

**MANAGING CROSS-BORDER CARE - AN EU
HEALTH SYSTEMS' PERFORMANCE
PERSPECTIVE**

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ABSTRACT

This study aims to measure the efficiency of 15 EU health systems when managing cross-border care. The study collected data across the years 2010-2014. The study used output-oriented and constant returns to scale Data Envelopment Analysis (DEA) with three input and three output variables. DEA model was performed for an across country efficiency comparison. A Tobit regression model was run in attempt to interpret the diachronic and cross-country efficiency scores and to achieve consistent and unbiased estimators.

The literature review focused on the EU policies and on DEA. The study used secondary data, gathered by World Health Organisation (WHO), Organisation of Economic Co-operation and Development (OECD) and European Core Health Indicators (ECHI). The principal findings of this study were that 5 countries were found fully efficient throughout the 4 years and 10 countries were found relatively inefficient.

In meeting the needs of the patients seeking treatment abroad, the right administration and public health management aiming at advancing health systems efficiency should be acknowledged as a contribution to improve resilience of health systems and to the provision of higher quality cross-border healthcare.

Key Words

Efficiency, Cross Border Health, DEA

INTRODUCTION

The Council of Health Ministers in 2006 has recognised that health systems are built on common values: universality, access to good quality care, equity and solidarity (Council Conclusions, 2006). However, they are faced with growing number of common challenges: increasing cost of healthcare, a rise of chronic diseases associated with an aging population and multi-morbidity leading to the growing demand for healthcare, shortages and an uneven distribution of health professionals, health inequalities and inequities in access to healthcare (COM, 2014 / 215). To address these challenges the EU Member States, need to interact and actions which advocate the need for cooperation should be considered on a short and long-term basis.

Till today, a set of actions have taken place such as: the objectives agreed within the framework of the Open Method of Coordination for social protection and social inclusion at the European Council of March 2006 were to ensure accessible, high-quality and sustainable health care and long-term care (Joint Social Protection Committee, 2006); the Council Conclusions which call for Equity and Health in All Policies: Solidarity in Health (European Parliament resolution, 2010) and the Directive 2011/24/EU of the European Parliament and of the Council of 9 March 2011 on the application of patients' rights in cross-border healthcare (Directive, 2011/24/EU), including chapter IV relating to cooperation in healthcare. The Directive defines that cross-border healthcare should cover both the situation in which a patient purchases such medicinal products and medical devices in a Member State other than the Member State of affiliation and the situation in which the patient purchases such medicinal products and medical devices in another Member State than that in which the prescription was issued (Directive, 2011/24/EU).

Moreover, the Council Conclusions calls in 2011(2011/C202/04) for modern, responsive and sustainable health systems and in 2013(16661/13) for the 'Reflection process on modern, responsive and sustainable health systems' aiming to identify effective ways of investing in health. The Commission Communication 'Towards Social Investment for Growth and Cohesion – including implementing the European Social Fund 2014-2020', and in particular its accompanying staff working document 'Investing in health', adopted on 20 February 2013, which stresses the different ways in which investment in health can help address present and future challenges faced by the health systems (European Commission, 2013a). The Annual Growth Survey 2014 underlines the need to strengthen the efficiency and financial sustainability of healthcare systems (European Commission, 2013b). The Council Conclusions

(2014/C217/02) recall the discussions at the Informal Meeting of Ministers of Health held in Athens on 28-29 April 2014 on the ‘Economic crisis and healthcare’ which highlighted the importance of health reforms to overcome the crisis and exchanging best practices and sharing of information between Member States in areas of common interest including the cost of healthcare, the basket of healthcare services, pharmaceuticals, health systems performance assessment and investing in prevention towards ensuring resilience of health systems; there was broad consensus to improve further access to healthcare particularly for the most vulnerable populations. These established EU actions aim to encourage cooperation between the Member States in the field of health.

The need for “new generation of reforms” has been urged by Health Ministers and Representatives of OECD Members in their meeting in Paris January 2017 (OECD, 2017). By taking into consideration the aforementioned Directive 2011/24/EU, the Council Conclusions in 2011 and 2013, the Commission Communication in 2013, the Annual Growth Survey in 2014 and the Council Conclusions (2014/C 217/02); this study will try to offer support to Member States actions by providing research on measuring efficiency of their health systems and in particular in managing cross-border care, forming a basis of potential exchange of information that would support health policies. Several authors have performed research in the field trying to propose policies on how to construct a framework on cross-border health (Wismar, Palm, Figueras, Ernst, & Ginneken, 2011); to address the challenges and opportunities in public health by the movement of patients across the borders (Helble, 2011); to address the implications for the countries health systems of both sending and receiving non-resident patients (Whittaker, Manderson & Cartwright, 2010); however little is known empirically with regards to the efficiency of health systems managing cross-border care.

