

# Performance Indicators Development in Function of Croatian's Hospitals Efficiency and Quality Monitoring (Note 1)

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## **Abstract**

*The aim of this paper is to explore issues of hospital's performance indicators development in Croatia. Accepted standards and regulations require defining of key performance and quality indicators of healthcare organizations. Performance indicators are defined at the sector level. Healthcare organizations are obligated to measure and track performance in accordance with the standards of quality assurance in health care and defined strategic objectives. Tracking performance is important for financing of healthcare organizations and performance monitoring of selected institution's program goals and healthcare system in general.*

*For hospitals, it is important to monitor and improve the quality. For that purposes they need to develop adequate and comparable performance indicators. In order to create comparable indicators it is necessary to conduct a detailed analysis of performance measurement of related hospitals in Croatia and Europe. The basis for performance measurement is information that institution owns, acquires and processes. In order to be relevant, indicators need quality information basis for their measurement.*

*This paper analyzes the current performance indicators of selected Croatian and European hospitals' performance measurement models. Based on the analysis, as the result of paper, we propose indicators for one hospital in Croatia. Authors propose a methodology for development of indicators, as well as a way of measuring and monitoring performance. Through a case study, we explore the use of performance indicators in monitoring and improving the quality of hospitals. Special emphasis has been placed on the role of performance indicators in the financing of health care institutions, and mutual comparison of hospitals as the basis for the development and improvement of the institution's quality.*

## **Keywords**

*performance indicators, efficiency, quality, hospitals*

## 1. Introduction

Services of health care institutions people use for a number of reasons: to treat or prevent disease, reduce pain, increase quality of life or just for information's on the health status and opportunities offered to them. The development of technology and society as a whole and the general increase in awareness of the importance of quality in health care for the welfare of people placed in front of the health care system a number of challenges in different activities. Patients are better informed about possibilities in the health care system and become actively involved in medical processes. Health care institutions, globally, more and more are under pressure to provide more and better, often expensive service (Bosa & Althaus, 2014). Health care costs are growing (OECD, 2014; CIHI, 2014b, p. 13), and the need for responsible management operations of health care institutions increases (Shaw, 2004, p. 7; Johnson et al., 2006, p. 423).

While medicine and technology have advanced rapidly in the past period, a system for the provision of health services are often not able to provide a consistently high quality of health care to all users (Bango et al., 2006, p. 4). At the same time increase in the quality of service, reduce costs, improve performance and increase customer satisfaction, become major challenges to the health care system today (AHA Board of Trustees, 1999, p. 2; Dubnicka, 2005, p. 380). Management of health care institutions in these conditions is extremely complex and demanding. Managers of health care institutions need to responsibly pursue goals by taking care of quality, performance and availability of services and information to all interested stakeholders (Reginato et al., 2011, p. 382).

The financing of the health care system can be private or public. Public financing of state provides health care for all or most of the population (European countries, Australia, Canada) through the national health care insurance (Kovačić, 2013, p. 552). Private financing means that individual self-paid for the health care. Public spending on health care in Croatia is about 7% of GDP per year (WHO, 2015) which belongs to the group of countries with the highest health spending in Europe (Dye, 2013, p. 83). Private funds only cover 16% of health care costs (Barić & Smolić, 2011, p. 48). Given the level of public expenditure on health and the needs of users that are considerably larger than the limited budgetary possibilities, it has developed the need for responsible and efficient management of health care institutions. The complexity of the health care system, the differing interests of stakeholders and a number of internal and external constraints thereby aggravating effect on the decision-making process (Smith et al., 2008, p. 1).

For successful decision-making, public managers of health care institutions should more strongly rely on entrepreneurial business principles, performance measurement and monitoring costs (Soares et al., 2014; AHA Board of Trustees, 1999, p. 11; Martinez, 2001, p. 10). Under the concept of performance measurement in health care system there is monitoring, evaluation and providing information in the extent to which different aspects of the health care system meet their key objectives (Smith, 2008, p. 2). Measuring ranges vary depending on the objectives, the information needed for stakeholders but also development opportunities of the health care system and the state as whole. The most common include

the area of quality, efficiency, satisfaction and finance (Nerenz, 2001, pp. 6-9). As a tool for measuring and monitoring performance, it is common to use performance indicators. The selection and definition of indicators is a complex process dependent in internal (development institutions, strategies, availability of data) and external (users, the default standards of quality, comparability, the development of the health system, etc.) factors.

