

Performance indicators of medical processes with strategic alignment in patient care

Indicadores de desempeño de procesos médicos con alineamiento estratégico en la atención al paciente

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Abstract

The key performance indicators (KPI) to the processes are of relevance, of priority and their study is justified, because they make it possible to measure in order to evaluate and improve medical care. Whose objective is to respond to why the KPI are important in the processes and how to define them according to their application. It refers to an analytical, conceptual and deductive reasoning study. Explanatory scope for its correlation of strategic KPI to processes, according to the importance of activities in medical services. The result leads to an understanding of the KPI model proposal for processes with strategic alignment levels. Finally, the KPI model for processes with levels of strategic alignment is presented, which it visualizes in an integral way and that contributes in its application to improve the quality in the medical service to the patient in the process.

Keywords: Strategic planning. Indicators. Medical processes.

Resumen

Los indicadores de desempeño (también conocidos como KPI [Key Performance Indicator]) de los procesos son de relevancia, de prioridad y se justifica su estudio, porque posibilitan medir para poder evaluar y mejorar la atención médica. El objetivo es dar respuesta al por qué son importantes los KPI en los procesos y cómo definirlos de acuerdo con su aplicación. Se refiere a un estudio analítico, conceptual y con razonamiento deductivo, de alcance explicativo para su correlación de KPI estratégicos a los procesos, de acuerdo con la importancia de las actividades en los servicios médicos. El resultado lleva a comprender la propuesta de modelo de los KPI para procesos con niveles de alineamiento estratégico. Finalmente, se presenta el modelo de KPI para procesos con niveles de alineamiento estratégico, que visualiza de manera integral y que coadyuva en su aplicación a mejorar la calidad en el servicio médico al paciente en el proceso.

Palabras clave: Planeación estratégica. Indicadores. Procesos médicos.

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Date of reception: 25-01-2020

Date of acceptance: 28-03-2020

DOI: 10.24875/CIRUE.M23000336

Cir Cir (Eng). 2021;89(3):392-399

Contents available at PubMed

www.cirugiaycirujanos.com

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Introduction

Strategic planning is the process of establishing an institutional vision as an achievable dream of managers, shared by the entire organizational community, which allows the institution's resources to be focused on the priority objectives that will drive it towards its vision. And it is the part that clarifies the mission or essential purpose of the institution, to project it on an image of future, desirable, reachable, and guided by its values. It is a process that allows to comprehensively visualize the future of institutions, strategic planning, understood as the process of leading an organization from where it is, and it is in the present, to where it shall be and exist in the future.

Organizations are vertically created based on specialization for the fulfillment of the different functions they develop. Thus, the responsibility for the results that are obtained is established on the function and not on the processes that are transversally developed to the organization units. The cross-sectional vision supported by the organization processes allows efforts to be integrated around a common goal, to understand the dynamic interactions that occur between the company, customers, suppliers, and other key players, and to align the organization's performance with the business strategy and objectives¹.

Evaluation starts from the strategic planning process; it is a basic instrument for achieving the organizational mission and vision, because it allows continuous improvement of any organization. As for key performance indicators (KPI), on one hand, the word "indicator" serves to indicate and comes from Latin *indicare*, which means to show or signify something with signs and signals; and on the other hand, "performance" is the ability of an organization to manage its resources and comply with established objectives and goals².

Now, in the relationship of inputs vs. outputs, they provide useful administrative measures, as long as the indicator whereby that relationship will be measured is established³. In addition to the above, an indicator is a vehicle to measure values on a measurement scale, resulting from a series of observed facts⁴.

An indicator is a sign, which should reflect peculiarities and links of the processes that originate in activities. It also establishes an information support, usually in numerical expression, which represents a magnitude, so that, through its analysis, decision-making on associated parameters is allowed by the control variables⁵.

Analysis for the construction of indicators in healthcare

The analysis starts with the importance of the indicators as regards their identification, selection, and proper formulation, which will evaluate and have control of the process; therefore, indicators are required to have certain characteristics:

- Representativeness, in relation to that which is intended to be measured.
- Sensitivity, which is the flexibility for incorporating change in the magnitude it represents.
- Profitability, which is the benefit obtained by establishing, collecting, calculating, and analyzing the indicator data.
- Reliability, which is the dependability of obtained data for acquiring objective measurements.
- Relativity in time, i.e., that it can be compared over time to analyze its evolution and future trends⁵.

