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Let's play the patients music

A new generation of performance measurement systems in healthcare

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Abstract

Purpose – Current performance measurement systems (PMSs) are mainly designed to measure performance at the organizational level. They tend not to assess the value created by the collaboration of multiple organizations and by the involvement of users in the value creation process, such as in healthcare. The purpose of this paper is to investigate the development of PMSs that can assess the population-based value creation process across multiple healthcare organizations while adopting a patient-based perspective.
Design/methodology/approach – The paper analyzes the development of a new healthcare PMS according to a constructive approach through the development of a longitudinal case study. The focus is on the re-framing process of the PMS put in place by a large group of Italian regional health systems that have adopted a collaborative assessment framework.
Findings – Framing information according to the population served and the patients' perspective supports PMSs in assessing the value creation process by evaluating the contribution given by the multiple organizations involved. Therefore, it helps prevent each service provider from working in isolation, and avoids dysfunctional behaviors. Re-framing PMSs contributes to re-focusing stakeholders' perspective toward value creation; legitimizes organizational units specifically aimed at managing transversal communication, cooperation and coordination; supports the alignment of professionals' and organizations' goals and behaviors; and fosters shared accountability among providers.
Originality/value – The paper contributes to the scientific debate on PMSs by investigating a case that focuses on value creation by adopting a patient-centered perspective. Although this case comes from the healthcare sector, the underlying user-centered approach may be generalized to assess other environments, processes, or contexts in which value creation stems from the collaboration of multiple providers (integrated co-production).

Keywords Performance measurement systems, Health care management, Inter-organizational performance, Patient-based perspective

Paper type Research paper

Introduction

Performance measurement systems (PMSs) can be defined as a set of conceptual tools aimed at defining, controlling and managing both the achievement of end-results (output or outcomes) as well as the means used to achieve these results at various levels (e.g. societal, organizational and individual) (Broadbent and Laughlin, 2009). These tools represent a key feature in every evidence-based management (EBM) process (Booth, 2006). EBM promotes the collection and use of performance measures and information in order to provide all stakeholders with evidence regarding the needs, resources used and results obtained (Walshe and Rundall, 2001; Lomas and Brown, 2009). Without the support of PMSs, decision makers and other stakeholders would not have evidence of whether the results achieved are consistent with strategies and whether they are moving in the right direction (Marr, 2006).

The first PMSs arose with the emergence of mass manufacturing models during the industrial age (Bourne, 2001; Bititci *et al.*, 2012). Since then, these tools have evolved to match the changing needs of organizations and society both in the private and public sectors (Radnor and Mcguire, 2004).

According to Wilcox and Bourne (2002) and Bititci *et al.* (2012), there are three main phases of PMS evolution. The first one (1890–1980) was developed from cost and management accounting systems (Wilcox and Bourne, 2002; Arnaboldi *et al.*, 2015), as part of which the "budgetary control" form of performance measurement emerged. The PMSs developed in this period were designed to deal with the vertical hierarchy

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principle that characterized organizations at that time, and a distribution of power consistent with the organizational structure (Bititci *et al.*, 2012).

The second phase of performance measurement started in the 1980s and was aimed at overcoming the exclusive adoption of a financial perspective including multiple dimensions of performance (Hayes and Abernathy, 1980; Wilcox and Bourne, 2002; Bititci *et al.*, 2012). During this phase, the first "integrated performance measurement" systems were developed in order to deal with the switch from bureaucracy to adhocracy occurring in private and public organizations at that time.

The third and most recent phase (from the mid-1990s) was driven by the need to link key performance indicators to strategy (Kaplan and Norton, 1992, 1996; Wilcox and Bourne, 2002). In this period measurement started to be conceived as a tool to facilitate strategic management practices in organizations, e.g. mapping the process of value creation within and, later on, beyond organizational boundaries (Bititci *et al.*, 2012).

In the last few years, the management literature has shown significant interest in analyzing the opportunities and challenges of performance measurement applications in inter-organizational settings (Bititci *et al.*, 2012; Anderson and Dekker, 2015; Dekker, 2016). This increasing attention has coincided with a significant growth in collaborative relationships between organizations in both the private (Anderson and Sedatole, 2003; Dekker, 2016) and public sectors (Brignall and Modell, 2000; Christensen and Laegreid, 2007; Bianchi, 2010; Kurunmäki and Miller, 2011; Halligan *et al.*, 2012).

Due to the institutional fragmentation characterizing the public sector, the literature (see among others Ryan and Walsh, 2004; Christensen and Laegreid 2007; Moore 2013; Cuganesan *et al.*, 2014) has identified a need to focus performance measurement on an assessment of the value creation process and, consequently, to go beyond the organizational boundaries and adopt a network perspective. This trend in the design of PMSs is also happening in healthcare, and the most recent evidence shows that this sector is even anticipating many of the global dynamics and challenges.

Healthcare systems are characterized by an intrinsic complexity derived from both governance fragmentation as well as uncertainty, pluralism and a multidisciplinary environment (Plsek and Greenhalgh, 2001; Lemieux-Charles *et al.*, 2003; Ramagem *et al.*, 2011).

Dealing with this complexity requires collaborative approaches among stakeholders in order to better respond not just to patients and service users but also to the needs of the whole population from a system perspective (Nuti, Bini, Ruggieri, Piaggesi and Ricci, 2016; Gray *et al.*, 2017).

This paper focuses on performance measurement challenges and future perspectives in healthcare. The aim is to analyze how the healthcare system has followed the path of the global trend and how it can contribute to the research agenda of performance measurement. The paper provides the results of a constructive analysis of the evolution of PMSs based on a longitudinal case of the re-framing of the PMS by a large group of regional healthcare systems in Italy that have adopted a network framework.

The next section contextualizes the performance measurement and management challenges in the healthcare sector, outlining its distinguishing characteristics. The third section presents the methodology and then the Italian case study on which this paper is based, and the fourth section explores its re-framing process. The discussion and conclusions are then developed in the final sections.

