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***Performance Assessment in Primary Health Care: A Systematic Literature Review***

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# Performance assessment in primary health care: a systematic literature review

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The aim of this research is to carry out a systematic literature review of the studies devoted to the performance assessment of primary health care providers. Focusing on the peculiarities of performance evaluation in the public sector, we analyse the selected empirical papers in terms of the efficacy of the developed measurement schemes. We also examine and classify performance measurement categories, dimensions, and techniques in order to provide a holistic picture of the main developments in the referred domain and to identify directions for future research.

*Keywords: primary health care, performance assessment, equity, efficiency, effectiveness*

*JEL Classification: C67, D61, I14*

## 1. INTRODUCTION

The demand for high quality health care has been constantly increasing and it is likely to keep growing in the foreseeable future. Due to the global demographic changes, potential users of health care services are getting older and therefore with greater disease complexity, provoking the emergence of higher expectations towards health systems performance. Furthermore, given the present growth of health care expenditures, it is projected that the majority of OECD countries will spend about 20% of GDP on health care by 2050 (Drouin et al., 2008). These tendencies have stimulated both researchers and policy makers to look for innovative solutions regarding the most appropriate ways to use the scarce resources in order to ensure that the changing needs for health care are met and health systems work most efficiently and effectively. Moreover, these aspects have led to a fundamental shift in health care research agenda by moving focus from hospitals to primary health care – part of the health system being recognized to be currently under researched but having a great potential to cope with the challenges faced by health systems worldwide (Schäfer et al., 2011; WHO, 2008). Consequently, quality improvement in primary health care has been acknowledged by

several international entities, including the World Health Organisation, as one of the central priorities for future research.

Performance assessment of primary care providers in this context facilitates the control of whether objectives are being achieved by organisations and gives information about which areas of their performance should be improved. Thus, it assists in a better use of limited resources and, consequently, contributes to improving health related quality of life for the general population.

The objective of this paper is to undertake a systematic review of the studies devoted to the performance assessment of primary care providers. In doing so we aim to understand what can be learnt from the research studies undertaken until now in order to draw up a future research agenda.

To date, several authors have performed literature reviews in the context of primary care. For instance, Amado & Dyson (2008) applied a conceptual framework for formative evaluation to review the methods and measures that have been used to compare primary health care providers. Kringos et al. (2010a, 2010b) classified performance indicators in primary care into categories at the level of structure, process and outcome. Hollingsworth et al. (1999) and Hollingsworth (2003, 2008) presented a review of non-parametric and parametric applications in health care, including primary care, focusing solely on efficiency measurement.

In comparison to the previous studies this literature review has a broader scope of analysis: apart from exploring all important elements of performance measurement in primary health care, we examine those actions that should be taken before and after performance measurement itself when it is applied to the public sector organisations. In this respect, our study provides a systematic and comprehensive overview of the whole performance assessment process, offers a critical and updated reflection on the state of the art in this area of research, and identifies the main tendencies, drawbacks and opportunities for future research.

The rest of the paper is organised as follows. Section 2 briefly introduces the protocol employed to identify relevant papers, describes the process of data synthesis and the framework used to analyse performance assessment studies. Section 3 presents descriptive statistics of the papers selected and characterises the results obtained. Section 4 discusses the main developments in this research area and concludes with a discussion of the limitations of this paper and suggestions for future research.

## **2. RESEARCH METHODOLOGY**

In this paper we combine a systematic and a traditional literature review.