## **2. The Role of Performance Measurement in Monitoring the Quality of the Health Care System**

The first performance measurement in health care system occurs before 250 years (McIntyre, 2001, p. 9). However, the full development and implementation of performance measurement has began in the last 25 years. The reasons for this are numerous: cost containment needs, informing users about their options and choices, control, accountability and quality of individuals and institutions, advances in technology that allows easier collection and dissemination of information (Smith, 2005, p. 3). In today's health care system, performance measurement is of utmost importance in the processes of quality assurance and monitoring efficiency.

Differences in the quality of medical procedures and results in similar institutions have created the need to ensure efficient, effective, equally high quality and equally accessible health care in all health care sectors, at all levels of health care in the country (NCQA, 2015, p. 6; Law on Health Care Quality, 2011, Article 6). Taking care of assurance and improvement of health care quality is led by the body established in the country (Croatia Agency for Quality and Accreditation in health and social care) and at international level (OECD, WHO). Quality assurance is a set of activities carried out in accordance with the standards, in order to monitor and improve performance and ensure maximum efficiency and safety of health care services provided (Brown, 1998, p. 12). The quality of the health care system is usually measured through several dimensions: effectiveness, safety, responsibility, accessibility, fairness and efficiency (Kelley & Hurst, 2006, p. 13). Performance indicators measure the success of achieving set goals and set standards for quality.

According to Donabedian (1988, p. 1745) conclusions about the quality of the health care system can be obtained based on information classified into three groups:

- **Structure:** characteristics associated with the setting in which the health care system operates, such as material (e.g., building, equipment, finance) and human resources (e.g., by qualified personnel) and organizational structure (e.g., the organization of medical staff).
- **Process:** highlights actions taken in providing (by patients who receive services) and receiving (by trained personnel who makes a diagnosis and determines therapy) health services.
- **The result (outcome):** indicates the effects that the service provided has the health of the patient and the public (e.g., patient satisfaction, increase public knowledge).

Given the importance and complexity of the health care system, interests of stakeholders are strongly influenced by the establishment of a system for performance measurement and definition of indicators. Individuals and organizations to which the health care system affects or interests them there is a lot:

providers and financiers of health services, public and individual patients, interest associations, regulators, policy-makers, employees, media (AHA Board of Trustees, 1999, p. 3; Donabedian, 1988, p. 1744). Their interests are different, and often conflicting. Solberg et al. (1997) points out that it is necessary to distinguish between performance measurement for improving health care services, research and accountability to users. To successfully establish a system of performance measurement is therefore important to distinguish: who and what activities we want to evaluate and what we want to achieve with these activities (strategies), which quality standards to be achieved and which data are available (Donabedian, 1988, p. 1745; Loeb, 2004, p. 7).

Constant and rapid changes in the environment, followed by the processes of globalization and the growth of competition and limited resources extremely complicate decision-making processes in health care sector. Research shows that currently the biggest problems create financial challenges to the health managers (efficient allocation of resources, a revenue cycle, finding new sources of financing, etc.), or the need for balance between health and financial goals (to improve financial performance without compromising on quality of service) (Gabenski & Pink, 2007, p. 8). In order to successfully respond to the challenges, health care institutions are introducing strategic planning and business management. For making quality strategic decisions managers of health facilities requires sound financial and non-financial information.