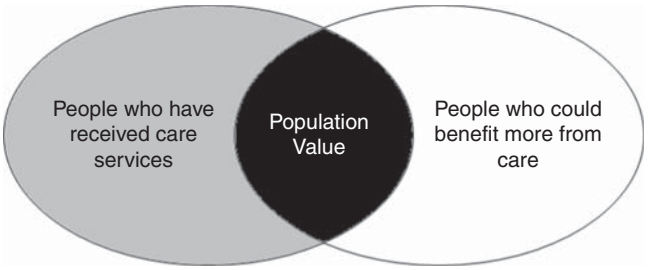
The evolution of PMSs in healthcare

Until the introduction of the New Public Management (NPM) paradigm, the public sectors of western countries adopted Weber's model of ideal bureaucracy (Hood, 1991; O'Flynn, 2007), whose system of control focused on input monitoring and process compliance (Head and Alford, 2015).

Management accounting forms of control were gradually introduced in the public healthcare sector following the NPM reform of the 1980s which promoted the use of private sector practices throughout the west (Hood, 1991; Brignall and Modell, 2000). The aim was to overcome the shortcomings of the traditional paradigm of public administration based on bureaucracy that did not focus on efficiency or results (Hood, 1991; O'Flynn, 2007). Several healthcare public systems thus introduced the first generation of "budgetary control" measurement systems mainly focused on financial measures, volumes of services provided and organizational responsibility assessments (Chua and Preston, 1994; Ballantine *et al.*, 1998; Arnaboldi *et al.*, 2015; Naranjo-Gil *et al.*, 2016). This phase, also known as "managerialism" or "managing for results," led to the breakdown of organizations into various business units controlled by setting goals and monitoring performance results stressing departments' productivity (Bouckaert and Halligan, 2008; Head and Alford, 2015). Although this generation of PMSs helped to overcome the bureaucratic model, it strengthened a "silo" structure, where each provider and each organizational unit operating in the healthcare system was monitored according to both the volume of activities (e.g. number of treatments) and financial measures such as revenues and costs. This approach frequently created internal competition within institutions, especially in terms of the allocation of financial resources (Chua and Preston, 1994; Christensen and Laegreid, 2007; Head and Alford, 2015).

The strong focus on financial performance and the attribution of responsibilities to organizational units of first generation PMSs limited the ability of healthcare stakeholders to assess performance according to the public value paradigm which, in the last few decades, has become the reference paradigm of public administrations (O'Flynn, 2007; Cuganesan *et al.*, 2014). Public value is a multidimensional construct that primarily results from government performance (Moore, 1995; Bryson *et al.*, 2014). In healthcare, public value has been defined as the relationship between outcomes and resources (Porter, 2010) from a population-based perspective (Gray and El Turabi, 2012). The identification of value as the key objective of healthcare systems (Porter, 2010; Gray and El Turabi, 2012; Gray *et al.*, 2017; Lee *et al.*, 2017) requires PMSs to shift their focus toward the assessment of health organizations' ability to take decisions and actions that effectively create and deliver value to the reference population (Naranjo-Gil *et al.* 2016). Population value in health care does not correspond to the volume of services delivered or the outcome achieved for the treated patients, but is the ability of the healthcare system to provide care to the people that could benefit most from it (Gray *et al.*, 2017).

In fact, it is not uncommon for health services to be also provided to people that do not need them, and thus wasting resources (see Figure 1—gray area). Moreover, the healthcare system may not be able to identify and provide care to those most in need (see Figure 1—white area). From the perspective of effectiveness, healthcare systems create value for the population when



Source: Adapted from Gray *et al.* (2017)

Figure 1.
Population value

the people treated are those that benefit the most from the treatment (see Figure 1—black area) (Gray *et al.*, 2017).

Performance measurement is thus required to overcome the traditional focus on the financial dimension and support a population value-based approach to performance assessment.

PMS in health care has thus followed the recommendations of many authors (Van Peursem *et al.*, 1995; Leggat *et al.*, 1998; Aidemark, 2001; Arah *et al.*, 2006; Nuti *et al.*, 2013), by implementing what Bititci *et al.* (2012) have called "Integrated Performance Measurement Systems."

This generation of PMSs in healthcare is characterized by:

- Multi-dimensionality: PMSs provide measures that go beyond volumes of activities and financial aspects, and are based on indicators related to structure, process, quality of care and equity from a population-based perspective, and also the system's financial sustainability (Donabedian, 1988; Ballantine *et al.*, 1998; Leggat *et al.*, 1998; Arah *et al.*, 2006; Nuti *et al.*, 2013).
- Evidence-based data collection and information provision: providing support for stakeholders in decision making (Sackett *et al.*, 1996).
- Shared design: all stakeholders, and particularly health professionals, should be involved in providing insights and suggestions (e.g. new indicators, revision of existing indicators) in a continuous fine-tuning process (Leggat *et al.*, 1998; Nuti, Vola, Bonini and Vainieri, 2016).
- Systematic benchmarking of results: benchmarking among providers and among geographic areas should be ensured in order to shift from monitoring to evaluation (Nuti *et al.*, 2013).
- Transparent disclosure, to stimulate data peer-review and, together with systematic benchmarking, to leverage professional reputation (Hibbard, 2003; Bevan and Wilson, 2013; Nuti, Vola, Bonini and Vainieri, 2016; Bevan *et al.*, 2018).
- Timeliness, to allow policy makers to make decisions promptly and to increase trust in indicators (Davies and Lampel, 1998; Bevan and Hood, 2006; Wadmann *et al.*, 2013).

However, even these PMSs present some limitations in addressing the new challenges of performance measurement because they are mainly designed according to an individual healthcare provider's perspective, whereas most services are delivered to patients thanks to inter-organizational (i.e. across providers) relationships. Especially in epidemiological conditions (e.g. chronic diseases, cancer, mental illnesses), the process of value creation can only be measured effectively by assuming the value-delivery chain perspective which, in healthcare, corresponds to the patients' clinical pathways. As such, the adoption of a care pathway perspective is pivotal in assessing performance and, consequently, guiding policy makers and other stakeholders' actions (Nuti, Bini, Ruggieri, Piaggesi and Ricci, 2016).