Consequently, it can be then perceived that there is a need to highlight the importance of criteria between strategic planning and the processes for establishing the indicators.

There are different proposals for the construction of indicators. Two of them are presented below, the first one with five steps⁵:

- 1) To reflect on the objective of the process in the generation of goods or services.
- 2) To determine the type of results to be obtained and the magnitudes to be measured in the variability of the process.
- 3) To determine and formulate the indicators that are to be used and implemented, representative of that which is intended to be measured.
- 4) To establish expected results.
- 5) To formalize the indicators with the results and objectives that are desired to achieve.

The second proposal is for establishing the construction of indicators and indicator dashboards on six stages⁶:

- Identification of indicators. The construction of the architecture of indicators in priority processes of specific activities is based on the processes, sub-processes, and stages for obtaining the process maps.
- Choice of priority activities in the mappings. The activity of highest importance within the process is chosen, not necessarily in the inputs or results of the process for priority or specific activities, which allows to preventively guarantee the

expected result of the goods or services. Priority activities are clearly identified in the value chain as unique and distinctive activities that satisfactorily deliver the goods or services, or else these activities become a bottleneck that would impact on the delivery of unsatisfactory goods or services and on conflicts between people⁷.

- Definition of indicators. Defining the KPIs that yield useful, accurate, correct, and important measurements is a guarantee for carrying out a good strategy and making relevant decisions. The KPI offers a visualization of the activities to anticipate the results and being able to make the decisions from any functional area in which the activity is located.
- Implementation and validation of indicators. It is the formalization through the document that allows to standardize the main elements that make up the indicator, it is the design of the indicator type worksheet, which allows follow-up through monitoring by the actor or owner responsible for reporting advances. In addition, it serves to demonstrate and validate whether the established control is appropriate and serves for collecting statistical information and consolidate its adjustment and implementation, and incorporate it as part of the dashboard for the operational group, middle managers, or senior management.
- Indicator perspectives. Categorization will allow to group them according to certain criteria to visualize the progress of the objectives of each group of indicators in detail⁸:
 - Profitability (productivity). It refers to recovering the investment and obtaining financial benefits in terms of cost/benefit. For hospitals, it is common to use a productivity that refers to outcomes in health care services.
 - Activities. Priority link within the value chain for goods or services to be obtained.
 - Patient safety. Classification used for indicators that monitor the use of good preventive practices for reducing failures, which are the cause of adverse events in the provision of patient care⁹.
 - Offer. These are the value proposals that are offered to the client or user, in their products or services.
 - Quality. It comprises customer or user satisfaction with the goods or services that are received.
 - Health regulatory bodies⁶. They point out and add indicators that external health entities

designate as mandatory and of mandatory observance follow-up to the benefit of the quality and safety offered to the patient.

- KPIs for middle and senior management⁶. Strategic KPI dashboards are a tool designed in a matrix structure. In the lateral part of the matrix, the different categorization hierarchies, known as perspectives, are established and selected by the actors of the processes. The upper right part includes the relevant data of the KPI that is intended to be visualized after being measured. The description of its structural design is:
 - Perspective. It allows indicators to be categorized: profitability (productivity), activities, patient safety, supply, quality, and health regulatory agencies.
 - Medical areas. It specifies the area of the position within the organizational structure.
 - Objective. It identifies and qualitatively expresses the purposes towards which the organization resources, efforts and activities must be directed to comply with its mission and vision.
 - Strategy. Initiative that establishes how the objective and goal that are desired will be achieved in order for the expected results to be obtained.
 - Indicator. Means, link, or variable to measure values on a measurement scale, derived from a series of facts observed in the priority activities of processes.
 - Indicator results. They make sense according to the established objectives (expected results) based on which a series of activities are organized to achieve them. It includes:
 - Goal. It is a quantitative element of the goal in one time.
 - Status. It is parameterization according to the progress of the results and is assigned green, red, or yellow color depending on the maximum or minimum permissible limit.
 - Chart. It visually illustrates KPI trends to analyze, understand, and make comparisons, among other benefits.