## **Article inclusion**

The systematic search for relevant studies has been undertaken in the EBSCOhost electronic database, which was chosen for its depth in coverage of health care related literature and advanced search capabilities of the system. The relevant studies were searched among peer reviewed articles published between January 1968 and December 2011. As selection criteria we used five keywords, namely, “performance”, “efficiency”, “productivity”, “equity”, and “effectiveness”, successively combined with each of the following sets of terms: “measurement”, “management”, “assessment”, “evaluation”, “Data Envelopment Analysis”, and with “primary care”, “primary health care”, “health centre”, “health center”. We searched for these terms in the title, abstract and subject terms of the publications at the EBSCOhost database. Out of 4975 papers that met the selection criteria mentioned above, we removed the duplicates and read the abstracts of the remaining papers. Where it was not evident from the abstract, full articles were reviewed for making decision regarding its inclusion in the final sample. Considering the objective of this study, papers on clinical interventions and health programs evaluation were excluded. Finally, additional articles were retrieved by means of a traditional literature review, from the reference lists of the papers located through the systematic review.

## **Method of analysis**

The final sample comprises of 90 articles among which are literature reviews, theoretical studies and empirical studies. All reviews and theoretical discussions were carefully read and key findings were identified. For the analysis of empirical studies we additionally employed a specific assessment model proposed by Smith (1996). The used of this framework allowed us to evaluate the efficacy of the performance measurement frameworks presented in the selected research papers. We also classified the empirical studies in terms of the performance indicators developed, the dimensions analysed and the analytical techniques employed. Each group of elements was then explored in more detail and conclusions for future research were drawn up. Ultimately, in this paper we have summarised in a narrative manner the main findings of the review with example references in some cases. The full reference list of papers reviewed can be obtained from the authors, upon request.

## **Performance measurement in primary health care: framework to analyse performance assessment studies**

As it was mentioned above, we analysed the empirical papers in terms of the efficacy of the developed measurement schemes, using the model designed by Smith (1996). Having studied the specific features of performance evaluation in the educational, social security, criminal justice, and health care systems, he argues that any assessment of the performance carried out in the public sector should incorporate three interrelated stages: measurement, analysis and action. The first stage, namely, the measurement stage, aims to create an underlying methodological basis for the whole assessment process through capturing relevant facets of performance into sets of indicators and responding to two fundamental questions: why do we

want to measure performance and how do we measure it. Then, at the second stage, we aim to interpret the chosen sets of indicators to give us an idea about the overall level of performance or its particular aspect, considering the possible effects of environmental factors. The final action stage suggests that appropriate changes in behaviour should take place triggered by the obtained performance results. Obviously, these actions should be aligned with the initially determined objectives of the measurement process. Now we would like to discuss each stage separately in the context of the performance assessment in primary health care.

## **Measurement stage**

### **Identification of stakeholders and their objectives**

The first question to be answered at this stage, as mentioned by Smith (1996), is whose objectives will underlie the measurement scheme. The relevant literature emphasises a particular complexity of the public sector concerning a variety of stakeholders' perspectives about what is meant by "good performance" of an organisation (Boyne, 2002; Campbell et al., 2002; Harrison et al., 2012). In health care it imposes the problem of conflicting objectives held by stakeholders not only across the groups but sometimes within these groups, related, for example, to the different levels of patients' aggregation (Williams, 1996). Thus, it becomes evident that any assessment framework is likely to be of a limited practical use unless the objectives are clearly prioritised at the initial stage of a framework's design.

Although the list of stakeholders in primary health care can be largely extended, we identified the following groups as the most important stakeholders for the purposes of this study: patients, health care professionals, health care managers, policy makers, the government and local authorities, and, ultimately, the general public (Smith et al., 2009; Williams, 1993).

However, apart from the identification of principal stakeholders in the performance measurement process, Smith (1996) emphasized the need to include these stakeholders in the subsequent actions during all three stages. This involvement contributes to a better understanding of the processes inside the health system and will secure higher chances of success in subsequent implementation of improvement strategies and plans.