It is evident that the rising number of citizens mobility that are seeking health care in another EU Member State is addressing issues of universal coverage, making the delivery and management of health systems focus on more efficient ways to utilise their resources. There are a number of reasons why patients might seek care in another European country, including availability, affordability, familiarity and perceived quality of health care (Footman, Knai, Baeten, Glonti & McKee, 2014). In practice many people have problems in accessing healthcare services when they need them (Eurofound, 2013) and that the proportion of people reporting unmet health needs due to cost, distance to healthcare or waiting lists has increased in several Member States during the economic crisis (Council Conclusions, 2014/C217/02).

The key research question of this study is: how can the health systems perform in the most efficient way as they are faced with the arrival of non-resident patients seeking treatment across the borders? This is a major research hypothesis this paper aims to answer by measuring the efficiency of EU Member States health systems, handling cross-border care, by using Data Envelopment Analysis (DEA) - a technical performance measurement tool. Moreover, an overview of the European policies providing inside information of the European citizens - patients' rights in cross-border healthcare in the European Union will reveal the factors that made cross-border health of such a great importance. Measuring the efficiency of the EU health systems would complement national policies directions to improve cross-border health services.

LITERATURE REVIEW

Cross-Border Health in the European Union

The Council Conclusions (2014/C 217/02) acknowledges that health is a value in itself and a prerequisite to economic growth; and that investing in health contributes to better health, economic prosperity and social cohesion. Universality in terms of population coverage is not negotiable and requires that all population groups have affordable access to a sufficient package of health services (OECD, 2016).

European Union's Treaty and its Charter of Fundamental Rights (C364/1 2000) and the EU institutions are bound to principles that ensure a high level of health protection, such as the right to benefit from medical treatment; access to healthcare - preventive, diagnostic and curative treatment regardless of financial means, gender or nationality (European Commission, 2015a).

Art. 168 of the Treaty on the Functioning of the European Union (TFEU) states that Member States are responsible for organising and delivering health services and medical care, which limits the EU's role in health systems to research/exchange of good practices and puts direct responsibility on the EU for health issues in cases with a clear cross border dimension or with an impact on the internal market. Regarding the cross-border dimension, the number of individuals choosing to travel across national borders or overseas to receive medical treatments has been a phenomenon for many years, but lately it has been on the rise. This phenomenon was noticeable by many Member States and therefore the European Commission had to verify the real need and the citizens willingness to seek treatment abroad.

In May 2007, a Flash Eurobarometer survey on "Cross-border health services in the EU" (Eurobarometer, 2007/210) was conducted by the European Commission to

find out how many people had actually received healthcare outside their country of residence, how aware EU citizens were of the possibilities for receiving healthcare abroad, and how willing they would be to receive medical treatment abroad and under what circumstances. No thorough research had been conducted before then. The key findings of the Eurobarometer were that 70% of the EU27 population tended to believe that costs of healthcare treatment received elsewhere in the EU would be reimbursed for them by their health authority. Four percent of Europeans received medical treatment in another EU Member State over the past 12 months; cross-border patient mobility was most significant in Luxemburg (LU), where every fifth citizen sought healthcare outside the country's borders. Slightly more than half of EU citizens were open to travel to another EU country to seek medical treatment (54%). The most prominent reason to do so was a hypothesised unavailability of the necessary treatment in the domestic healthcare system. The hope of better quality (generally, or through a specialist residing elsewhere in Europe) and the promise of quicker access to the necessary treatment were also important motivating factors for patients. Europeans were least likely to look for cheaper treatment when considering the option to obtain health service from another EU country, but still, it played a role for 48% of those who were open to travel for such a purpose. Better quality of treatment was a more important driver of mobility in the new Member States than in the old ones, while there were less marked differences in the other aspects investigated. The 42% who were not willing to travel abroad for treatment were motivated by distinctly different reasons in the old and the new Member States. Generally, the survey found that citizens in the EU15 zone were deterred by their satisfaction with domestic services, and the convenience of local treatment (which were the dominant reasons of a sedentary patient attitude at the EU27 level too), while those in the non- Member States (NMS) zone were more likely to be discouraged by affordability problems (Eurobarometer, 2007/210).