Categorization of indicators

Another aspect of analysis is indicators' classification, first by measurement context²:

- Input indicators: they quantify physical, human, financial, technological, and infrastructural resources, among others; they are requirements in

the production of goods and services for final achievement of results.

- Process indicators: those KPIs that measure the performance of activities related to the execution or way in which the work is carried out to produce the goods and services.
- Product indicators: shows the KPIs in the goods and services in a quantitative way produced by an organization.
- Final result or impact indicators: KPIs that measure the results with regard to the ultimate goal expected with the delivery of goods and services.

The second categorization refers to objectives related to the processes that are at the level of activities, those concerning goods and services, quality components, and those of results and impact at the level of purpose and goal, respectively. Impact indicators allow to verify the social or economic purposes the social program contributes to¹⁰.

The third classification is presented below with the indicators with strategic, tactical, and operational alignment, which allow coherence and clarity in the formal structure of the organization¹¹:

- Strategic indicators. KPIs that are established for evaluating; they are parameters for measuring compliance with implementation of the strategy for its objectives and the scope of expected results and their impact. They are situated at the corporate level, the top management of the organization.
- Tactical indicators. KPIs that correspond to the measurement parameters of compliance with the execution of the work program or projects to reach their specific objectives and obtain the expected results. They are situated at the departments known as middle management.
- Operation indicators. At last level, but not less important, are the KPIs with parameters for measuring compliance with the execution of process activities or projects for the achievement of their particular objectives, and the scope of the expected results in the production of the goods or services. They are situated within the operation and, finally, they are the owners and actors of the process.

Correlation of performance indicators with strategic alignment and medical processes

Figure 1 analyzes and correlates KPIs on strategic alignment in a homogenization of criteria with the

processes. The need to establish indicators on a regular basis is observed and complemented not only in terms of results, but from the beginning, during the priority activities of the process and in the results, in addition to correlating or associating the strategic levels with the processes of organizations, with the purpose of being more preventive in the measurement and being corrective in the improvement actions, and even of impact towards the exterior of the process in external agencies it impacts on. Therefore, to define an indicator, its relationships with the strategic planning model must be considered^{2,11,12}.

Therefore, currently, KPIs have an important participation in competitiveness, which is based on having a plan that contemplates mission, vision, objectives, and corporate strategies. In addition, it is necessary to include KPIs in supply inputs, in the most important activities, and in the process output:

- The key process input variable (KPIV) or key performance indicators of supplies or requirements inputs. The KPIs corresponding to the inputs of physical and human, financial, technological and infrastructural resources, among others, are considered; quantified in requirements for the production of goods and services for the achievement of expected results of products or services.
- The key process variable (KPV) or key performance indicators of processes or of priority or key transformation activities. Indicators within the production of goods or services, or in chain production and even in the logistics and supply chain of primary activities are considered. However, “process”, a fundamental subject of this study, as the National Institute of Statistics and Geography (2002) points out, is defined as “a series of logical and orderly activities that must be definable, repeatable, predictable, continuous or cyclical, measurable, which lead to obtaining products that can be goods or services”, for example, hospitalization, emergency care, outpatient care and surgery processes, among others
- The key process output variable (KPOV) or key performance indicators of outputs, results, products, or services, and even impact. KPIs that measure satisfaction with results in terms of expected ultimate goal (impact) with the delivery of goods and services are considered.

