospital bed numbers ratio from the transitional year.

A necessary reduction in capacities and a commencement of transformation to chronic care was generated by an unsustainable system and lack of incentives for the provision of high-quality services.[12,25] The total number of hospitals[26] is still relatively high despite the 7.7% reduction (182 in 2005, 168 to 2016). Hungary has achieved a significant decrease in the number of acute care hospital beds from 60 000 to 41 500 from 2005 to 2015. During the hospital reforms in 2007, the proportion of acute care beds from all hospital beds decreased from 75% to 62%.[10] The bed reduction and capacity-setting act proposed by Lajos Molnár in 2006 was preceded by a 2-year deep economic and health policy analysis about the excessive hospital structure and the huge proportion of unnecessary hospital admissions. Nevertheless, this governmental measure had not been withdrawn after 2010 with the changes of the leading political parties, but rather continued at a different pace. A further 5% bed reduction was carried out by the Fidesz government in 2012. Moreover, all of the structural change elements were continued by the conservative government in the frame of EU-funded projects (mainly within the Social Infrastructure Operational Program 2.2.6), and the currently ongoing Healthy Budapest Program applies the same approach to

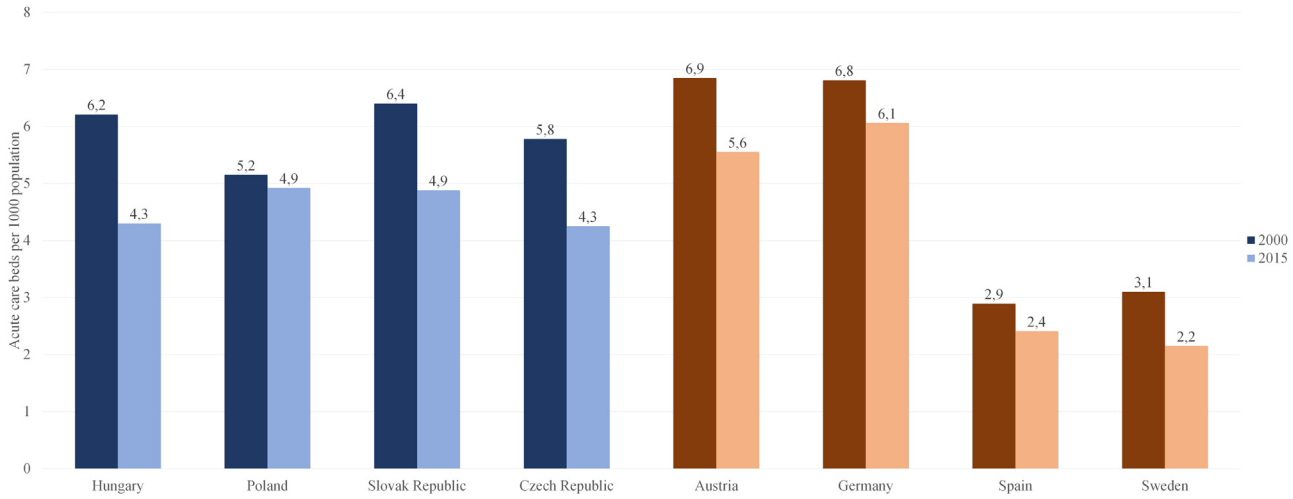

Fig. 2 – Changes in the proportion of acute care beds compared with the total number of beds in Hungary, between 1990 and 2017 (source: National Health Insurance Fund Administration).

structural change as the formerly implemented projects (Social Infrastructure Operational Program 2.2.4., 2.2.7.) in the 6 rural convergence regions.[16]

A lower decrease could be observed in the reduction in the number of discharged patients from hospitals: 22.3% from 2005 to 2016, from 2.55 million to 1.95 million patients (meanwhile, the Hungarian population has decreased by 3.5%). Analogously, the average length of stay in acute care has decreased from 6.3 to 5.1 days, representing an important improvement in the technical efficiency of the sector. Nevertheless, the rather low occupancy rate (69%-72%) suggests that additional efficiency gains could be explored.