The last two decades the European Union (EU) has steadily increased its involvement in the health policies of its Member States, with considerable support from the European Court of Justice (ECJ) (Brooks, 2012). To increase accessibility, the EU promotes an optimal implementation of the 2011 Directive on cross-border healthcare. On 24 April 2011 the Directive 2011/24/EU on the application of patients' rights in cross-border healthcare came into force. It aimed to provide all EU citizens with equal access to quality healthcare, responding to their specific needs. It was due to be transposed by Member States by 25 October 2013. It clarified the rights of patients to seek reimbursement for healthcare received in another Member State. The Directive codifies many years of European Court of Justice (ECJ)

judgments going back as far as the second half of the 1990s. The Court found that "health services" are "services" within the meaning of the Treaty which means that the principles of "free movement of services" apply to health. These principles need to be applied to health. The Directive represented an attempt to resolve this question with regard to the free movement of patients. The Directive codified the main principles of the ECJ's case law i.e. patients who are entitled to a particular health service in their home country are entitled to be reimbursed for that service if they receive it in another Member State. The level of reimbursement is up to the cost of that treatment in their home country. For some healthcare (broadly, in-patient care and care requiring highly specialised or cost intensive medical equipment or infrastructure) Member States can require patients to seek "prior authorisation" before travelling for treatment. That authorisation may be refused if the patient can be offered the treatment in their home country within a medically acceptable time limit. One complication is that the Directive is not the only piece of EU law concerning rights to coverage of costs of treatment abroad. Regulation (EC) No 883/2004 (the social security Regulation) also provides certain rights to planned treatment and emergency healthcare (the latter via the European Health Insurance Card). Operating these two pieces of legislation together is a challenge for the Commission and for Member States. To assist patients in using their rights, each Member State is required to set up a National Contact Point (NCP) to inform patients about their cross-border healthcare rights (e.g. entitlements to healthcare, level of reimbursement, procedures). This NCP provides information to patients from other countries about the quality and safety standards used in their Member State along with other relevant information (e.g. complaints and redress procedures; whether a provider is authorised to provide certain services).

The Directive also created permanent structures of cooperation in certain areas where there is considerable potential in more cross-EU working. Until now those areas had been worked on via short time-limited projects. The Directive gave the European Commission a legal basis for on-going work on: eHealth; Health Technology Assessments (HTA); and European Reference Networks (ERN). The Directive may eventually have more impact on national policies than on cross-border consumption of care (Footman Knai, Baeten, Glonti & McKee, 2014), and can contribute to shaping healthcare reforms in many EU countries, e.g. national governments would be required to provide adequate information for border-crossing patients which might lead to increased measurement and publication of quality of care indicators, to establish cost calculation mechanisms and the need to clarify invoices which might

lead to changes in funding systems, and more transparency domestically (Baeten & Jelfs, 2012).

In 2015, the European Commission released a report on the “operation of Directive 2011/24/EU on the application of patients’ rights in cross-border healthcare” (European Commission, 2015b). This report sets out the current state of play of transposition, and covers the most important and relevant provisions, such as the use of prior authorisation, the level of patient mobility, reimbursement practices, information to patients and cooperation under the Directive. The outcomes of the report are:

- Low citizens' awareness of their general rights to reimbursement;
- Very complicated systems of prior authorisation;
- Unjustifiably low reimbursement tariffs;
- Burdensome administrative requirements;
- Significant differences between NCPs in their performance and quality of information provided;
- ERN aim bring together highly specialised healthcare providers from different EU Member States.

This approach will concentrate expertise and facilitate access to diagnosis, treatment and provision of affordable, high-quality and cost-effective healthcare to patients suffering from rare or complex and low prevalence diseases or conditions. This is a good example of a formal EU structure for voluntary collaboration in the field of healthcare with the potential to lead to important improvement of quality of care and even to life-saving gains for thousands of patients (European Commission, 2015a).