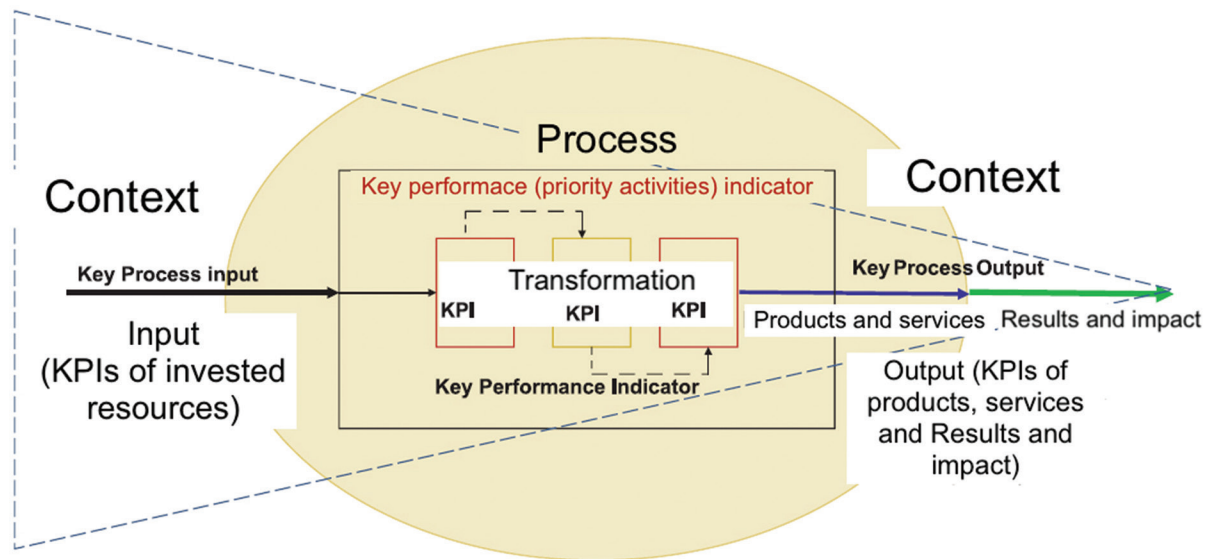


Figure 1. Indicators according to the measurement context.

Correlation of medical processes performance indicators with strategic alignment

For all the above, it becomes necessary and important to understand the standardization of medical and support processes in order to improve them in their various priority activities correlated and aligned with the organization strategy. Figure 2 shows how the need to routinely establish indicators is complemented not only in terms of results, but also from the beginning, during priority activities within the process and in the results, with the purpose to be more preventive in the measurement and being corrective in improvement actions. Therefore, to define an indicator, the relationship of the process with the strategic planning model must be considered¹³.

Figure 2 shows priority activities that are identified in the value chain as unique and distinctive activities that satisfactorily deliver the goods or services of the process. In addition, a dotted triangle is superimposed, which represents the visualization and unfolding of the strategic pyramid that the organization, institution or company must implement at its operational, tactical and strategic levels, prioritizing indicators according to the hierarchical level involved within the process, not only the productive, substantive, main process, but in all the support processes of the organization in its various areas, such as finance, marketing, human resources, research and development, information systems, etc.¹¹⁻¹³.

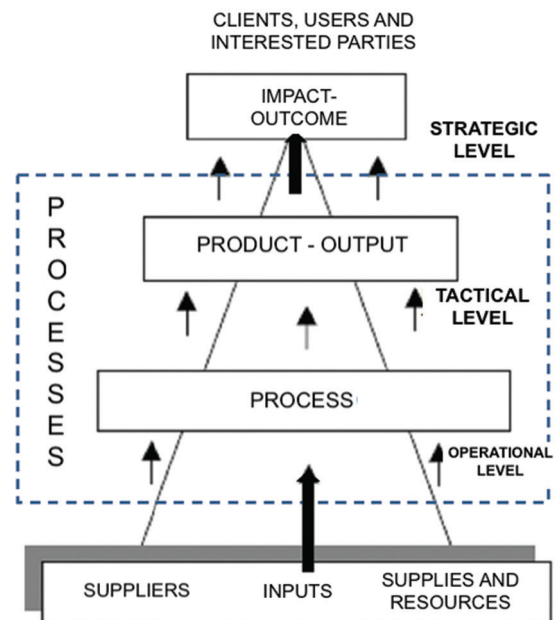


Figure 2. KPI model for process priority activities and strategic alignment levels.