At national level, however, one of the key budget issues is the choice of models for financing health care. In European Union countries healthcare is financed through public (social security contributions and/or taxes) and private (private insurance and/or pay-per-provided service) mechanisms. Funds raised in the budget, health care institutions are awarded through contracts concluded between the national centre for social security and health care institutions or transfer via regional (local) authorities. Methods of financing health care also differ in the European countries. Prospective methods based on a defined budget include salaries and capitation per patient. *Retrospective* methods based on commission for health care services are in the form of fees for the service or payment per case (Thomson et al., 2009, p. 41). The disadvantage of these methods is poor transparency between the funding and activities. Therefore, in the last 10 years the main mechanism of payments in European hospitals became ABC method (Dražić Lutilsky, 2014, p. 108). The funding system based on activities increases efficiency, improves service quality and transparency of funding covers the costs and establish a connection with the activities of the services (O'Reilly et al., 2012, p. 78). The application of the ABC method creates a useful baseline for measuring the financial performance of healthcare organizations. Type of allocation of budgetary resources affects the efficiency of the organization of health services, their availability and quality, enables cost control and financial sustainability of the system as a whole.

### 3. Analysis of the Relevant Models for Performance Measurement Hospital

The success is a term that is often mentioned in the health care system in recent years. Since the mission of hospitals is related to the provision of specific health care services that can solve the health problems of patients (efficiency) in the best possible way (quality) and at the lowest cost (efficiency), the performance actually measure their achievement (Barliba et al., 2012, p. 1). However, success is not unique concept and it is not easily measured.

In order to define the model for performance measurement applicable to the hospital that operates in Croatia, in accordance with international standards, the authors have explored the existing models in the environment. The results showed that there are many models applicable at the sector and institutional level. Since the characteristics of some models overlap, relevant is rated 10 models that are presented in Table 1. For each model it is provided: relevance area—a sector (international/national) or institutional, area measurements, which includes examples and performance indicators.

**Table 1. Models for Hospital Performance Measurement**

Source	Model	Field of measurement	Performance indicators
<i>OECD (Kelley &amp; Hurst, 2006, p. 15)</i>	Health Care Quality Indicators (HCQI)—internationally	Quality: Effectiveness, Safety, Responsiveness/Patient centeredness Access: Accessibility Cost/expenditure	Structure indicators: inputs (such as whether doctors are suitably qualified and whether hospitals are appropriately equipped) Process indicators: delivery of appropriate (or inappropriate) health care (such as whether children are immunized appropriately, or at risk patients' blood pressure is checked regularly by a physician) Outcome indicators: health improvements (such as rates of hospital-acquired infections or rates of 1 year survival following acute myocardial infarction)
<i>Cercone and O'Brien, 2010, p. 31</i>	World Organization—Performance Assessment Tool for Quality Improvement in Hospitals (PATH)—internationally	Health Clinical effectiveness and safety Patient centeredness Production efficiency Staff orientation Responsive governance	Clinical Effectiveness and Safety (Mortality, etc.) Efficiency (Length of stay, etc.) Staff Orientation & Safety (Training expenditure, etc.) Responsive Governance (Health care transitions, etc.)

				Patient Centeredness (Patient expectations, etc.)
<i>Cercone and O'Brien, 2010, p. 26</i>	Hospital Compare—USA		Process of care Outcome of care Patients hospital experience Medicare payment and volume	Acute Myocardial Infarction (Aspirin at arrival, etc.) Heart Failure (Smoking cessation advice/counseling, etc.) Pneumonia (Initial antibiotic timing (within 4hrs), etc.) Surgical Care Improvement Project (Prophylactic antibiotic selection, etc.) Children's Asthma Care (Use of reliever medication for inpatient asthma, etc.) 30 day risk-adjusted mortality rate (Pneumonia, etc.) Patient Satisfaction (Patient survey of Hospital Experience, etc.)
<i>Cercone and O'Brien, 2010, pp. 29-30</i>	Health Consumer Powerhouse—EU	Consumer	Patients' rights and information Waiting times Outcomes "Generosity" of public healthcare systems Pharmaceuticals	Patients' rights & Information (Right to second opinion, etc.) Waiting Times (Direct access to specialist care, etc.) Clinical Outcomes (Heart infarct mortality<28 days after getting to hospital, etc.) Generosity of Public Healthcare Systems (Infant 4-disease vaccination, etc.) Pharmaceuticals (Access to new drugs, etc.)
<i>CIHI, 2013; CIHI, 2014a</i>	Health indicators—Canada		Health System Performance: Acceptability, Accessibility, Appropriateness, Competence, Continuity,	Health System Performance: hospitalized acute myocardial infarction event, Injury hospitalization, Self-injury hospitalization, 30-day acute myocardial infarction in-hospital