In 2015, the European Commission released the second Eurobarometers on Patients’ rights in cross-border healthcare in the European Union (Eurobarometer, 2015/425). This new survey in 2015 was commissioned as a follow-up to a similar survey conducted in 2007, in order to assess the situation of cross-border healthcare after the enforcement of the directive. The results show that a small minority of Europeans (5%) received medical treatment in another EU country. In eight Member States, the proportion of people who received treatment in another EU country was above 5%: this figure was 16% in LU, 12% in Italy (IT), and 10% in Hungary (HU). Other countries which ranked above average were Romania (RO) (8%), Portugal (PT)(7%), the Czech Republic (CZ)(7%), Poland (PO)(7%) and Ireland (IE)(6%). Only 15% of respondents encountered problems getting reimbursed for cross-border treatments. Around half of the respondents 49% show willingness to travel in another EU country to receive medical treatment, which is slightly lower than the 2007 Eurobarometer which was 53%. The main reasons to seek treatment abroad were to receive treatment that was not available at home (71%), and to

receive better quality treatment (53%). Other reasons to get treatment in another EU country included receiving treatment from a renowned specialist (38%), receiving treatment more quickly (34%) and receiving cheaper treatment (23%). Treatments that respondents would consider seeking abroad were mostly for major pathologies, such as cancer treatment (53%) or heart surgery (38%) (Eurobarometer 2015/425). The impact of the EU Directive on patients' rights and cross border health care in Malta shows that the directive has not affected patient mobility in Malta (MT) in the first months following its implementation. Government appears to have instrumentalised the implementation of the directive to implement certain reforms including legislation on patients' rights, a health benefits package and compulsory indemnity insurance (Muscat Aluttis, Sorensen, Pace & Branda, 2015).

A report on the state of play of the Cross-border Healthcare (CBHC) Directive shows significant legislative advances at the EU-level in the past two years coupled with genuine efforts at the national level (European Commission, 2015c). The report clearly showed that European citizens' awareness about their right to choose healthcare in another EU country remains low as well as the patient mobility for planned healthcare – far below the potential levels suggested by the aforementioned Eurobarometer survey.

The same year - 2015, the European Commission in order to disseminate the Directive, as it was noticed that many EU citizens were not aware of its existence, on European Patients' Rights Day published a newsletter outlining the 10 benefits the EU brings to patients. These were: to receive healthcare when visiting another EU country; to be reimbursed for healthcare sought in another EU country; to receive information on safety and quality standards in EU countries; to be treated by qualified healthcare professionals; to get a copy of your medical records; to have your prescription recognised in all EU countries; to be treated with safe and effective medicines; to be able to report suspected side effects of medicines; to be treated with safe medical devices; to benefit from common high standards of quality for blood, organs, tissues and cells (European Commission, 2015a).

In June 2016, the Council issued country specific recommendations (CSRs) to the Member States. Despite the overall streamlining and reduction in numbers of CSRs, the number of CSRs on health systems reforms increased from 11 in 2015 to 13 in 2016. Overall, in 2016, the focus of the health-related recommendations remained on the need to improve efficiency and sustainability of health systems, but this fiscal challenge is often combined with others - such as effectiveness, quality and/or accessibility of healthcare. Access to high-quality healthcare is stressed as an explicit

policy aim in 6 CSRs in 2016. Further, many of the recommendations call for concrete, targeted reforms to optimise the hospital sector and to strengthen primary care.

Moreover, in 2016 the European Commission (European Commission, 2016) released a study aiming to contribute to effective cross-border cooperation between EU-Member States by means of pooling resources for high-cost medical equipment investments. The study at hand highlighted the fact that cross-border cooperation in the field of cost intensive/highly specialized medical equipment could bring economic advantages for many EU-Member States – in most cases a win-win situation for all cooperating parties involved.

Current EU Policy Actions on Measuring the Performance of the European Health Care Systems

Measuring performance means monitoring progress towards system goals. In recent years, there have been significant improvements in health system performance assessments at the national and EU levels. Monitoring performance implies identifying and measuring concrete outcomes that reflect actual progress in their direction, as assessment frameworks aim to do. National assessment frameworks should trigger improvements in the health system towards national targets and assist and support national efforts. To support the provision of healthcare and the organisation of health systems by each Member States, assessment frameworks measuring performance can offer insights through monitoring and evaluation of key indicators (European Commission, 2016).

The European Commission adopted a policy document on "Investing in Health" as part of the "Social Investment Package" on 20 February 2013. It is a policy framework extending the EU's Health Strategy by reinforcing its key objectives, establishing the role of health as part of Europe 2020, and claims that health is a growth-friendly type of expenditure because healthy population and sustainable health systems are decisive for economic growth.

The paper develops three strands for investing in health:

- 1 Investing in sustainable health systems is important because budgetary pressures, demographic changes and the rise of chronic diseases challenge health systems' sustainability. Innovative reforms should improve the cost-efficiency of healthcare spending and reconcile fiscal consolidation targets with continued provision of high quality and safe care.
- 2 Investing in people's health enhances human capital. Improving people's health reinforces their employability, helps them to secure livelihoods and contributes to growth. It requires fostering active and healthy ageing and disease prevention measures. A well-trained health

workforce that can respond to growing healthcare needs is necessary.