By way of example, figure 3 shows the macro-process architecture of a high-specialty hospital^{6,13}. It refers to general processes of the hospital; it runs in parallel to the development of this series of interviews as a general integration of its processes, whose advantages allow to see the beginning and end of the process. It was transferred to flat and horizontal structures, and the names or positions of those responsible for the organic structure do not appear, which allows a diagnosis

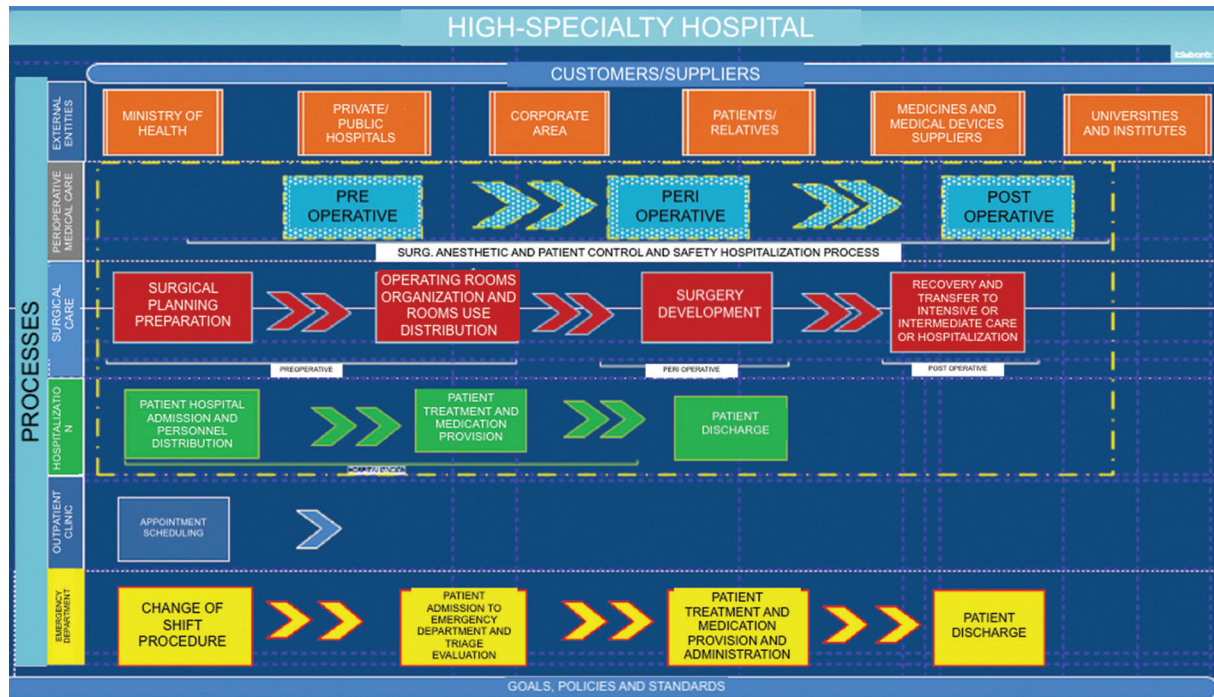


Figure 3. Macro-process model of a high-specialty hospital. Source: own creation.

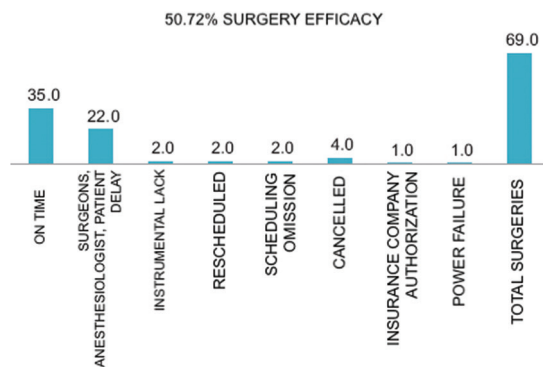


Figure 4. Efficacy of surgeries on scheduled time vs. procedures that were actually performed in a timely manner.

that does not generate conflicts between people and visualizes that they are a working team that carries out the activities and that needs to be measure before and during the process to deliver the results expected by senior management.

Table 1, to follow the example, shows the construction and the dashboard of indicators to observe their application in surgery^{6,13}, and the strategy is observed as a means to achieve the objective and the indicator of programmed surgical efficacy in relation to the performed surgeries, and that affects quality and safety for the patient (Fig. 4).