### **Performance measurement categories**

The development of specific measures to reflect the progress (or its absence) towards stated objectives is the next step at the measurement stage, according to Smith (1996). Performance measurement categories are used to classify these measures according to various characteristics. To date, a framework developed by Donabedian (1980) has been mostly used in the health care research to categorise performance indicators. He identified three interrelated elements, which are structure, process and outcome, as the key aspects for assessing quality of health care. Structure refers to organisational characteristics of the providers of care, including human, physical, and financial resources and tools used in

delivery of health care services, presenting the inputs in health care provision. Process refers to the activities that go on within and between health care practitioners and patients, focusing on conformity to technical and ethical norms of good care. And, finally, outcome refers to the impact of these activities on a patient’s current and future health status.

In addition, we believe that it is important to distinguish the outcomes of health care from the outputs, since the latter only indicates the quantity of health services provided, without reflecting any further effects of these activities on a patient’s health. This discrimination gives us an opportunity to disentangle the concept of “efficiency” and “effectiveness”, described later in this study. However, as Jacobs et al. (2006) noted, the majority of efficiency literature do not provide such distinction, loosely considering activities, outputs and outcomes in health care as “outputs”.

All four categories form the fundamental basis of a comprehensive conceptual framework for performance assessment of primary care providers, presented in Figure 1. This model is designed on the basis of the framework proposed by Amado & Dyson (2009) and allows us to classify the performance indicators into the groups, depending on what characteristic they represent. The additional category of needs is defined as a potential user’s capacity to benefit from the health care provided, as proposed by Culyer & Wagstaff (1993), and this category is used in the framework to present the dimension of equity.

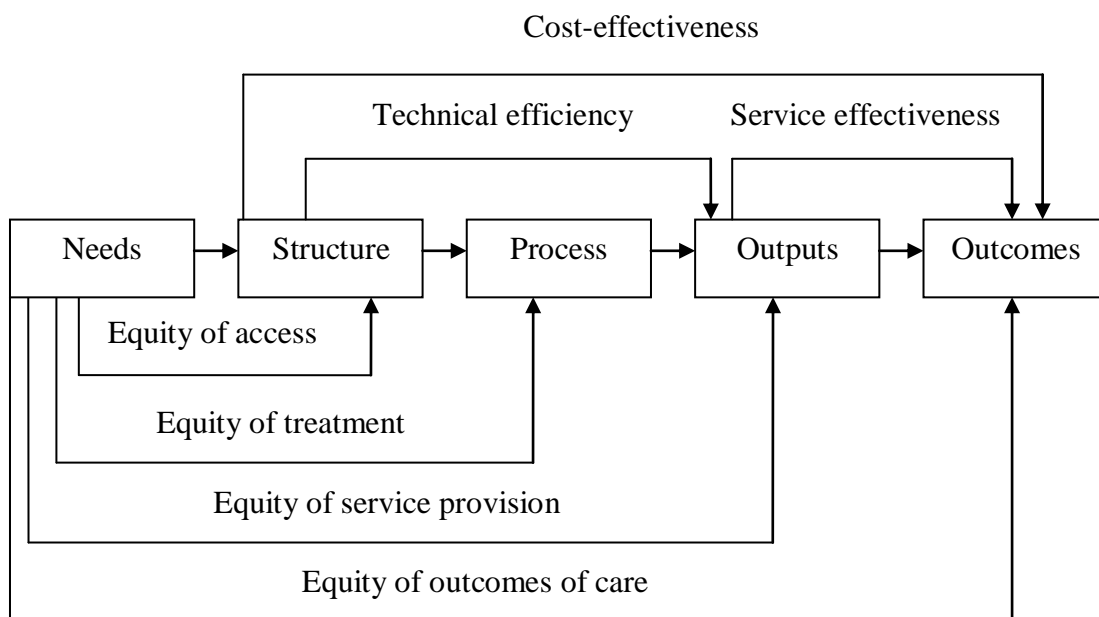


Figure 1. Conceptual framework for performance assessment of primary care providers

In order to clarify the concepts involved in this framework, we will now discuss the performance measurement dimensions presented in Figure 1.