- 3 The health status of the population varies considerably within and between Member States, depending on income and education. Investing in reducing inequalities in health contributes to social cohesion and breaks the vicious spiral of poor health contributing to, and resulting from, poverty and exclusion.

Moreover, the European Commission is working together with Member States on tools for health system performance assessment, aiming at more fiscally sustainable, effective, accessible and resilient health systems. Member States have their own national healthcare systems – their own networks of people, institutions and resources working in the field of health. As outlined in its Communication in 2014 (COM 2014 / 215) on health systems, the Commission promotes cooperation at the EU level with a view to strengthen effectiveness, increase accessibility and improve resilience of the national health systems in the EU. To strengthen effectiveness, for example, the EU promotes health systems performance assessment, patient safety and integration of care. To improve resilience, it promotes cooperation on HTA and e-Health (European Commission, 2014).

To this aim an Expert Group on Health Systems Performance Assessment (HSPA) was set up in 2014 to identify tools and methodologies to support national policy makers in assessing areas such as quality and integration of care. In addition, the European Commission works towards the development of the joint assessment framework of health systems in the Social Protection Committee (SPC). These initiatives use EU-wide comparable data, mostly from the Joint Questionnaire (Eurostat- OECD – WHO) on health care statistics. Similar initiatives have well advanced databases, such as the OECD Health Care Quality Indicators Project, and allow for comparing the performance of health care sectors. In the OECD Health Care Quality Indicators Project, a set of indicators focuses, among others, on potential preventable hospital admissions for chronic diseases, excess mortality for patients with schizophrenia or bipolar disorders and a core set of patient experience questions.

In January 2017, OECD published the results of the reflection process entitled: ‘Recommendations to OECD ministers of health from the high level reflection group on the future of health statistics - strengthening the international comparison of health system performance through patient-reported indicators’, providing an opportunity to provide the niche market with a cross-country comparative analysis of outcomes which are very limited, hampering the capacity of

policy makers to gain new knowledge that would help them provide health services shaped around patients' needs.

Besides, the same year OECD is calling Health Ministers and OECD representatives to share views and options on how to design and implement the "Next Generation of Health Reforms" within the guiding principle in re-orienting the health systems by focusing on patients and their continuity of care, and by promoting people's physical and mental good health (OECD, 2017). In addition, it addresses that the "new generation of reforms" needs to be based on measuring health system performance based on what it delivers to people and make a better use of health data.

Another approach to assessment of health systems performance, with a focus on efficiency gains, is the horizontal assessment framework (HAF) used by the European Commission (DG ECFIN) to identify structural-fiscal reforms to support fiscal sustainability at Member State level. At country level, assessment frameworks can promote the exchange information and best practices with a view to improving the sustainability and efficiency of Member States' health systems. The most recent document released in November 2017 by the European Commission in cooperation with the OECD and the European Observatory on Health Systems and Policies was the 28 Country Health Profiles, diagnosing the State of Health in the EU between 2010-2015 and providing conclusions that need to be taken forward for more effective and efficient health system (European Commission, 2017b; 2017c).

Measuring the Performance of Health Care Systems and Hospitals by using DEA

The computation of the EU Member States health systems cross-border care efficiency has been explored by using the non-parametric mathematical programming approach – DEA.

The theoretical development of the Data Envelopment Analysis (DEA) approach was started in 1978 by Charnes, Cooper & Rhodes, who produced a measure of efficiency for decision making units (DMU). DEA is a nonparametric linear programming-based technique that develops an efficiency frontier by optimizing the weighted output/input ratio of each provider, subject to the condition that this ratio can equal, but never exceed, unity for any other provider in the data set (Charnes et al., 1978). DEA analysis has been widely used in other economic sectors since 1957 as organisations have struggled to improve productivity and efficiency (Farrell, 1957). Since then, several researchers have worked on the extension of the theoretical modelling of DEA and/or combination with new variables (Charnes et al., 1978; Caves Christensen & Diewert, 1982; Newhouse, 1994; Coelli, 1996; Färe & Grosskopf, 2000; Cooper et al., 2007;

Ozcan, 2008; Färe et al., 2011; Ferrier et al., 2011; Chilingerian & Sherman 2011; Charles, Färe & Grosskopf, 2016).