Dealing with care pathways entails creating horizontal inter-organizational networks to allow coordination between health professionals across organizational boundaries. These networks, which may or may not be officially recognized, are usually organized to take care of the patient along the different phases of the pathway. The relationships among network components are characterized by interdependence, complexity and continuous change, and the absence of a clear hierarchy makes their assessment problematic (van der Meer-Kooistra and Scapens, 2008).

The management literature on performance assessment has tended to focus on inter-organizational performance assessment at the single-institution level (Cuganesan

et al., 2014; Dekker, 2016). Kurunmäki and Miller (2011) outlined the need to broaden the study of inter-organizational relations and performance management to include not only organizational forms, but the practices and processes through which they are made operable, e.g. pathways.

The limitations of current PMSs—which are related to collecting and displaying exclusively performance data from an organizational perspective (e.g. regional health system, local health authorities, hospitals)—are linked to the risk of shifting professionals' attention to sub-optimal performance rather than delivering value to patients, thus leading to performance distortions and strategic inconsistency (Meyer and Gupta, 1994; Van Thiel and Leeuw, 2002; Melnyk *et al.*, 2013). A lack of alignment between strategy and performance evaluation systems may result in "performance traps" or "performance paradoxes" (Meyer and Gupta, 1994; Van Thiel and Leeuw, 2002; Lemieux-Charles *et al.*, 2003; Bevan and Hood, 2006; Wadmann *et al.*, 2013). Performance traps are related to narrow views and uses of measurement which may lead, for example, to sub-optimization (focusing on local performance results rather than overall system goals); myopia (focusing on short-term targets at the expense of longer-term objectives); and tunnel vision (the narrowing of managerial attention) (Van Thiel and Leeuw, 2002; Bevan and Hood, 2006; Wadmann *et al.*, 2013; Nuti, Vainieri and Vola, 2017). This is even more evident in highly fragmented governance structures (Noto and Bianchi, 2015).

There is thus a need for a PMS that measures the value created for the population (as with second generation PMSs) and also takes into account the patient perspective. This implies that PMSs in health should consider horizontal relationships between healthcare organizations and professionals, and mitigate professional and organizational barriers to networking (Berry, 1994; van der Meer-Kooistra and Scapens, 2008; Kurunmäki and Miller, 2011; Cuganesan *et al.*, 2014; Dekker, 2016).

A key element in dealing with these challenges is the way performance data are reported so as to foster the sharing of results among stakeholders (Bititci *et al.*, 2016). The use of appropriate communication channels, such as an effective visual system, is crucial in order to create commitment to achieving the desired performance and appropriate behaviors throughout all organizational levels (Kaplan and Norton, 1992; Otley, 1999; Bititci *et al.*, 2016).

Performance visualization concerns the representation and framing of data, information and knowledge in a graphical format which may lead to new insights and an understanding of the performance of the organization/system analyzed thus fostering stakeholder commitment to the strategic goals of the organization (Tversky and Kahneman, 1981; Lengler and Eppler, 2007). In fact, since people are driven by bounded rationality, evidence-based decision-making is intrinsically mediated by the way evidence itself is communicated. According to Bititci *et al.* (2016), effective visual systems for strategic and performance management support strategy development and implementation; performance reviews; internal and external communication, collaboration and integration among different units and levels; cultural changes; and innovation.

In order to benefit from PMSs, performance information thus needs to be framed and communicated consistently with the aims and strategies (Teece, 1990; Pettigrew, 1992; Bititci *et al.*, 2016) of health systems (Nuti *et al.*, 2013).

A shift from a single-organization performance assessment to an inter-organizational assessment requires the integration of measures and representations that map the service delivery process that the network has to put in place, which in the case of healthcare means the patient pathway. PMSs are thus required to represent performance information according to the goal of the system that is being measured (e.g. fostering collaborative practices, networking and shared accountability).

Method

This paper describes the results of a longitudinal constructive study carried out in Italy on the evolution of the Italian Regional Performance Evaluation System (IRPES) in healthcare.

The IRPES was initially developed in 2004 thanks to a collaboration between the Mes-Lab—Institute of Management of Sant'Anna School of Advanced Studies and the regional health system in Tuscany (Italy). Since 2008, the IRPES has been shared by many other regional health systems in Italy so that they can benchmark their results against each others' (Nuti *et al.*, 2013; Nuti, Vola, Bonini and Vainieri, 2016). The IRPES is currently (2018) adopted by 11 Italian regions and two autonomous provinces (Apulia, Basilicata, Calabria, Emilia Romagna, Friuli Venezia Giulia, Liguria, Lombardy, Marche, Tuscany, Umbria, Veneto, the Autonomous province of Bolzano, the Autonomous province of Trento) covering around 190 health organizations providing health services for about 20 million inhabitants. This PMS is currently used by these regional systems when producing regulations defining the objectives and priorities of their health systems. Some of these regulations have been directly based on the evidence produced by the IRPES[1].

What distinguishes the IRPES from other PMSs is the voluntary-based adoption by regional health systems and the role of the Mes-Lab in facilitating the continuous development of new analyses and tools to support stakeholders in interpreting data (Nuti and Vainieri, 2016; Nuti, Vainieri and Vola, 2017).

The Mes-Lab has played a primary key role in both the development and the re-framing of the IRPES. The constructive approach adopted aims to solve issues through the direct involvement of researchers in several phases of the innovation process, such as testing solutions (Kasanen *et al.*, 1993; Labro and Tero-Seppo, 2003). The constructive approach is widely used in technical sciences, mathematics, operations analysis and clinical medicine, as well as in management research (Kasanen *et al.*, 1993; Nørreklit *et al.*, 2016). The use of the constructive approach has shed light on the principal issues involved in measuring and interpreting results. Since the IRPES was first set up, the research group has interacted with policy makers, managers and professionals of the health care sector. The solutions implemented were thus designed to overcome its shortfalls. This paper discusses the contribution to the literature from this experience.