**Performance measurement dimensions**

Beyond the isolated evaluation of each category of performance measures, there is an alternative in exploring their interrelations through the joint treatment of several performance categories at once. Such linkage is provided by various dimensions such as equity, efficiency and effectiveness that make it easier to track the causes of underperformance and enables to overcome the partial nature of the conventional systems of indicators. We will now discuss each performance dimension in more detail.

Williams & Cookson (2000) pointed out that in economics the term of "equity" usually refers to fairness in the distribution of a good. However, in the health care setting this notion can obtain several distinctive connotations, depending on which aspect of health care provision is taken into account – equality of access, equality of treatment or equality of health outcomes (Mooney et al., 1991; Culyer et al., 1992; Goddard & Smith, 2001;). Moreover, there are two distinctive perspectives proposed by Aristotle in defining this dimension. Specifically, horizontal equity refers to equal treatment for equal need, while vertical equity assumes unequal and appropriate treatment for different needs. In this study all our discussion about this performance dimension is based on the concept of horizontal equity. Figure 1 portrays the variants of equity by different connections lied between the category of needs and other elements of the framework corresponding to the performance measurement categories. In this respect, equity of access evaluates the absence (or the presence) of organisational, economic and geographical obstacles in health care access for potential users with equal need. Equity of treatment evaluates if there exists equal service for different groups of patients regarding technical and interpersonal management of care. Equity of service provision evaluates if there exists equality in the quantity of clinical activities provided to patients with the same need for health care, and equity of outcomes of care refers to patients' satisfaction and impact on health care status across defined patient groups with similar needs.

The achievement by a decision-making unit of technical efficiency means that an increase of any outputs or inputs is not feasible without decreasing some other outputs or inputs (Koopmans, 1951). Cost-effectiveness evaluates the achievement of the objectives of health care provided including the cost component of the inputs required (Gold et al., 1996). Service effectiveness is defined as the ratio of health care outcomes to the level of services provided (Schinnar et al., 1990).

### **Monitoring of side-effects**

The implementation of a measurement framework can potentially lead to dysfunctional behaviour and encourage the attainment of "undesigned" targets (Smith, 1995; Casalino, 1999, Smith & Goddard, 2002; Bevan, 2006). With growing popularity of incentive regulation in the health care setting, the unintended consequences of performance measurement should be treated with particular caution and rigor (Petersen et al., 2006). Undesired changes in behaviour might be intentional or unintentional, however, in both cases it may cause profound implications regarding the quality of health care delivery. In this context Mannion and Braithwaite (2012) attempted to classify dysfunctional consequences of national performance measurement systems into four groups: poor measurement itself,

misplaced incentives and sanctions, breach of trust as intentional bullying and gaming, and politicisation of performance systems. In this respect, a good performance measurement scheme should include the monitoring of possible side-effects and try to prevent their occurrence.

## **Analysis stage**

At the analysis stage an interpretation of the performance measures is supposed to take place, according to Smith (1996). The simplest way is perhaps to develop a system of performance indicators by specifying the available data in the groups of individual ratios, as in the Balanced Scorecard method, proposed by Kaplan and Norton (1992). In this case rankings and classifications are applied to compare the level of organisational performance among peer entities. Alternatively, the employment of one or several analytical tools might give us valuable insights into performance by transforming raw PIs into aggregated final results.