In 2017, Emrouznejad and Yang (2017) published an article reviewing the bibliography in the recent four decades (1978–2016), mentioning that there are, in total 10,300 DEA-related articles in the literature and, in the last three years (2014, 2015 and 2016) the numbers of journal articles reached about 1000 published works in each year. The same source mentioned that since 2017, the keywords of Data Envelopment Analysis or Data Envelopment Analysis (DEA) or DEA or DEA models have been used in 9989 articles in peer reviewed journal, efficiency in 2382 and performance in 272. In addition, energy, industry, banking, education and healthcare including hospital were found to be the most popular application areas.

Measuring efficiency of the health care systems, hospitals and clinics by using DEA, started in the 80s. The first author to use DEA to evaluate overall hospital efficiency was Sherman (1984). More studies measured the efficiency of hospitals and clinics in the 80s (Nunamaker, 1983; Bowlin, Charnes, Cooper & Sherman, 1984; Banker, Conrad & Strauss, 1986; Grosskopf & Valdmanis, 1987; Färe, Grosskopf & Valdmanis, 1989; Wagstaff, 1989).

During the 90s also, many studies were performed measuring efficiency of hospitals and clinics worldwide and some of them are (Maindiratta, 1990; Valdmanis, 1992; Ozcan & Lynch, 1992; Ozcan, 1992; Ozcan, Roice & Haksever, 1992; Ozcan & Roice, 1993; Chirikos & Sear, 1994; Ehreth, 1994; Morey, Retzlaff-Roberts, & Fine, 1994; Lynch & Ozcan, 1994; Thanassoulis, Boussofiane & Dyson 1996; Prior, 1996; Magnussen, 1996; Morey & Dittman, 1996; Burgess & Wilson, 1996; Hollingsworth, Dawson & Maniadakis, 1999).

As from 2000 until today there is extensive literature that has measured efficiency in hospitals and clinics by several authors (Steinmann, Dittrich, Karmann & Zweifel, 2004; Butler & Ling, 2005; Staat, 2006; Siciliani, 2006; Ozcan, 2008; Hollingsworth, 2008; Nayar & Ozcan, 2008; Cook & Seiford, 2009; Androutsou, Geitona & Yfantopoulos, 2011; Ferrier & Trivitt, 2013; Kaya, Samut & Cafri, 2016; Cetin & Bahce, 2016).

MATERIAL AND METHOD

Empirical data is limited and measuring the efficiency of the health systems handling cross border care through frontier methods such as DEA. This study used the DEA as a tool to measure the performance of the health systems managing cross-border care in the EU Member States across the years 2010-2014. This method has been chosen due to the fact that, an output-oriented measure has

been performed in order to evaluate by how much quantities can be proportionally increased without changing the input quantities used (Charnes et al., 1978; Charnes et al., 1994; Hollingsworth et al., 1999; Farrell, 1957).

This study has used three inputs (hospital beds, total number of practising physicians, per 100,000 inhabitants and practising qualified nurses and midwives, per 100,000 inhabitants). Labor inputs were used with the indicators of annual number of practising physicians and practising qualified nurses and midwives per 100,000 inhabitants per EU Member State and an aggregate proxy of capital inputs with the number of beds.

The study has used three outputs (hospital discharges in-patients per 100,000 inhabitants, hospital day cases patients per 100,000 inhabitants, number of non-resident people among all people discharged from hospital per 100,000 inhabitants).

Cross-border care is an important EU-health policy issue and can be measured with the indicator on patient mobility. The available indicator that identifies EU-Member States patients' mobility using cross-border care is the number of non-resident people among all people discharged from hospital per 100,000 inhabitants. According to ECHI a non-resident patient is a patient living in another country/region but coming to the country/region of reference for a treatment and/or care. A hospital discharge is the formal release of a patient from a hospital after a procedure or course of treatment (episode of care). Increased patient mobility raises many issues and concerns in Member States such as health care availability and utilisation, health infrastructure development, cost sharing and patient safety (ECHI, 2017).

The data was gathered by OECD, the Global Health Observatory data repository from WHO and European Core Health Indicators ECHI. ECHI is collecting the data through Eurostat. Eurostat provides the percentage of non-residents among all hospital discharges for some EU Member States and other European countries, collects data on health care activities and provides data on hospital discharges, including the hospital discharges of non-residents.