The Italian Regional Performance Evaluation System

The IRPES system is made up of more than 300 indicators which measure the multidimensional performance of each healthcare organization. The following are monitored: health status of the population; capacity to pursue regional strategies; clinical performance; efficiency and financial performance; patient satisfaction; and staff satisfaction (Nuti *et al.*, 2013). The indicators are calculated yearly using administrative databases. The aim of the IRPES is to assess and monitor health system performance at a regional and local level: indicators are computed with regional and local granularity (both local health authorities and teaching hospitals).

The regional health systems adhering to the IRPES share a collaborative and constructive approach with each other and with the Mes-Lab research group: they discuss the definition of the indicators and on how they should be calculated. Each regional health system is responsible for processing its own data.

About half of the 300 indicators are evaluated by comparing their results with international or national/local standards. All regional health systems use the same standards, referring to the scientific literature, normative standards or, where these are lacking to the distribution of each indicator among health authorities. Performance is therefore assessed according to five different performance tiers, ranging from the worst (0—red) to the best (5—dark green).

Results are publicly disclosed through an open-access website and through an annual report[2].

Each indicator is depicted using a wide range of graphical solutions. Figure 2 uses histograms to report the results of one of the indicators used in the IRPES (i.e., waiting times for malignant breast cancer intervention).

The IRPES also exploits georeferencing data in order to display cartographic representations (see Figure 3). Such graphical solutions depicting the performance associated with a specific geographical area are aimed at assessing value creation for geographically delimited population groups.

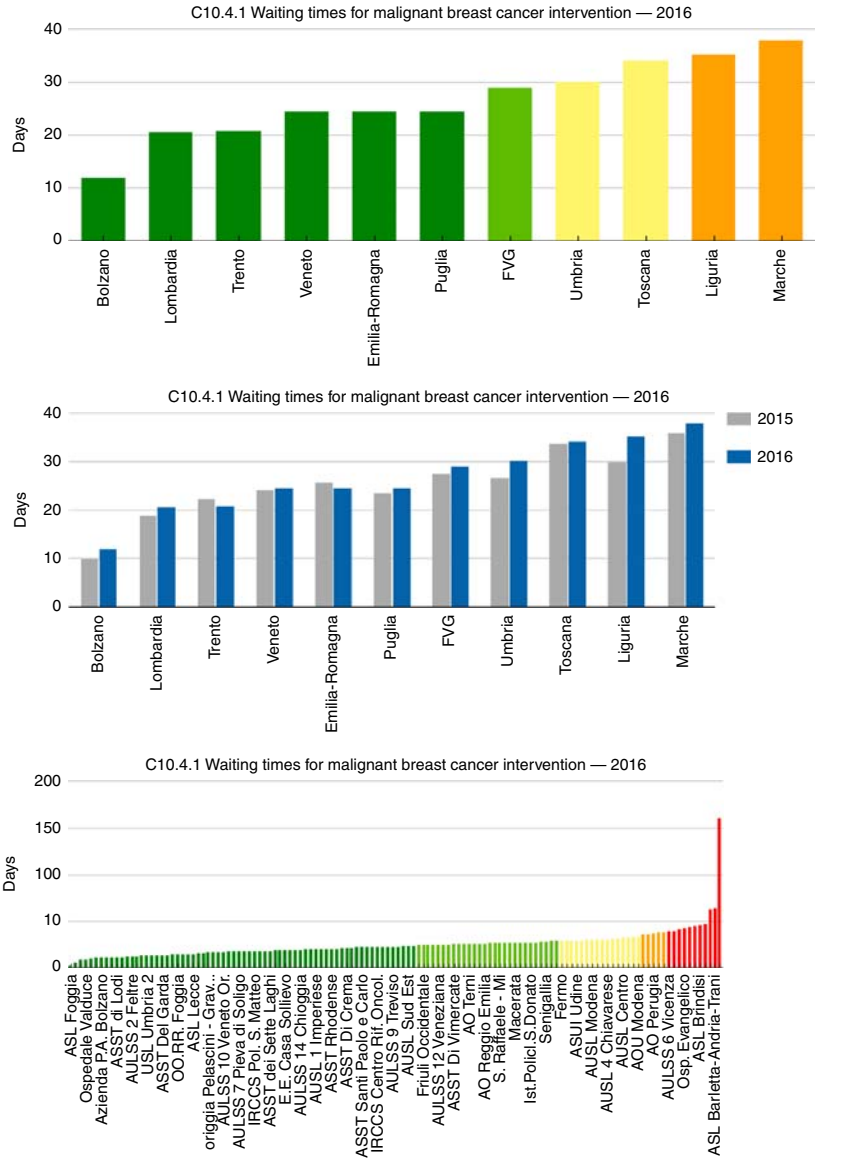


Figure 2.
Waiting times for malignant breast cancer intervention

Source: 2016 data—available at http://performance.sssup.it/netval

Source: 2016 data—available at http://performance.sssup.it/netval

Figure 3.
Cartographic representations of waiting times for malignant breast cancer intervention