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			Effectiveness, Efficiency, mortality, 30-day medical Safety readmission, 30-day stroke Hospital Financial in-hospital mortality, Ambulatory Performance Indicator care sensitive conditions, etc. Financial Performance: total margin, Current ratio, Administrative services expense as a percentage of total expense, Information systems expense as a percentage of total expense, Nursing inpatient services total worked hours per weighted case, Diagnostic services total worked hours per weighted case, Clinical laboratory total worked hours per weighted case, Average age of equipment, etc.
<i>NHPA,</i> <i>2014</i>	Hospital Performance and Healthy Communities—Australia	National Health Performance: Effectiveness, Safety, Continuity of care, Accessibility, Responsiveness, Efficiency & sustainability	Effectiveness—Safety and quality (Hospital Standardized Mortality Ratio, Unplanned hospital readmission rates, etc.) Effectiveness—Patient experience (Measures of the patient experience with hospital services) Equity and effectiveness—Access (Access to services by type of service compared to need, Emergency Department waiting times by urgency category, etc.) Efficiency—Efficiency and financial performance (Relative Stay Index for multi-day stay patients, Cost per weighted separation and total case weighted separations, Financial performance against activity funded budget (annual operating result), etc.)

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<i>CHIF, 2014</i>	Performance for hospitals activities—Croatia	Quality Success	Quality indicators (number of re-hospitalization within 30 days since release, Mortality Ratio, Myocardial infarction in-hospital mortality, stroke in-hospital mortality, percentage of treatment in daily hospital, percentage of admission through emergency room) Success indicators (ratio of health care staff in number of total hospital staff, number of staff per bed, number of health care staff per bed, bed capacity, “turnover” of patient per bed, etc.)
<i>Northcott and Llewellyn, 2004, p. 7</i>	Balanced Scorecard (BSC)—institutional	Financial Process and Efficiency Patient and Quality Organizational Health and Learning	Financial indicators: Return on Net Funds Employed, Operating Margin to Revenue, Revenue to Net Funds Employed, Debt to Debt plus Equity Ratio Process and Efficiency indicator: Resource Utilization Ratio, Performance to Contract, Inpatient ALOS* x Patient Admission Rate, Percentage Eligible Elective Day Case Surgery Patient and Quality: patients’ Overall Satisfaction, Hospital Acquired Blood Stream Infections, Emergency Triage Times, Percentage of Complaints Resolved/Closed Organizational Health and Learning: Staff Turnover (voluntary), Staff Stability Rate, Sick Leave Rate, Workplace Injuries
<i>Caballer Tarazona</i>	Data Envelopment Analysis (DEA)—institutional	Efficiency	Indicator 1: Incomes/doctors Indicator 2: Interventions/doctor

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*et al.,*

2010, p.

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<i>CRH, 2014</i>	Chesterfield Royal Hospital— institutional	Quality Performance Finance Employees	Quality indicators (Stroke care, Hospital Standardized Mortality Ratio, Patient Experience, etc.) Performance indicators (Time spent in the emergency department, delayed receiving care, etc.) Finance indicators (Return on Assets, EBITDA Margin, etc.) Employment indicators (Sickness absence, Age profile, Gender and work pattern, etc.)
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*Source:* authors.

Based on the analysis of selected institutional and sector models of performance measurement it can be concluded that performance indicators of the health care system (sector indicators) have been developed and presented through reports on national and international level. Hospitals in Croatia, as well as at the international level, have not yet developed a practice of measuring and reporting on key performance indicators. It is also noticed that hospitals that define performance indicators usually are associated with sector indicators and projects within which they operate. The choice of indicators and areas of measurement is dependent on the needs of the user information. The measurement results are used for different purposes: accreditation, quality evaluation, ranking, comparing (benchmarking), finance, business decision-making and reporting. As a part of the health care system the financial and non-financial performance indicators are defined. The number of performance indicators at the level of institutions is too large (preferably about 20 to define key performance indicators). Indicators are classified in the area of monitoring, with the most common areas as: process quality, efficiency, patient experience and finance.