DEA efficiency scores at EU Member States, are related to the relative efficiency of the services provided by each Member State or to inefficiencies related to the excessive and incorrect input utilisation. The highest efficiency level of EU Member States hospitals per year are those which scored 1.00 (100%) efficiency scores and those below are considered as relatively efficient.

Organizations subject to evaluation in the DEA literature are the Decision Making Units (DMUs). This study used 49 DMUs as every single DMU is considered in terms of provision of in-patient care and day-cases/outpatients in each EU Member State. All the 49 DMUs were comparable

as they have provided data on the number of non-resident people among all people discharged from hospital per 100,000 inhabitants, so heterogeneity was eliminated. The period of 2010-2014 was selected due to the set of databases, as in these years more than one EU Member State was collecting data on non-resident people discharges. DEA model was performed for an across country efficiency comparison for the aforementioned years. The results were obtained using “DEA Solver Software” (Cooper et al., 2000).

In an attempt to interpret the diachronic and cross-country efficiency scores and to achieve consistent and unbiased estimators, a Tobit regression model was run with efficiency score being the dependent variable and the following explanatory variables: life expectancy at birth, total health expenditure per capita and total health expenditure as a percentage of the GDP. The efficiency score of each DMU per year was considered as a single observation and this figure was regressed against the explanatory variables in the corresponding year resulting in a sample of N=49 observations. However, the analysis did not show any significant correlations with the explanatory variables used and thus, the results are not hereby presented.

DISCUSSION OF RESULTS

This study measures the efficiency of 15 EU health systems in providing cross-border care, through a set of similar DMUs.

The results showed that across the study period 2010-2014, five out of 15 countries were fully efficient [LU, MT, RO, Slovenia (SI), Slovakia (SK)] with LU being the only Member State which provided data for all the years. Throughout the years the lowest efficiency score was observed by Croatia (HR):0.71. Table 1

While analysing the yearly performance of the EU countries under the study the results showed that in 2010 the three countries [HU, IE and LU], scored 1. In 2011 seven out of ten countries were fully efficient [HR, HU, IE, IT, Lithuania (LT), LU, SI], but it is noticeable that the rest of the countries for the same year also achieved very high scores [Spain (ES):0.95, Germany (DE):0.92, CZ:0.86]. In 2012, 50% of the countries were fully efficient (LU, IE, MT, RO, SI, SK), while in 2013, five out of twelve countries scored 1 (HU, LT, LU, RO, SI). In 2014, six out of ten countries were fully efficient [Belgium (BE), IT, LU, MT, RO, SI], with all the countries being highly efficient, except ES which scored below 0.9.

Table 1: EU Member States efficiency scores on cross-border care

DMUs	Efficiency scores 2010-2014				
	2010	2011	2012	2013	2014
Belgium			0.9698	0.8453	1
Czech Republic		0.8697	0.7649	0.8169	
Germany		0.9242	0.8311	0.9935	0.8711
Spain		0.9555	0.766	0.8623	
Croatia		1	0.7148	0.9127	0.9918
Hungary	1	1	0.8632	1	0.9541
Ireland	1	1	1	0.7823	
Italy		1	0.7856	0.9328	1
Lithuania		1	0.9167	1	
Luxembourg	1	1	1	1	1
Latvia					0.9557
Malta			1	1	1
Romania			1	1	1
Slovenia		1	1		1
Slovakia			1		

The efficiency of the health systems managing cross-border care differs between EU Member States and the reasons are diverse and could be ascribed to lacking information, differences of national health systems, organisational and administrative hurdles and lacking political support. LU, MT, RO, SI and SK have been managing cross-border care in the most efficient way. This has been achieved due to a set of reasons. Access to medical care requires an adequate number of doctors and nurses, and a proper distribution in all parts of the country (OECD, 2016), consequently it seems that these five fully efficient countries have satisfactory range of doctors, nurses and midwives to manage cross-border care. In LU it is noteworthy that a large proportion of people covered by the compulsory insurance live outside the country (Joint Report on Health Systems, 2010) and this may be the major factor that LU scored 100% efficiency in managing cross-border care across the years. In addition, LU, according to the Eurobarometer in 2007, was the country with the most significant cross-border patient mobility.

The most recent publication of the European Commission (2017) is referring to the same years 2010-2014 as this study and presents the 28 EU countries health profiles. It is highlighted that the health systems performance regarding effectiveness, access and resilience, are calling for systematic performance assessment and improvements in data collection (European Commission, 2017). It is worth mentioning that cross-border care was not taken into consideration while “building” the 28 countries

health profiles and evaluating the health systems performance. Complementary, this study also calls for further health systems performance assessment including the cross-border care parameter.