We could broadly classify these tools into parametric and non-parametric, into stochastic and deterministic. There are two types of parametric approaches used to compare organisational performance: regression analysis and Stochastic Frontier Analysis (SFA). The regression analysis of performance data estimates the central tendency of the observed data in relation to the one or more independent variables (Fox, 1997). SFA, invented by Aigner et al. (1977) and Meeusen & van den Broeck (1977), aims at constructing of a cost (or production) frontier with an error term composed of a traditional symmetric random noise component and a one-side inefficiency term. As a parametric techniques, SFA also requires to specify the functional form of a cost (or production) function that is of certain difficulty in such complex setting as health care is. Data Envelopment Analysis (DEA), a non-parametric technique, was initially proposed by Charnes et al. (1978) to calculate optimal efficiency estimates for each entity within a set of peer decision-making units (DMUs). In contrast to SFA, DEA can easily handle multiple input and multiple output models of the production process and uses no a priori weighs. Furthermore, it doesn't require the knowledge of which inputs are converted into which outputs. An efficient frontier is spanned by a linear combination of the best practice units to "envelop" underperforming DMUs. Both in the SFA and DEA analysis, a DMU's efficiency is interpreted as the distance between the unit under scrutiny and the frontier line. However, given its deterministic nature, DEA treats any deviation from the frontier as an evidence of inefficiency, making no allowance for data inconsistencies, outliers, or random noise. A more detail description of SFA and DEA can be found elsewhere (Cooper et al., 2004; Kumbhakar & Lovell, 2003).

## **Action stage**

Smith (1996) suggested that the actions derived from the analysis of data should be taken at the final stage of the performance measurement process. In this respect two distinctive approaches outline possible actions. On the one hand, performance assessment gives an opportunity to ascertain if organisations are successful in delivering their strategy and meeting stated goals. From this standpoint, it serves for the purposes of internal and external



control and maintains accountability relationships, existing between an organisation and its various groups of stakeholders (Freeman, 2002; Harrison et al.; 2012). On the other hand, performance assessment can contribute to enhancing health systems functioning (Smith et al., 2009). If in the first case the emphasis is made on verification and control of past actions, the second approach is more directed at learning and bringing about improvements in future. The choice of approach is directly connected with defined objectives of the performance measurement and should be therefore developed in close cooperation with the targeted group of stakeholders.

### **3. Results**

#### **Study characteristics**

In order to provide an overview of the selected literature some study characteristics are discussed below.

The number of published studies devoted to the performance assessment of primary care providers has been generally increasing during the time period from 1989 until 2011, reflecting the growing importance of the research topic. It is interesting to note that the earliest paper on this issue is dated from 1977 and its objective was to evaluate the performance of 9 health centres in New Jersey, the USA, in relation to the national health policy (Breyer, 1977). Then, between 1978 and 1988 the research area remained uncovered in terms of new publications, which is consistent with Hollingsworth et al. (1999) in relation to efficiency measurement studies. Regarding the most recent trend, from the 84 studies analysed, the majority of studies were published after 1995 (only 7% of studies were produced before 1995). Between 1995 and 2009, this research area benefited from the publication of an average of 4 articles per year. In the last two years, the number of publications in this area is very significant, representing 8% and 14% of the total literature selected, respectively.

As for geographical distribution, the 84 selected papers report the results of empirical research originated in 25 countries across the world with almost a half of the studies (49%), emanating from the UK and the USA.

#### **Measurement stage**

##### **Stakeholders' objectives**

As it was discussed earlier, the performance measures should be designed once the stakeholders' needs in the measurement of the performance have been specified. However, based on our review, it is noteworthy to conclude that in 40% of cases there was no explicit identification of the end-users who can ultimately benefit from the results of the undertaken assessment. The rest of the studies have prioritised the objectives of one or several of the following groups of stakeholders: government, local authorities, policy and decision makers –

49% of studies, health care providers and managers – 38%, the general public and users of the health services – 13%.