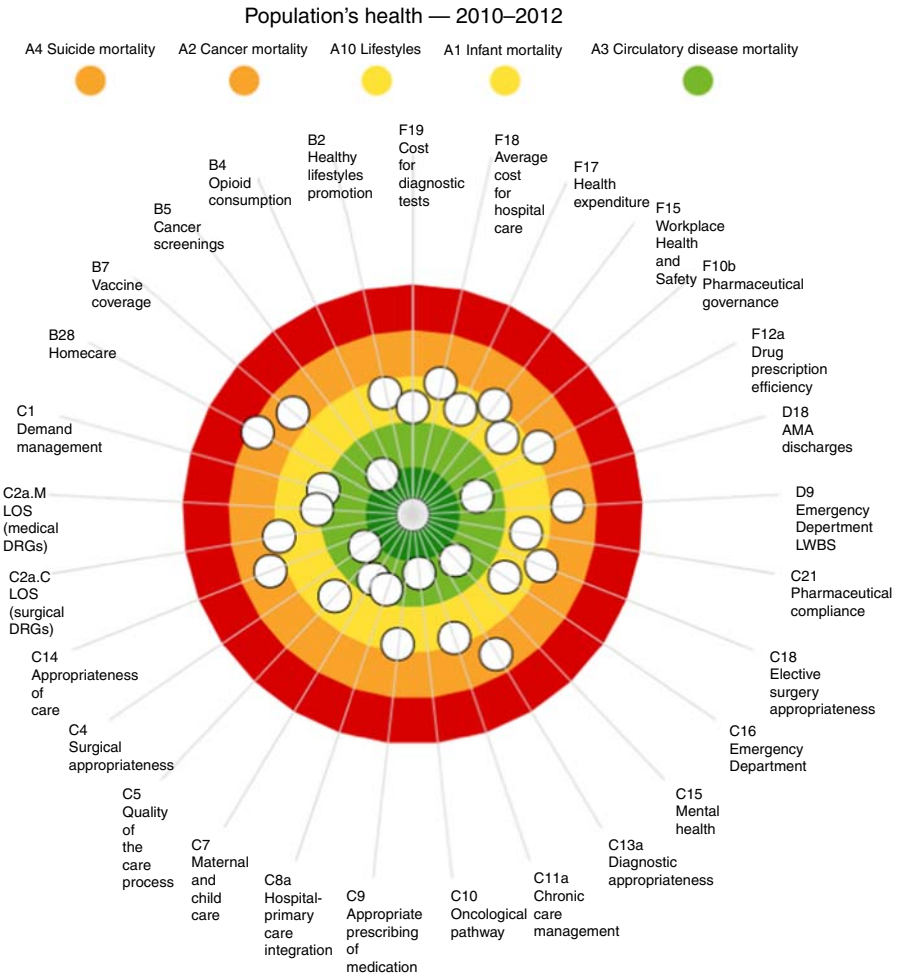
In order to provide an overview of each organization's performance, the whole set of indicators is currently composed of a subset of "macro-indicators" which is represented through a target chart (a "dartboard"), in which the highest scores (dark-green band) are positioned in the center and the lowest ones (red band) are in the outer circle.

Figure 4 shows an example of the Friuli Venezia Giulia results.

According to the taxonomy reported in first section, IRPES can be considered as an integrated performance management system (Bititci *et al.*, 2012; Nuti *et al.*, 2013; Nuti, Vola, Bonini and Vainieri, 2016). It can be deemed to comply with the set of procedural requirements mentioned above:

- Multi-dimensionality: this goes beyond the assessment of financial sustainability and considers measures related to clinical processes, appropriateness, quality of care, patient satisfaction and staff satisfaction.
- Evidence-based data collection and information provision: the IRPES is based on both administrative data and data collected ad hoc, whose standardization and normalization follows rigorous and standard scientific criteria.
- Systematic benchmarking: the PMS described here compares the performance across regional health systems and providers on a yearly basis. The evaluation for each indicator is based on gold standards or on the distribution of results across the organizations participating in the system.
- Transparent disclosure: the IRPES is publicly reported annually both through a printed report and via the web (http://performance.sssup.it/netval).
- Timeliness: data and indicators are collected and calculated every year and publicly disclosed within six months from the end of the reference year.

Because of this design and the effective visual representation, the system has aided regional and local organizations in improving their performance and reducing



Source: 2016 data—available at http://performance.sssup.it/netval

Figure 4.
An example of the Friuli Venezia Giulia Region IRPES dartboard

unwarranted variations (Nuti, Vola, Bonini and Vainieri, 2016). The IRPES has stimulated professionals and other stakeholders to focus on population value creation through the inclusion of a large set of outcome measures, also by considering the residents' geographical area.

However, the IRPES is currently anchored to an "organization-focused" perspective, i.e. it monitors and reports each unit and organization performance separately. Although evidence provided by this measurement system is key to assessing organization performance, focusing on the single tiles may be misleading given that patients' care paths that generally cross different care settings. In reality, emerging healthcare needs require coordinated responses and shared responsibility by a wide range of providers. Thus, evaluation systems need to be reframed accordingly in order to detect the contribution of all the links of the healthcare value chain and to highlight the shared responsibility of the different organizations contributing to the care pathway.

To overcome these limitations, the IRPES now takes into account the population value chain perspective. The next section describes the re-framing process that has been implemented in order to integrate the organizational perspective with the patient-based perspective.

Re-framing the IRPES

After a decade of IRPES use, the research team together with the regional stakeholders recognized the need to analyze performance information also at a pathway level.

In order to offer an effective graphical representation by shifting the focus from single organizations' perspective to care pathways results, the original graph (i.e. the dartboard) was integrated with a new tool that represents the care pathways' performance by relying on the metaphor of the "stave," i.e. the set of horizontal lines and spaces used in sheet music. Both the metaphors share a common characteristic: they hint at a "positive" allusion, by referring to recreational and artistic activities. This is intended to stimulate a favorable approach by the user, especially by leveraging on the framing effect (Tversky and Kahneman, 1981). The metaphor of the stave conveys is intended to transmit the message that the health care system should play the patients' music, following step by step his/her pathway.

As shown in Table I, a selection of the original indicators used in the IRPES were repositioned according to the different phases that the patients cross along the pathways (Nuti, De Rosis, Bonciani and Murante, 2017). So far, five pathways have been selected, according to their relevance: the maternal and pediatric pathway, the oncological pathway, the chronic diseases pathway, the mental health pathway and the emergency care pathway. Their design involved the selection of the most appropriate indicators, in order to effectively represent the different phases each care path is composed of.