Structural Change at Mezzo Level in Hospital Infrastructure Dimension

At the territorial level (level II) in dimension 1 as capacities and infrastructure, the related indicator is the level of integration and number of hospitals. The regional structure could be changed by mergers of healthcare institutions and partial assimilation of smaller health institutes into bigger centers. The number of integrated inpatient care centers has doubled during the last 10 years.[10] Nowadays, most counties are covered by 1 single large integrated healthcare center, 1 to 2 further specialized hospitals, and few outpatient care centers.

Within the EU Structural Fund supported hospital investments,[25–27] small local hospitals lost their acute or short-term care profile (mainly ICU, internal medicine, surgery, pediatric care wards) and became long-term care, chronic care, or rehabilitation profile hospitals between 2005 and 2013 (representing around 5.2% of the total hospital bed capacities).

Development of 1-Day Surgery in Hungary

During the past few decades, the number of surgical procedures carried out on a 1-day basis has increased rapidly. Innovations, such as advancement in medical technologies, particularly the diffusion of less-invasive surgical interventions, better anesthetics, and a faster recovery period, have provided bigger safety and more health outcomes for the patient and significantly reduced the cost of each intervention.[27] In Hungary, 1-day surgery within the hospital performance was exempted from the performance volume limit in 2015, but it has not brought the expected results yet. Among European Union countries, about 33% to 74% of all surgical interventions are performed as 1-day surgery (ODS).

As a part of the utilization change (patient flow) in dimension 2, the number of 1-day interventions has grown each year since 2010, and this figure had doubled (209%) by the end of 2017 (Fig. 3), although there are further reserves in the system. Annually, 350 000 to 370 000 interventions could be performed in the form of 1-day surgery[27]; 64% of ODS interventions are carried out in university clinics, 24% in county hospitals, and 7% in city hospitals. In general, 80% of patients are eligible for elective 1-day interventions. Currently, 283 types of interventions can be performed as ODS in Hungary, including hernia, gall, varicose vein, and cataract surgery; some gynecological interventions; or hand surgery. Cataract surgery is one of the most typical procedures that is provided mainly in ODS settings in Hungary. There has been significant growth of 58.9% from 2004, since the first direct ODS development program was launched by the National Health Insurance Fund Administration, to 2015 (59 200 to 94 100).[27]

Home Healthcare Program

Home care aims at satisfying people's health and social needs while in their home by providing appropriate and high-quality home-based healthcare and social services, with the support of info-communication technologies, in the context and balance of inpatient care and residential homes providing an affordable continuum of care.[2,10] This analysis in dimension 2 (utilization) addresses the question of whether the development of home care can meet the emerging need coming from the aging of the population. In Hungary, most home care, or more precisely skilled home health, has been financed by the National Health Insurance Fund Administration since 1996. The number of home healthcare patients increased from 63 900 to 71 108 between 2008 and 2014 but remained at this level during the last 4 years.[18] Meanwhile, hospitalization paid by Hungarian diagnosis-related groups reduced from yearly 2.17 million to 2.0 million between 2008 and 2017. Home healthcare-related hospitalization in typical medical professions (eg, neurology, internal medicine, pulmonology, gastroenterology) reduced from 673 600 to 517 300 between 2008 and 2017; as a consequence, the ratio of home care