### **Structure (Inputs)**

Campbell et al. (2000) identified two main domains within this category of performance indicators: physical characteristics and staff characteristics. To follow this classification it would be reasonable to attribute facilities and medical equipment to the first category, while the number of staff members and their qualifications to the second. Indeed, these examples are very illustrative and, according to our data analysis, form a substantial part in the total scope of studies that investigated structure, representing 24% and 46% of the described subset of papers respectively. Furthermore, a considerable part of the selected studies examined the way in which these resources are functioning. Concerning physical resources, type of the appointment system, opening hours and record keeping system are among most examined structural elements (22% of the studies that examined structure indicators), while the organisation of human resources is predominantly documented in terms of task delegation and coordination, including referrals to the secondary care specialists (17% of the same scope of studies). An intermediate group of structural elements that lies between physical and staff characteristics is a range of available health care services and their quantity. It turned attention of researchers in 22% of studies where structure was explored. Donabedian (1980) also pointed out that staff satisfaction as well as any other practitioner-related characteristic can become a part of structure if a certain tendency is tracked. Thus, we identified 11% of studies that include staff satisfaction into research of structure. What is missing in the classification of structural elements by Campbell et al. (2000) but was included in the definition of structure by Donabedian (1980) is financial resources and costs in a health care system. The majority of structural elements can be translated into costs held by health care managers (for example, running costs on personnel), patients (average cost per visit) or governmental entities (size of financial investments). It comprises 29% of the total scope of the selected empirical research that focused on structural aspect of the health care delivery.

### **Process**

Only 27% of the selected empirical studies investigated process measures. According to the results of the analysis, it is appropriate to divide process indicators into two groups: technical and interpersonal. The technical aspect of health care process is captured through a set of indicators that reflect the level of application of medical knowledge to a patient's health problem, as noted by Donabedian (1980). Thus, process indicators aim to measure to which extent the health care provided corresponds to current medical norms and requirements. In this context, many studies attempted to identify an adherence to protocol in chronic disease management (mainly, diabetes, hypertension and asthma treatment) and preventive service delivery. Among others it includes investigation of a patient's history taking and medical prescription components, physical examination, appropriateness in the use of medication. Another aspect of health care process, defined by Donabedian (1980), is interpersonal that demonstrates the level of social and psychological interaction between doctor and patient. In

the selected studies this type of process indicators was mostly measured in terms of patient education and counselling, quality of communication, and continuity of care. The distribution between technical and interpersonal process indicators is 50% and 75% respectively of the total scope of studies that explored the process characteristics of health care providers.

### **Outputs and outcomes**

In the selected empirical papers outcomes were measured four times less than outputs. Typical output measures include the number of visits, procedures and tests, the percentage of population/number of patients that undergo certain type of medical interventions. As for outcomes, Jacobs et al. (2006) suggested to group them into two categories: the additional health conferred on the patient and patient satisfaction with the health care received. We found it appropriate to label the first group of outcome measures as “clinical-related” and the second group as “patient-related” with regard to the prioritised stakeholders’ perspective. However, in the selected studies we encountered the outcome measures that reflect satisfaction of the general public with the health services provided (Anbrasi et al., 2011). Thus, the third group of outcome measures could be defined as “community-related”. We believe that it is important to distinguish patient satisfaction from community satisfaction as the latter has a broader social meaning. This is tightly related to the concepts of community-oriented primary care (Longlett et al., 2001) and public health (Turnock, 2009).

### **Technical efficiency**

A significant part, precisely, 47% of the empirical studies focused on the evaluation of efficiency among other performance dimensions. Both input- and output-oriented models were employed in the studies. As for inputs in the technical efficiency analysis, they were mostly identified in terms of labour and capital resources characteristics, such as number of health services provided, total working hours, number of staff members or square footage of facilities (56% of input measures). About a quarter of the efficiency studies treated the costs of resources as inputs, conducting cost-efficiency analysis. Finally, the remaining studies used the mixture of costs and physical resources measures as inputs. It is interesting to note that particular measures were identified as inputs in some models and as outputs in others. For example, number of medical visits were inputs in studies by Bryce et al. (2000), Chilingirian & Sherman (1996), Siddharthan et al. (2000) and outputs in research by Murillo-Zamorano & Petraglia (2011), Pina (1992), Ramírez-Valdivia et al. (2011). It reflects different approaches in estimating technical efficiency and once again emphasizing the importance of stakeholders’ participation in the identification of what is considered to be an efficient organisation.