As an example, the case of the oncologic pathway is reported and described.

The stave, like the dartboard, uses five color bands (from red to dark-green). These bands are now displayed horizontally and are framed to represent the different phases of care pathways. This view allows users to focus on the strengths and weaknesses that characterize the healthcare service delivery in the different pathway phases.

In order to further investigate performance according to a patient-based perspective, this structure has been integrated with patient-related experience measures (PREMs) and, in the near future it will also consider patient-related outcomes measures (PROMs)—currently in the experimental phase. These measures are calculated by conducting standardized and continuous surveys with patients to get their feedback on outcomes and care experiences. These surveys assess quality of life and patient outcome (PROMs) during pre-treatments, treatments and follow-up phases and patient experiences (PREMs) by collecting data on information and support received during access to care (e.g. screening), treatments (e.g. surgery) and follow-up.

Staves are designed to display the pathways' performance both at regional and local levels. Regional pathways report regional performance, without detailing the providers. Local pathways instead show performances achieved by each provider in a geographical area, in order to highlight the individual contribution to the overall care pathway and to focus the viewer's attention on (joint) value creation for each local area population.

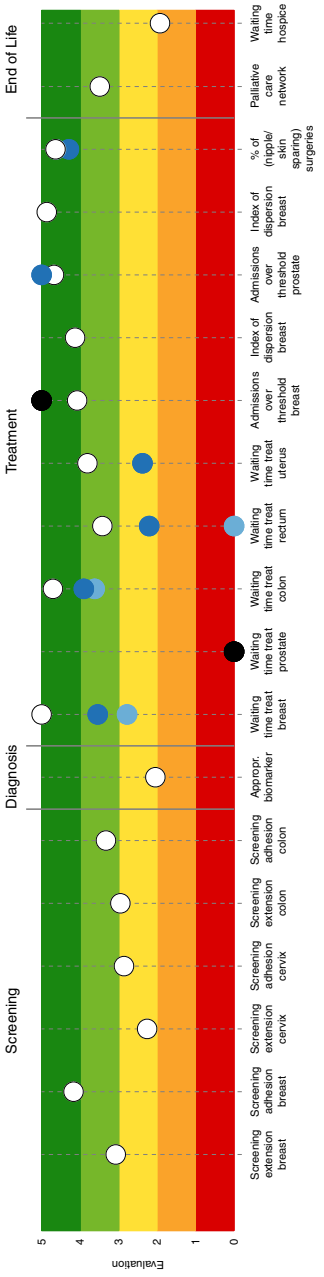
As shown in Figures 5 and 6, each dot reports the evaluation associated with the performance achieved by each provider (colors represent different organizations) in the geographical area, with regards to the pathway's indicators.

The dots on the stave are thus associated with the name of different health organizations. In Tuscany (Figure 6), the performance of both the local health authority's (AUSL Centro) and an autonomous hospital (AOU Careggi) are reported; in the Padua area, three providers cooperate to provide oncological care and are therefore jointly reported by the stave: the local health authority (AULSS 16 Padova) and two autonomous hospitals (AO Padova and IOV).

Oncologic pathway	
Screening	
B5.1.1	Screening extension breast
B5.1.2	Screening adhesion breast
B5.1.4	Voluntary screening adhesion breast
B5.1.5	% women visited within 20 days from positive screening
B5.1.6	% visit adhesion after positive screening
B5.2.1	Screening extension cervix
B5.2.2	Screening adhesion cervix
B5.2.4	Voluntary screening adhesion cervix
B5.3.1	Screening extension rectal colon
B5.3.2	Screening adhesion rectal colon
B5.3.5	Voluntary screening adhesion rectal colon
Diagnosis	
C10.5	Prescriptive appropriateness of tumor biomarkers
Treatment	
C10.4.1	Waiting times for malignant breast cancer intervention
C10.4.2	Waiting times for malignant prostate cancer intervention
C10.4.3	Waiting times for malignant colon cancer intervention
C10.4.4	Waiting times for malignant rectum cancer intervention
C10.4.5	Waiting times for malignant lung cancer intervention
C10.4.6	Waiting times for malignant uterus cancer intervention
C17.1.1	Percentage of admissions over the volume threshold for breast cancer
C17.1.2	Index of dispersion of cases in wards under the volume threshold for breast cancer
C17.5.1	Percentage of admissions over the volume threshold for prostate cancer
C17.5.2	Index of dispersion of cases in wards under the volume threshold for prostate cancer
C10.2.1	% of breast-conserving surgeries (nipple/skin sparing) for breast cancer
C10.2.2	% of women who undergo sentinel lymph node excision
C10.2.2.1	% of women who undergo radical axillary lymph node excision
C10.2.4	% of women treated with radiotherapy within 4 month from breast surgery
C10.2.5	Administration within 8 weeks of chemotherapy in subject with breast cancer
C10.3.1	% of patients undergoing re-intervention within 30 days of hospitalization for colon (three-year)
C10.3.2	% of patients undergoing re-intervention within 30 days of hospitalization for rectum (three-year)
C10.3.3	Administration within 8 weeks of chemotherapy in subject with colon cancer
C10.6.1	% of men undergoing radiotherapy who begin treatment within 6 months from intervention
F10.2.1c	Average expenditure for oncology medicines (local health authority)
F10.2.1d	Average expenditure for oncology medicines (hospital)
End of life	
C28.1	% of deceased oncologic patients within the palliative care network
C28.2	% of patients with maximum waiting time between reporting and hospitalization in hospice $\leqslant$3 days
C28.2b	% of oncologic patients with maximum waiting time between reporting and hospitalization in hospice $\leqslant$3 days
C28.3	% of hospice admissions with a period of hospitalization greater than 30 days