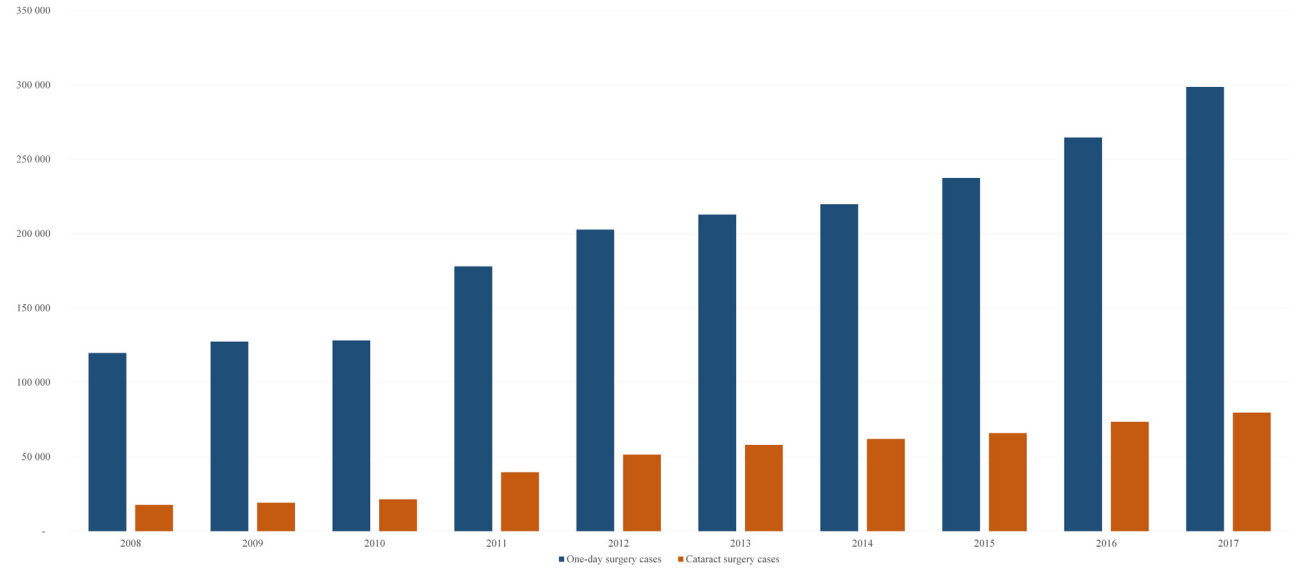

Fig. 3 – The total number of 1-day surgery cases and cataract cases in Hungary, between 2008 and 2017 (source: National Health Insurance Fund Administration).

cases to home care-related hospital cases has significantly increased from 9.5% to 13.7%[18] despite the slight increase in home healthcare cases and the stagnation during the last few years (Fig. 4).

Structural Changes of Human Resources

The structural change in level I and in dimension 3 can be characterized by the number and proportion of healthcare personnel (doctors, nurses) as human resources (HR). According to the OECD statistical database,[26] the Hungarian HCS has one of the lowest density of nurses per 1000 population with a 6.47 value. In 2015, in the OECD countries, this measure was 9.26, and it was especially quite high in the Netherlands (10.5), Germany (12.6), Sweden (11.1), and Finland (14.3). Austria, Czech Republic, and Slovenia show intermediate value as 8.0 to 8.8; meanwhile Poland, Spain, and Italy have a significantly fewer number of nurses, 5.2 to 5.4 per 1000 population.

The number of general practitioners (GPs) has declined in recent years (Table 2), and the number of vacant practices increases mainly in poorer, deprived rural areas of the country. In 2017, there were 346 vacant practices, and this figure shows a slow increase of average population per GP practice since 2000.[15,28] In Hungary, the average age of physicians is fairly high, with the 55 to 59 and 60 to 65 age groups appearing in the highest proportion.[29]

Discussion

This analysis has demonstrated that there are missing and currently in-flux elements of the Hungarian healthcare system