### **Service and cost-effectiveness**

Only a small subset of the empirical studies investigated service and cost-effectiveness of health care providers. It may be related to the fact that infrequent measurement of the outcomes of health care hampers an exploration of these dimensions. At the same time, Gold et al. (1996) mentioned that most cost-effectiveness analysis are conducted with regard to

particular health intervention programs, generating over 100 studies per year in professional medical journals, and therefore concentrating on a lower level of the health system functioning.

Some studies misplaced the notion of efficiency with effectiveness, according to our definitions, comparing inputs to the outputs but not to the outcomes of health care (Goñi, 1999, Twinn & Shiu, 1996). We also found that some efficiency studies included outcome measures in addition to output counts, exploring efficiency and effectiveness simultaneously (Thanassoulis et al., 1995).

### **Equity**

Equity was investigated in 15% of the selected empirical literature. The most used discrimination criteria were ethnicity and socio-economic status of patients. All of the studies employed the concept of horizontal equity to evaluate the extent to which equal access, treatment, service provision or outcomes of health care exist in relation to equal need. Concerning the type of equity, we found that equity of access and service provision were mostly explored in the selected studies.

### **Analysis stage**

Data Envelopment Analysis was employed in 43% of the selected empirical studies versus 4% of the same scope that used Stochastic Frontier Analysis as an analytical tool. We also found almost equally frequent use of regression analysis in comparison to the DEA technique (42% of the total empirical studies). Generally, in most recent studies from the sample there is a clear tendency towards using the multi-stage DEA models rather than the one-stage DEA models and in 18% of the empirical studies DEA was combined with regression analysis to adjust for case-mix factors. Systems of performance indicators without employment of regression analysis, DEA or SFA were developed in 31% of the selected empirical research papers.

### **Action stage**

During the papers' review it was not always evident what actions are proposed in relation to the obtained research results. In other cases suggested actions were manifest, as, for example, "having more physicians available for ANC (antenatal care – authors' remark) in PHCCs (primary health care centres – authors' remark) could improve the standard of care" (Habib et al., 2011, p.202), when the insufficiency in number of medical consultations was revealed. However, the scarcity of disposable resources might turn such kind of suggestions into practically infeasible if their feasibility was not discussed with the stakeholders. We found the examples of both accountability related and improvement actions, although most of them did not consider the stakeholders' opinion. For example, Schmaker (2008) estimated that if health care managers achieved "an improvement of 5% in productive efficiency thus would result in about 27 million more visits with no additional resources" (Schmaker, 2008, p. 69) in the U.S. primary clinics.

## 4. DISCUSSION AND CONCLUSIONS

Although the organisational forms of primary health care providers may vary considerably across the countries, every health system aims at achieving equitable, efficient and effective delivery of health care services. In doing so, each system seeks to maximize its positive effect on health related quality of life of people in different communities.

In this study we reviewed existing approaches presented in the relevant papers to compare performance of primary care providers. In this respect, different aspects of the performance assessment process were examined in order to provide an integral picture of the main developments in the referred domain and to draw a research agenda for the future. In what follows, we discuss the major results of our analysis.

Considering the multiplicity of stakeholders in the health care sector, it is essential to ensure that the ultimate results of performance measurement are demanded and of interest to certain stakeholders. Furthermore, stakeholders' participation in the development of measurement frameworks enables to capture the relevant facets of performance within a primary health care organisation and subsequently to construct robust and feasible measures. At a later stage, it is also important to involve the stakeholders in the analysis of the obtained results and in the development of feasible improvement strategies. However, this review has clearly demonstrated that many empirical studies on performance assessment do not follow this scheme, increasing the gap in that way between the research community and the decision makers in health care.