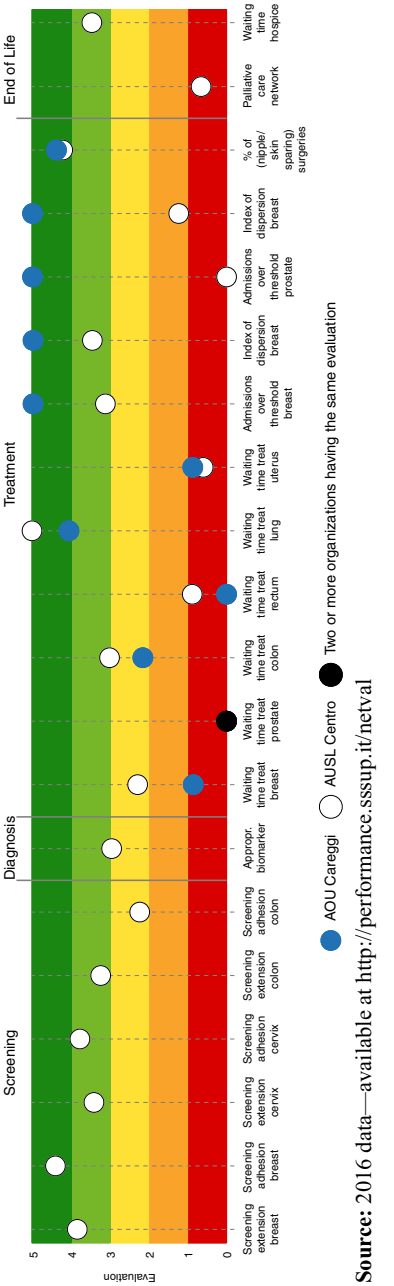
Table I.
List of the indicators that constitute the oncological pathway, grouped according to the different phases based on administrative data

By adopting a pathway perspective, the stave meets two goals. First, it steers the user's attention toward the patient perspective, by embracing the value creation paradigm. Second, by showing the performance of the different organizations that serve the population of a geographical area in each pathway phase, the stave highlights the contribution that each organization provides, stressing joint responsibility in the overall results of the care pathway. Thus, it is easier for the stakeholders of the healthcare system to understand the criticalities in delivering value to their reference population. Through this visual representation, managers may be able to assess the performance of



Source: 2016 data—available at http://performance.sssup.it/netval

Figure 5.
An example of the stave in the geographical area of Padova (Veneto)



Source: 2016 data—available at http://performance.sssup.it/netval

Figure 6.
An example of the stave in the geographical area of central area (Tuscany)

the service supply in the various phases that make up a care pathway and, consequently, to attribute co-responsibilities to the multiplicity of providers involved in the service delivery of each phase.

As previously mentioned, the stave is currently adopted by 13 health systems (11 regions and 2 autonomous provinces). These pathways can be viewed both at the regional and at the intra-regional, i.e. geographical area, level. The performance achieved by the 81 geographical areas, which reflect the perimeters of the local health authorities of the network-adhering regions, is publicly disclosed so that local populations can assess the value created (www.performance.sssup.it/netval).

Discussion

The previous section described the development of a major performance evaluation system in Italy starting from its design in 2004 till the most recent developments in 2017. There have been two main phases:

(1) The IRPES was first created in 2004 in Tuscany, in order to integrate financial information concerning the regional health care system with evidence on quality, equity, efficiency, appropriateness, effectiveness and responsiveness. The aim was to make such information available to stakeholders in the healthcare system (regional managers and administrators, professionals, patients, citizens, etc.). Since 2008, an increasing number of regional health systems in Italy have been adopting the same IRPES, resulting in an inter-regional performance comparison.

This comparison was enhanced by integrating the original financial dimensions with the others, and by enlarging the range of monitored units. Consequently, health care institutions have been monitored in terms a wider range of perspectives and benchmarked against a growing number of comparable providers.

Comparing this phase with the previously mentioned theoretical frameworks on PMS, this transition reflects first the introduction of a "budgetary control" approach (measuring financial performance of the system's units) and subsequently its shift toward "integrated performance measurement" (measuring the multidimensional performance of the system's units) (Chua and Preston, 1994; Ballantine *et al.*, 1998; Bititci *et al.*, 2012; Naranjo-Gil *et al.*, 2016). The focus of the performance evaluation process has been the same throughout the ten years of the project: health care organizations, in their different granularity (regions, health authorities, hospitals, health districts, etc.). The limitations encountered adopting this approach were thus related to the difficulty of assessing the value created by the joint actions of the providers involved in the health service delivery.

(2) In 2016 the IRPES was reframed in order to collect and to report data that analyze and illustrate the performance achieved by one or more providers. The key to analyzing the activity of a network of health care providers involved in the service delivery is to adopt a patient-based perspective (Gray and El Turabi, 2012; Nuti, Vola, Bonini and Vainieri, 2016). The IRPES's analytical focus has integrated the evaluation of individual institutions with the evaluation of patient care paths. The introduction of a new data visualization tool—the above-mentioned stave—illustrates the theoretical foundations of this integrative perspective. Thus, the new PMS enables the adoption of the patient care paths perspective, i.e. clinical activities performed by multiple providers in order to take care of complex health problems that require clinical assistance and coordination over time.

The PMS evolution should be interpreted according to the modifications of the "context" the PMS is developed in (Bititci *et al.*, 2012). Phase 2 above reflects the dynamic process of

alignment of the IRPES to the evolving contextual, institutional, organizational and strategic situation.

Since this paper deals with PMSs in the health care sector, the context analysis needs to carefully assess the recent revolutionary shift—partially due to ICT innovation—concerning the patients' role in steering their health care choices and related outcomes (Richards *et al.*, 2013). The transition from Phases 1 to 2 was aimed at fine-tuning the performance evaluation process with the opportunities offered by the patients' new role.

Integrating the previous perspective with a new approach, aimed at assessing healthcare organizations' performance in co-producing value for patients, implied designing a new architecture of the evaluation process. While the analytical perspective remained the same, the focus shifted as a result of exploiting a multidimensional approach. The interest in the overall performance of divisional units was integrated by monitoring the performance in individual geographical areas during specific macro-activities (care paths) that involve a plurality of organizations.