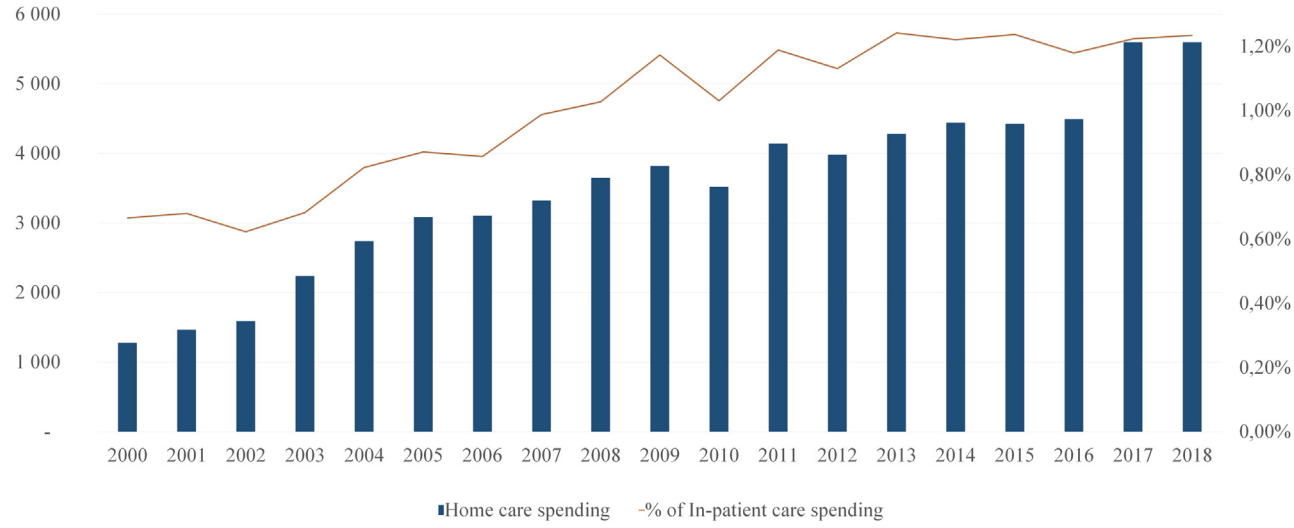

Fig. 4 – Home healthcare performance as a percent of inpatient admissions in Hungary (source: National Health Insurance Fund Administration).

Table 2 – Number of GPs and the average number of registered patients at 1 GP practice at the end of the year in Hungary.

	Title Year	1990	2000	2005	2010	2015
	Total number of physicians in Hungary	32 883	30 695	32 563	33 943	35 854
a.	Total number of GPs	5957	6729	6589	6451	6277
b.	Number of GPs for adults	4537	5159	5018	4926	4817
c.	Number of pediatric GPs	1420	1570	1571	1525	1460
d.	Proportion of GPs of the whole number of physicians (%)	18.1	21.9	20.2	19.0	17.5
e.	Number of patients registered per adult GP	1975	1647	1717	1745	1815
f.	Number of children registered per pediatric GP	995	951	939	945	968
g.	Number of inhabitants per GP	1765	1516	1529	1548	1566
h.	Number of nurses in GP practices	5080	5859	5772	5628	5856
h.	Proportion of nurses per GP practices (%)	85.3	87.1	87.6	87.2	93.3

Note. Source: National Health Insurance Fund Administration.
GP indicates general practitioner.

concerning effective structural change. The following limitations of the study must be mentioned: selection of structural changes indicators, missing outcome data, and long-term impacts of the analyzed infrastructural and performance changes.

Reduction of Hospital Beds and Master Plans for Hospital Sector Restructuring

Regarding hospital master planning goals according to the World Bank report, there is a need to set planning targets to adjust needs in hospital infrastructure, equipment, and staff against evidence-based targets. It is also important to compare the existing availability of hospital capacity with need and invest or disinvest accordingly and to identify enabling factors in the health system that need to change to facilitate the improvements in hospital capacity utilization that lead to improvements in performance.[6]

In Hungary, the last decades in the development and implementation of structural reform of the hospital sector were characterized by reform endeavors. Overall, this restructuring program at the macro and mezzo levels met these main goals of master plans. In the observed period, the Hungarian governments continuously supported the expansion of ODS through the announcement of tenders and creating a favorable regulatory framework, the integration process in the hospital sector, and the development of the emergency care system (including setting up a national network of ERs).

In the 6 Hungarian convergence regions (except the capital region), the hospital sector could get significant grants from European Structural Funds. More than 50 hospitals received at least 1 billion Hungarian forint (more than €3 million) between 2007 and 2015. The hospital sector used 413.4 billion Hungarian forint (€1.27 billion) only for infrastructure development. After the fusions, healthcare providers could make effective measures against the shortage of HR through this organizational rationalization and the concentration of high-cost medical equipment (ICU, computed tomography, magnetic resonance imaging, angiography, radiation therapy). The formerly separated hospitals become units, and then the structural change will be carried out between the sites: removing or demolishing some old-shaped pavilions and unifying the chronic care, rehabilitation, and nursing wards in separate sites. In this reorganization process, another achieved efficiency gain is the clarification of progressivity levels. Parallel to these organizational changes, many of the healthcare centers received significant grants from EU-funded programs to improve these specialties and to improve outpatient care and diagnostics.