These conclusions will be used when creating a model on the example of a hospital in Croatia.

#### **4. The Development of Performance Indicators in the Example of Hospital in Croatia**

##### *4.1 Selecting and Defining Performance Indicators*

Based on the analysis of needs for performance measurement in the function of monitoring the quality and efficient business management, and analysis of the current state of monitoring the performance of the health sector, the following shows the selection and definition of performance indicators for a hospital in Croatia.

The assumptions underlying the selection of indicators are as follows:

- 1) Hospital operates as a public institution in Croatia,
- 2) Hospital is engaged in health care (diagnostics, internal, surgery, children's Hospital, etc.),
- 3) An analysis of the internal and external factors,
- 4) Defines the mission, vision and strategy of the hospital,
- 5) Financing is carried out through the Diagnostic-Related Groups (DRGs) and by price Days of Hospital Care (DHC) for treatment,
- 6) The information needed to calculate the indicators are available at the hospital level,
- 7) Key performance indicators are used to monitor the quality and strategic business management of the hospital,
- 8) Collected information are presented internally (patients, employees, management) and externally (agency, department, public) system stakeholders,
- 9) Measurement results are used to make business decisions of various interest groups, but they are not the only source of information and should be supplemented by the necessary quantitative and qualitative data.

To track the performance of a wide range of hospital activities, it is proposed to define indicators through four areas: the process of health care, patients, health of the organization and training, resources. Ensuring quality and efficiency, as the component for performance monitoring, are stretched through all four areas.

**Table 2. Areas of Measurement and Performance Indicators on the Hypothetical Example of Hospital in Croatia**

Measurement area	Performance indicators	
The process of health care: quality performance of hospital processes, availability and efficiency of resource utilization	1. The rate of mortality 2. Number of re-hospitalization within 30 days 3. Percentage of resource utilization	1. Waiting time for service 2. Turnover of patients per bed 3. Percentage cure (remission within one year)
Patients: customer satisfaction, quality and safety of provided services	4. Patient satisfaction 5. Percentage of resolved complaints	4. Quality of service provided 5. The percentage of mistreatment
Health of organizations and training: quality and staffing, motivation for training and advancement	6. Qualification of health professionals 7. The rate of employees stability	6. The number of awarded medical professionals 7. The percentage of plan training of health

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	8. Number of professional promotion	professionals
Resources:	9. Rate in equipment of hospitals	8. Percentage of budget execution
physical (space, equipment, financial resources, etc.) and personnel (doctors, nurses, administration, etc.)	10. The number of employees per bed	9. Margin 10. Cost per activity

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*Source:* authors.

On the example of the hypothetical hospital, authors have selected 20 key performance indicators that provide to the interested users information about the quality and effectiveness. Number of indicators may differ, as well as areas of measurement, depending on the interests of stakeholders. In order for measurement to be successful, it is necessary to describe each indicator, its purpose and objective, method of calculation, method of collection and sources of information, reporting deadlines, availability and way of presenting the results. For management purposes, it is important to specify measures, which are to be taken in order to increase the success of the hospital.

#### *4.2 The Use of Performance Indicators in Monitoring and Improving the Quality of Hospital*

Once defined, performance indicators can be applied in several areas that contribute to the quality of the health care system at the institutional and sector level. The use of indicators is particularly useful in the accreditation and evaluation of the quality, comparing (benchmarking) the quality of institutions, ranking, financing, business decision making and reporting. The significance, the use and interpretation of indicators in these processes varies, depending on the objectives and tasks of the procedure itself as well as national goals and values of health.

Accreditation is a process of external, independent, evaluation of the quality of the hospitals based on conformity assessment of their work with the established optimum standards for activities that they perform (Law on Health Care Quality, 2011, Article 2). The accreditation process in Croatia is done by the Agency for Quality and Accreditation in health and social care, based on laws and regulations (Regulation on the accreditation standards for hospital health institutions, 2011; Regulation on standards of health care quality and the manner of their application, 2011). In the process of evaluation, it is estimated the quality of the hospital through a series of performance indicators, such as: the qualifications of health care professionals, the waiting time for service, customer satisfaction, etc. By comparing the results of the evaluation with the specified standards and other similar institutions, accreditation body may make the assessment about the level of quality that the institution has achieved. Hospitals that continually monitor their performance indicators can detect in time any weakness and by implementing measures, they could improve compliance with the set quality standards.