In this case, the theoretical taxonomy proposed by Bititci *et al.* (2012) might be somewhat misleading, if uncritically applied to the interpretation of this process. Bititci interpreted the general transition of PMSs from "integrated performance measurement" to "integrated performance management" as a shift from "single organizations" to monitoring "collaborative organizations," the latter intended as "virtual organizations that are additional to the organizations that are participating in the collaborative enterprise" (Bititci *et al.*, 2012). The re-framing process of the described PMS should not be interpreted as an integration of previous performance monitoring approach by including performance implications of autonomous but relevant organizations (such as those supporting the supply chain). Instead, it represented the shift from an organization-focused PMS to a strategic activities-focused PMS. In other words, the PMS is now assessing the ability of the health care system to manage its core activities, through the integrations of its organizations. Individual institutions, which represented the focus of IRPES phase 1, now become an "instrumental focus." Maybe counterintuitively, the label coined by Bititci and colleagues to identify the most recent generation of PMSs—"integrated performance management"—better complies with PMSs in health care than in other sectors: their focus actually shifts from individual organizations to the integration of individual organizations within the (health care) system.

Flanking the previous organization-centered perspective with the patient-focused approach entailed designing an evaluation system aimed at assessing how healthcare systems create value for their respective populations. This implied assessing:

(1) different providers' contributions in joint value creation; and

(2) value creation throughout the various phases of the care paths, referring to different care settings and different providers.

The adoption of the new perspective has therefore been pre-conditional to designing a performance evaluation system capable of assessing two fundamental elements of value creation in healthcare: co-production and integration.

Evidence on the effectiveness of this new approach is not yet available. However, the reframed PMS has four possible benefits:

(1) strategic re-focusing: shifting the focus from organizations' performance to integrated activities' performance may help stakeholders become more aware of the "new" strategic goals of health care systems;

(2) legitimization: the new approach may contribute to legitimizing organizational units specifically aimed at managing transversal communication, cooperation and coordination, such as the above-mentioned inter-authority departments (Lemieux-Charles *et al.*, 2003);

(3) alignment: since it focuses on care paths, the new approach is more in line with clinical activity and therefore more easily understood and accepted by professionals, thereby fostering their engagement; and

(4) shared accountability: integrating the results of different providers in a single performance management framework fosters the shared accountability of the network of organizations participating in service delivery.

Conclusions

This paper investigated the results of a constructive research experience related to the transition of a PMS in order to identify potential improvement of PMSs in health care. Due to the active involvement of the research team in the development of the case described, the approach used in this paper did not adopt an evolutionary approach but opted for a constructive approach: being inspired by the literature on healthcare management and PMSs, the collaboration between the research team and the stakeholders allowed to re-design the IRPES starting from the patient perspective.

The IRPES experience helped to reverse the deterministic and reactive interpretation of the relationship linking the contextual situation with the PMS aimed at evaluating it. The new role of patients in healthcare today is not merely in terms of new informational needs (for instance the introduction of PROMs and PREMs), but relates to a new perspective that assesses two fundamental determinants of value creation in healthcare—i.e. co-production and integration.

In conclusion, three final issues should be mentioned: the tool's replicability, the limitations of the research and its potential developments.

In terms of the tool's replicability, the IRPES case suggests the need for PMSs to integrate the classic organizational perspective with a user-centered perspective when the aim is to assess environments, processes, or contexts in which value creation stems from the collaboration of multiple providers (integrated co-production).

Contingent limitations—such as data unavailability or unreliability—may of course hinder the generalizability of such an instrument, but do not invalidate its underlying innovative approach. In fact, the used approach may prove fundamental in evaluating areas where the user's role is becoming essential in co-determining value creation. For example:

- Other healthcare systems, regardless of differences in epidemiological needs, strategic responses and institutional architecture.
- Other service-oriented areas, such as education, both in the public and in the private sector.
- Some manufacturing sectors, where the customers' role is relevant in value creation. The literature tracing the evolution of PMSs usually highlights how the PMSs in the manufacturing sector and private sector have helped develop PMSs in the service sector and public sector, respectively. The case described here might represent a double pay back, with an innovation in a service-oriented and public sector (the Italian health care sector) paving the way for future improvements in the evolution of PMSs.

With regard to potential developments of our PMS it may be useful to recall that the health care sector in the west experienced—probably before other sectors—the need to: integrate the activities of the various organizations that jointly contribute to value creation (i.e. "integrated co-production"); acknowledge and potentially manage the impact that actors belonging to different but related systems (such as social care) have on the health care system itself.

The re-framing of PMS accounts for the first need (inter-organizational assessment) but does not yet respond to the second (inter-systemic assessment). While previous contributions called for PMSs aimed at evaluating the performance of "collaborative organizations," the experience described here may suggest the need to design PMSs able to evaluate "collaborative systems" in order to assess the reciprocal interactions connecting the health care system, the social system, the environmental system, and so on. The new health care context seems to call for widening the perspective of PMSs, toward an "open evaluation" approach by integrating the performance of systems other than those in the health care sector.

The paper relies on a longitudinal experience to thoroughly investigate its dynamics by identifying the problematic issues it tackled and the solution it devised. Comparisons with other cases were not made; thus, further studies could investigate the re-framing process described in this paper by analyzing multiple experiences or cases from different contexts.

Notes

1. See for instance the government acts of Basilicata, Veneto and Tuscany, available at: www.regione.basilicata.it/giunta/site/giunta/department.jsp?dep=100061&area=585290&otype=1059&id=2996190; https://bur.regione.veneto.it/BurvServices/pubblica/DettaglioDgr.aspx?id=356632; www.regione.toscana.it/bancadati/atti/Contenuto.xml?id=124931&nomeFile=Delibera_n.675_del_05-08-2013
2. www.performance.sssup.it/netval

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