Discussion

To construct indicators and visualize their formalization to institute and implement the indicator, a worksheet is necessary, which must also detail who will be responsible for its construction and monitoring, as well as for keeping the indicator updated and including in its format at least the following elements and information:

- Header. Name of the organization and area corresponding to the level of organizational structure.
- Have the name of: Indicator datasheet.
- Specify whether it is a strategy, objective, project or process indicator.
- Indicator name.
- Indicator definition. The indicator is described according to the concepts or variables that compose it. It must include the essential aspects in a synthetic way.
- Algorithm. It algebraically expresses how the indicator is obtained. It should include the unit of measure of each component and the formula if necessary.
- Purpose of the indicator. In all cases it is to measure.

Table 1. Construction of indicator dashboards for application in surgery

Perspective	Medical areas ³	Objective	Strategy	KPI	Indicator results	Goal	Status	Chart
Quality and Patient Safety	Surgery	Guarantee specialized medical care with suitable, timely and safe service for the performance of surgical procedures	Strengthen through analysis of their processes and indicators to guarantee surgical medical care at HSHs	1) Number of performed surgeries 2) Efficacy of surgeries on scheduled time	209 surgeries 50% efficacy in scheduled surgeries performed on time	100%	From 1% to 100%	

- Data sources. Set of technical characteristics on the sources of information of the data that make up the indicator:

- Source: name of the unit, establishment or body that generates the information.
- Geographical coverage: it expresses the territorial delimitation to which the information corresponds. It can be national, by sectors, by areas, etc.
- Observation unit: it defines the units the source of information has for obtaining data; for example, events, people, survey, failures, complaints, errors, inconsistencies, among others.
- Information availability date: day on which the information is disclosed.

- Indicator construction:

- Responsible for constructing the indicator. Name of the responsible person.
- Updating date.
- Observations. Elements that allow greater clarity on the indicator and statistical methodological references, as a sample of the population, will be presented.
- Chart. The construction of data and results is visually and statistically presented.

In conclusion, an indicator is defined as the numerical representation of a variable that reveals changes depending on time. It is the expression, usually numerical, of the identified process analysis, and its measurement is through an algorithm or formula, which facilitates different users' access to information in order to transform it into strategic initiatives and actions for improvement.

It is important to point out, highlight and keep in mind some important aspects:

- That, in all cases, the purpose of an indicator is to measure compliance, the objective, execution of the process or project or implementation of the strategy.

- That indicators, in addition to measuring and remaining in constant monitoring for the attainment of results, it is convenient and highly useful for them to be established in order to measure during the process, which will allow to guarantee and understand this word as prevention, to obtain expected results, with the purpose to meet the expectations of the various actors of the process in its value chain, where quality requirements are supplied and entered, operational activities attended and prioritized to then monitor with KPIs, to provide a response in terms of expected results, which can be converted, depending on the organization, into goods or services that satisfy the client, user or interested party.

In addition, there must be strategic alignment at its corresponding organizational or hierarchical levels, with the establishment and implementation in accordance with its activities priorities with indicators that allow to ensure alignment towards the mission, vision of strategic objectives and, where appropriate, implement the lines of action or the corresponding initiatives in time that allow redirecting or claiming strategic actions towards the expected results in the production of goods and services.

In short, the indicators have to be documented and formalized so that their monitoring and continuity can be followed up between one administration and another, through indicator worksheets, so that they can later be classified according to the perspectives of more convenience within the organization, with coherent alignment

and, after the performance of pilot tests, to be incorporated into the corresponding automation.

Acknowledgements

Thanks to the General Directorate of Academic Staff Affairs, at Universidad Nacional Autónoma de México, for the support granted in the postdoctoral stay.

Ethical disclosures

Protection of human and animal subjects. The author declares that no experiments have been performed on humans or animals for this research.

Confidentiality of data. The author declares that she has followed the protocols of her work center on the publication of patient data.

Right to privacy and informed consent. The author declares that no patient data appear in this article.

Conflicts of interest

The author declares that she has no conflicts of interest.

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