The results of this study can also support the application of the Directive 2011/24/EU as the research outcomes highlight the performance of the Member States providing cross-border care. The finding of the report on the “operation of Directive 2011/24/EU on the application of patients’ rights in cross-border healthcare” (European Commission, 2015) showed a gap in awareness and use of the Directive both by patients and Member States. In accordance, the outcomes of this study for the years 2010-2014, presented a high proportion (of almost 70%) of the Member States being relatively, but not fully efficient, which is a sound message that Member States are performing well but there is still a need for assistance in ensuring the sustainability of EU health systems, building on common values of universality, access to good quality care, equity and solidarity. The need for sustainable health systems as part of the national sustainability measures and the need to ensure access to high quality health care for all, including non-resident patients, seem to be key ingredients for a strong EU cross-border health care structure.

The results show that 1/3 of the countries were fully efficient. This can be considered as an important improvement of quality of care and even to life-saving gains for thousands of patients. Moreover, the aforementioned report “Operation of Directive 2011/24/EU on the application of patients’ rights in cross-border healthcare” calls for voluntary collaboration in the field of healthcare and in particular for cross-border health as a formal EU structure. So according to the results of this study a suggestion could be made that the most efficient countries could share their best practices on how they manage the flow of non-resident patients and highlight key health policies that could be adopted by the least efficient ones.

The Directive 2011/24/EU remains a key policy instrument and its transposition is a continuous process which can be a focus of the Member States to structure a “new generation of reforms”. It is worth mentioning that since its introduction in 2011, Member States seem to have put more efforts in collecting data on how many non-residents patients actually receive healthcare in their country, however data availability is limited and not much information is available about how well informed are patients seeking treatment abroad; how they perceive the value in choosing cross-border health; the level of satisfaction; the technology and the clinical specialty they used while being treated in the visiting EU country. Therefore, these can be addressed as limitations of this study and further research is required.

RECOMMENDATIONS

In light of this study, improving the performance of the health systems while managing cross-border care would be beneficial to cover the need to provide universal health care to all, and this can be supported by reaffirming the Council guidelines and Conclusions (Council of the European Union, 2010; Council Conclusions, 2006; Council Conclusions, 2014 C 217/02). The findings of this study could encourage cooperation to improve the complementarity of health services for those living in Member States and are seeking healthcare services across borders. In this sense, the way forward would be to foster coordination among NCPs and strengthen cooperation between them, in order to guide patients according to their health care needs. Other recommended actions would be to improve patient information on cross-border healthcare and to involve more stakeholders such as the patient organisations, healthcare providers, insurers, regions and local communities, to reinforce the mobilization and strengthening of human resources for health and to improve health systems performance assessment. In addition, assessing reforms to promote efficiency in a systematic and formalised manner based on evidence and best practices, adequate and sustainable financing needs to be ensured targeted towards good coverage, access and quality of care, and towards designing remuneration and purchasing mechanisms. Enhancing the sustainability of hospital care by pursuing structural reforms of the sector, should include improvements in financing mechanisms and should match the national contexts cross-border care services.

Efficient health systems can be recognized as productive due to the fact that people's health influences economic outcomes in terms of productivity and growth friendliness and they can play a significant role in economic development and public spending. The Union actions can complement national policies (Council Conclusions, 2014), therefore Member States need to address national policies that would support health systems efficiency including the efficient management of cross-border care.

The introduction of DEA as a practical research tool for examining efficiency across EU-Member States hospitals opens a path to evaluate and compare health systems performance, while managing cross-border care. The results can form a basis of potential exchange of information and promote best practices that would structure health system reforms.

More research is needed to enlighten the decision makers on options for potential policies targeting at efficient healthcare systems including cross-border care services. Advancing in health systems efficiency should be

acknowledged as a contribution to improve health systems resilience and quality of healthcare.

CONCLUSIONS

Member States engagement in a cross-border healthcare Directive is a major achievement in the field of EU health policy, as it offers greater rights to patients to choose their healthcare providers and it increases transparency in health systems to the benefit of all patients, but still health systems performance needs to be strengthened. The Directive on patients' rights in cross-border healthcare in combination with performance strategies, need to be supported. In meeting the needs of the patients seeking treatment abroad, the right administration and public health management aiming at advancing health systems efficiency should be acknowledged as a contribution to improve resilience of health systems and to the provision of higher quality healthcare.

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