Home Care Programs in an International Context

There are several comprehensive studies that report the growing need for home healthcare and insist on further developments in European and global healthcare systems.[2,30] This means a shift from expensive forms of care, such as inpatient acute care and nursing homes, to clinically appropriate care in the community and at home. Moreover, considering European best practices, the final aim should be total integration or at least strong coordination providing continuum of care between the different service elements.[2]

About the HR Problems and Development

In an international context, the GP coverage of the Hungarian population seems among the lowest in the EU with the 6.4 GPs/10 000 habitants (compared with the 6300 GPs to 9.85 million habitants in 2015). In the same year in 2015, the OECD average was 7.76 doctors per 10 000 population; this rate is 7.5 in Spain, 7.4 in Italy, and 7.6 in the UK and Austria. The Netherlands is almost the highest with 8.4; Germany is among the lowest rate at 7.0, and in Sweden this measure has a similar value to Hungary of 6.4. In contrast, the slowly growing number of nurses in primary care seems a positive tendency.

Conclusion

Structural change is in progress in the Hungarian healthcare system and some efficiency gains have been reached; however, significant potential efficiency gains could be reached with better organization and management of health services in addition to the dissemination and better incorporation of modern healthcare technologies.

Decision makers will have to address the challenges of the aging population and technology innovation. The structural change will also help to integrate the info-communication tools including national eHealth and telemedicine systems and improve curative services and chronic disease management programs. Further potential tasks include the improvement of outpatient specialist care to achieve better access (rapid diagnostic, 1-day surgery care, day hospital care), reducing schedule and waiting time, expanding the preventive services of primary care by the establishment of the so called “GP clusters,” reducing the inequalities in access, providing supplementary services for the population, and implementing appropriate structural transformation of resources.

Future research should address the changes of allocation of resources, the health impact of these structural changes, and deeper analysis of the improvements of hospital technical efficiency.

Acknowledgments

The authors have no other financial relationships to disclose.