Performance indicators are seen as the simplest elements of the assessment process that reflect particular features of the health care performance in a quantitative form. To date, a wide variety of performance indicators have been developed that can be classified into 4 categories depending on which aspect of care do they represent: structure, process, output or outcome.

Structural components, in turn, reflect the possibility for potential users to receive health care, when measuring relatively stable organisational characteristics of a health care provider. Good structure in this sense means sufficiency and adequacy in labour and capital resources along with a proper management design in their organisation. It also includes financial aspect of interaction between patients, providers, taxpayers, and the state. However, structural elements cannot indicate whether the needed health care has been received by individuals and what the consequences of such care are.

Process and outputs capture the qualitative and quantitative characteristics of medical care, while outcomes measure its effect in short and long-term perspectives. Particularly, measures of process are designed to show technical and interpersonal aspects of the care provided during patient-provider interaction. Although these measures do not participate in most efficiency and effectiveness analysis, they can eventually contribute to the understanding of *why* particular performance results are observed. It is also important to note that sometimes

the distinction between structure and process measures can be subtle, since the way services are delivered may be included into the structure category, treating it as stable characteristics.

Regarding output and outcome measures, the former is more commonly documented in the studies selected, since it indicates the quantity of the services provided and, consequently, the relevant data collection is of comparative easiness. Outcome measurement, on the contrary, is accompanied with a number of challenges, and, perhaps, the most significant one is how to establish the correspondence between the care provided to patients and the ultimate impact of such care on patients' health.

It is our conviction, however, that the isolated study of performance measures contributes very little to the understanding on how to improve the performance of health care organisations and therefore has a limited impact on patients' health. The research of isolated performance indicators is important to signal problems, but unless further investigation is carried out and corrective actions are implemented, its usefulness is limited. We argue that the quality of primary health care can be measured through appropriately designed efficiency, effectiveness and equity measures that establish links between different performance measurement categories.

Various analytical techniques may be employed to analyse performance data. Unlike the systems of performance indicators, a non-parametric technique known as Data Envelopment Analysis can provide an aggregate measure of performance, identify best practices and establish performance targets, facilitating measurement, analysis and action processes described above as the main components of the performance measurement. Its parametric counterpart known as Stochastic Frontier Analysis fails to achieve the same level of applicability in the primary health care setting. Our explanation to the less common use of SFA in primary care performance assessment relates with the requirement to specify the functional form of a production (or cost) function which can be very difficult in this context.

There are some limitations associated with this review. The first limitation relates to the comprehensiveness of the electronic database; the absence of publications in the researched area between 1978 and 1988 might also indicate this problem. However, we believe that the combination of systematic and traditional literature reviews allowed us to cover the majority of published studies in the researched domain. The second limitation relates with the fact that we only analysed papers written in English.

In conclusion we believe that the following questions should be addressed in further research:

1. There is a range of overlapping terms existing with regard to structural measures, such as accessibility, availability, capacity, adequacy that could be uniquely standardised and systematised to avoid confusions and to afford cross-country organisational comparisons.
2. In the context of performance measurement most technical process measures focus on preventive and chronic disease management within primary health care domain. Further research should include the development of performance process measures on acute disease treatment.

3. Short-term and long-term outcomes of health care are not easily measurable. Further research is needed to account for time lags between the health services provided and the outcomes of such care, considering possible factors outside the control of the health care providers.
4. A greater accent should be placed on evaluating service and cost-effectiveness of health care providers. In case of service-effectiveness analysis a special attention should be given to the questions of contributinal (when the care delivered is known to produce specified outcomes) and attributional (when the outcomes can be attributed to the care provided) validity, as proposed by Donabedian (1980).
5. Equity studies should seek for inclusion of unmet need, focusing more on target population's needs rather than on patients' demand of health care. The estimation of need for health care of local populations can be made on the basis of relevant demographical and epidemiological data.
6. Further technical efficiency analysis should account for dynamic effects in health care production to consider time lags between investments in health care and the followed results.

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