Performance indicators are an important tool in comparing (benchmarking) quality of hospitals with each other, with the results of the health system as a whole, the targeted sizes and the results achieved in previous periods. Key figures such as cure rate, the number of awarded health care professionals, the

cost per activity, etc. provide hospitals the ability to assess their quality, as well as insight into the areas of weaknesses, advantages and possible improvements. Performance indicators enable benchmarking hospitals on the (inter) national and institutional levels. On the (inter) national benchmarking performance enabled the evaluation and ranking of hospitals. At the institutional level, comparing quality encourages competition and competitiveness among hospitals, which is a powerful tool for change and improvement of the quality of institutions.

Public hospital managers are responsible for ensuring the provision of high quality health care services to patients, with the lowest costs for taxpayers (Value for money). At the national level, it is important to make a suitable and optimal allocation of limited financial and physical resources taking care of continuous improvement of health care patients. Performance indicators such as cost per activity, the percentage of budget execution, the number of employees per bed, etc. provides managers with hospital quality information necessary for the successful and balanced management of hospitals, and the efficient allocation of budgetary resources.

Indicators of the time required to wait for service, rank of patient satisfaction, mortality rates, etc. are a good basis for the preparation and presentation of reports on performance. These reports can be presented to different groups of internal and external stakeholders, as the basis for decision making or promoting the success of the institution. Measuring and reporting the performance of hospitals is particularly important for good information to patients about the possibilities offered to them in order to make good decisions and to better engage in health processes. In addition, to health care professionals about areas of possible improvement and motivation for improvement; to financiers, taxpayers and patients about the level of responsibility that effectively manage significant resources invested in the health care system.

## **5. Conclusion**

Measuring performance in the Croatian health care system becomes important because of the need to ensure uniform quality of health services provided at a national level, the development of strategies to improve quality, large budgetary allocations for health and, accordingly, the effective management of health care institutions. Patients at present time expected (or are entitled to) understand information related to the process of health care, choice and participation in decision-making related to their health treatment. Taxpayers, liable to pay contributions and fund health insurance, want to make sure that the money is spent effectively and in accordance with their expectations. Government and regulatory authorities have a duty to protect the safety and welfare of patients, to ensure the health of the nation and establish a health policy of the state. Hospitals and other health care institutions should monitor and improve health services. Health care professionals must be in step with the latest health practices and have the ability to continually improve their performance. The public wants to be sure that, if necessary, have adequate and quality health care. In order to successfully meet the interests and needs of numerous internal and external stakeholders system, health institutions should define performance

indicators as a basis for measuring and monitoring the performance of all organizational processes. Application performance indicator in health at national and organizational level is broad. Indicators allow for evaluation and improvement of quality of health care institutions, their mutual comparison, ranking and competition, identifying strengths and weaknesses in operations, adoption of efficient business decisions, transparency and accountability to the public.

Despite the clear necessity of defining performance indicators, their creators do not have an easy task. Defining indicators is difficult: the complexity of the health system, the different interests of the stakeholders, the differences in performance monitoring for decision making and accountability, poor availability of information required for measurement, environmental conditions, and a number of other internal and external factors of the system. Model for performance measurement of hypothetical hospital proposed in this paper is the result of an analysis of relevant models from the world and the needs of stakeholders in the Croatian health system. Model shown is a framework proposal that can be used for hospital development indicators and mechanisms for measuring success in their own terms and conditions. It is important to emphasize that for a comprehensive assessment of the quality and efficiency, in addition to the results of key indicators, it is necessary to consider a number of other quantitative and qualitative information, depending on the needs of stakeholders.

Since the key performance indicators are not defined at the level of hospitals in Croatia, and the paper has shown the need for them, it is expected that this paper will contribute to the discussions on measuring performance at the organizational and national level in Croatian health care system.

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## Notes

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