REFERENCES

1. Endrei D, Molics B, Ágoston I. Multicriteria decision analysis in the reimbursement of new medical technologies: real-world experiences from Hungary. *Value Health*. 2014;17(4):487–489.
2. Tarricone R, Tsouros AD, eds. *Home Care in Europe*. World Health Organization. Milan, Italy: Universitá Commerciale Luigi Bocconi; 2008.
3. Kringos DE, Boerma WGW, Richard Hutchinson A, Saltman RB. Is strong primary care an answer to the current challenges? In: *Building Primary Care in a Changing Europe. Observatory Studies Series, No. 38*. Copenhagen, Denmark: European Observatory on Health Systems and Policies; 2015:27–40.
4. Habicht T, Aaviksoo A, Koppel A. *Hospital Sector Reform in Estonia*. Praxis; 2016.
5. Fidler AH, Haslinger RR, Hofmarcher MM, Jesse M, Palu T. Incorporation of public hospitals: a "silver bullet" against overcapacity, managerial bottlenecks and resource constraints? Case studies from Austria and Estonia. *Health Policy*. 2007;81(2-3):328–338.
6. World Bank Group. Support to develop a health system strategy for priority disease areas in Latvia. Hospital Infrastructure, Equipment and Human Resource Mapping. World Bank Group; 2016.
7. Boerma WGW, Dubois CA. Mapping primary care across Europe. In: Saltman RB, Rico A, Boerma WGW, eds. *Primary Care in the Driver's Seat? Organizational Reform in European Primary Care*. Maidenhead, England: Open University Press. 2006:22–49.
8. Saltman RB, Bankhauskaite V, Vrangbaek K. *Decentralization in Health Care*. European Observatory on Health Systems and Policies. Maidenhead, England: Open University Press; 2007.
9. Boncz I, Nagy J, Sebestyen A, Korosi L. Financing of health care services in Hungary. *Eur J Health Econ*. 2004;5(3):252–258.
10. Dózsa C. Strategic responses of hospitals in Hungary to a changing environment in the early 2000s [PhD thesis]. Budapest, Hungary: Corvinus University; 2011.
11. Dózsa C. Strategic changes in the health care system – the strategic options of hospitals in the 2000 years. *IME*. 2011;10(3):22–28.
12. Kincses Gy. The principles, problems and history of changes in the health care system. In: Ajkay, Z., Kullman L. (szerk.) *A Magyar Kórházügy*. Budapest, Hungary: Magyar Kórházszövetség; 1995.
13. Mihályi P. *Hungarian Health Care: Diagnosis and Therapy*. Budapest, Hungary: Springer Orvosi Kiadó Kft; 2000.
14. Orosz É. *On a Halfway or Misguided? Recent History of our Health Care and the Health Policy Alternatives*. Budapest, Hungary: Egészséges Magyarországért Egyesület; 2001.
15. Sinkó E. The operation of health care system in the last 4 years. *Egészségügyi Gazd Szle*. 2014;52(2-3):2–4.
16. Dózsa C, Borcsek B, Tóth J. Hospital infrastructural developments by European Structural Funds in years 2007-2015. *IME*. 2016;9(15):5–10.
17. Boncz I, Sebestyen A, Dobrossy L, Otto S. The role of immunochemical testing for colorectal cancer. *Lancet Oncol*. 2006;7(5):363–364.
18. National Health Insurance Fund Administration (NHIFA). Statistical yearbook for the years: 2015, 2016, 2017. www.neak.gov.hu. Accessed May 2, 2018.
19. Boncz I, Sebestyen A. Financial deficits in the health services of the UK and Hungary. *Lancet*. 2006;368(9539):917–918.
20. Boncz I, Evetovits T, Dózsa Cs, et al. The Hungarian care managing organization pilot program. *Value Health Reg Issues*. 2015;7:27–33.
21. Boncz I, Kaló Z, Mohamed Ibrahim MIB, Greenberg D. Further steps in the development of pharmacoeconomics, outcomes research, and health technology assessment in Central and Eastern Europe, Western Asia, and Africa. *Value Health Reg Issues*. 2013;2(2):169–170.
22. Nagy J, Dózsa C, Boncz I. Experiences with the application of the DRG principle in Hungary. In: Kimberly JR, de Pouvourville G, D'Aunno TA, eds. *The Globalization of Managerial Innovation in Health Care*. Cambridge University Press; 2008:284–319.
23. Endrei D, Zemplényi A, Molics B, Ágoston I, Boncz I. The effect of performance-volume limit on the DRG based acute care hospital financing in Hungary. *Health Policy*. 2014;115(2-3):152–156.
24. Endrei D, Kollár L, Bódis J, et al. Effects of performance-volume limit on the institutional financing of the Clinical Centre of the University of Pécs, Hungary. *Orv Hetil*. 2010;151(31):1270–1274.
25. Orosz É. Several strategic questions of the Hungarian health insurance system. In: Bodrogi J *(szerk.): Main Questions of the Health Care Reforms*. Budapest, Hungary: Semmelweis Kiadó; 2010.
26. Organisation for Economic Co-operation and Development. Health statistics database. (2018).
27. Mészáros J. The position of one-day surgery and expected aspects. XIX. Országos Járóbeteg Szakellátási Konferencia és XIV. Országos Járóbeteg Szakdolgozói Konferencia. 2017.
28. Dózsa C, Borbás F. Conceptual framework of integrated care and options for integration in primary care. *Orv Hetil*. 2015;156(22):881–887.
29. Elmer D, Boncz I, Endrei D, et al. Aging of health care professionals in Hungary. *Value Health*. 2017;20(9):A672.
30. Kiersey RA, Coleman A. Approaches to the regulation and financing of home care services in four European countries. An evidence review. Dublin, Ireland: Health Research Board; 2017. http://www.bdsp.ehesp.fr/Base/508492/. Accessed May 2, 2018.