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REVIEW ARTICLE

Sustained improvement of the hospital management system: the 4 fundamental pillars

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Abstract

Hospitals are multifaceted organizations where primary clinical processes must be seamlessly integrated with complex ancillary, logistical, and administrative functions to ensure optimal patient outcomes. This framework outlines 4 fundamental pillars designed to establish a sustainable model for hospital management and continuous quality improvement (QI). The first pillar, Informatization, focuses on the holistic adoption of electronic documentation, big data analytics, and AI-assisted tools to facilitate evidence-based decision-making and the precise measurement of both clinical processes and product metrics. The second pillar, Accreditation, emphasizes the development of Standard Operating Procedures (SOPs) and safety benchmarks, highlighting that these standards are most effective when driven by internal motivation rather than external pressures. The third pillar, Task Salaries, introduces a shift from hourly pay to outcome-based compensation, rewarding clinicians for achieving quality targets such as minimized complications, reduced reoperations, and high patient satisfaction. The fourth pillar, Internal Market, establishes a transparent internal accounting system based on activity-based costing, ensuring accountability and efficient resource distribution across all clinical and support departments. Together, these pillars foster an organizational culture of transparency, cooperation, and accountability, enabling healthcare institutions to meet evolving patient demands while improving operational efficiency and the overall quality of care.

Keywords: healthcare management · processual approach · healthcare accreditation

Citation

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Introduction

A hospital constitutes a multifaceted organization wherein numerous processes occur concurrently. The principal axis of operation is what is commonly referred to as "the primary process", which encompasses actions undertaken for the patients' benefit, facilitating their transformation from a state of illness to health.

Complementary and exceedingly intricate processes (e.g. anaesthesia or nursing) bolster the primary process and its execution would not be feasible without these supporting elements. Similarly, all logistic, technical, information technology (IT), and administrative functions that provide essential resources for the seamless operation of the primary process hold significant importance. These activities are dispersed across various locations [1], interact amongst themselves, and strongly influence the primary process, enabling its execution in accordance with established protocols or necessitating alterations to those protocols [2]. Moreover, the intricate interplay between these processes is further enhanced by the integration of advanced technological solutions, which serve to streamline operations and improve patient outcome.

The methodology articulated within the framework of the four pillars of hospital management is anchored in the principles of process management [2]. The comprehensive, multidimensional functioning of the hospital is conceptualized as a principal process accompanied by an array of ancillary processes, which necessitates delineation and quantitative assessment [3].

In this review of methodologies, we endeavor to articulate a new strategic framework comprising 4 fundamental pillars that facilitate the establishment of an effective and sustainable hospital management model.

First pillar: Informatization

The implementation of a new hospital management model is not feasible without the foundational pillar, which is informatization, as it plays a crucial role in enhancing operational efficiency and ensuring quality patient care by integrating IT into hospital management systems. The fundamental nature of such transformation pertains to a holistic and thorough informatization process that considers a variety of ergonomic documentation practices (frequently organized in a stratified manner, e.g. checklists) that prioritize the speed of data entry and ease of retrieval, in addition to reporting instruments that facilitate the operational efficiency of healthcare personnel [4]. Moreover, this encompasses tools designed for the collection and presentation of essential clinical and managerial data tailored for medical management professionals, as well as mechanisms for the aggregation of information from various administrative units of the hospital.

The comprehensive adoption of electronic documentation (notwithstanding the initial challenges associated with the implementation of this tool) markedly reduces and streamlines administrative tasks while concurrently minimizing the reliance on paper-based medical histories or consent and declaration forms [5-6]. This transition not only enhances efficiency but also ensures better compliance with regulatory standards and improves the overall quality of patient care through accurate data management [7]. It is crucial that these tools are flexible, allowing for the collection of information about new measures that might not have been considered before, while also ensuring the delivery of clear and visually appealing representations. The transparent presentation of carefully curated data significantly enhances decision-making for managerial objectives, which is particularly crucial for healthcare leaders, who frequently need to find a balance between patient care and business requirements [8].

Furthermore, the integration of advanced data analytics tools within the informatization framework can significantly enhance decision-making capabilities across hospital management [9]. By leveraging big data, healthcare administrators can identify patterns and trends that inform resource allocation, patient flow, and treatment efficacy, thereby optimizing operational performance and enhancing patient care outcomes. For instance, predictive analytics can forecast patient admissions, allowing hospitals to proactively adjust staffing and resource availability, which is crucial in managing bed capacity and ensuring quality of care [10]. Moreover, the present use of artificial intelligence (AI) technology allows for a considerable reduction in the time required for quality improvement projects and allows for the examination of a much wider range of data [11-12]. This promotes faster execution of PDSA (Plan, Do, Study, Act) tasks and speeds up the application of changes. A well-executed, comprehensive, and systematic approach to informatization facilitates the assessment of clinical processes, encompassing both the thoroughness of activity descriptions (documentation completeness, process metrics) and the evaluation of outcomes (complications, survival duration, periods free from relapse, quality of life, product metrics). The accurate quantification and clarity of information within the IT system enable the development of meaningful visual representations and the generation of alerts in instances of deviations from the established parameters for process metrics.

Second pillar: Accreditation

Without the implementation of IT, the likelihood of achieving success in accreditation is considerably diminished.

Table 1. Software resources employed at the UCK hospital in Gdańsk (Poland) for the documentation of medical procedures, gathering input information associated with quality enhancement, and executing as well as assessing the success of quality improvement initiatives

Name	Function	Usage
CliniNet	a CIS (Clinical Information System) platform used to gather information regarding the treatment progress of patients	recording of procedures, among other things, for the aim of obtaining accreditation
CliniNet	HIS (Hospital Information System) designed to gather information regarding the internal service flow, the provision of medical services, and the administration of medications and medical supplies	documentation pertaining to the internal market and secondary procedures for computation, as well as for accreditation purposes.
MSD	a system that enables the extraction of data from CliniNet based on specific queries (scenarios)	evaluation of the progression of procedures, for instance, for the aims of analysis in accreditation and validation of the treatment pathway
MyHospital	a system that facilitates the extraction of information from CLINInet in accordance with the specified guidelines (e.g., reoperations, rehospitalizations, prolonged stays, etc.)	evaluation of the progression of procedures, such as for the aims of analysis in accreditation and validation of the treatment process
System UCK	a system that gathers data regarding non-compliance and process disruptions derived from unit reports and on-call reports	evaluation of process trajectories, interaction among staff, confirmation of monitoring activities, among other elements for accreditation objectives
OncoReports/ OncoIndi	a system designed to gather data regarding the progress of processes within the framework of multidisciplinary organ units (on the basis of data from CliniNet)	evaluation of the process trajectory, including but not limited to, accreditation objectives and the validation of treatment procedures
UCK Trials	a system designed to gather data on the advancement of clinical trials, encompassing the thoroughness of documentation and the emergence of expenses not accounted for in the initial study protocol (transcript from CliniNet)	evaluation of the procedural course, such as for accreditation objectives, identification of unclaimed eligible expenses to be funded by the clinical trial sponsor — pay for the outcome

Accreditation is a strategic approach, always conducted voluntarily, involving regular and systematic certification according to established quality standards, which facilitates the evaluation of health services offered by a healthcare organization [1]. It is important to highlight that this is not a specific tool, but rather a framework of actions and a collection of suggested measures designed to enhance the professional quality activities of the hospital. Numerous studies emphasize the expenses and challenges associated with preparing for and upholding the requirements of accreditation [13-18]. In clinical operations, these rules apply especially to specific infrastructure, resources, or analytical areas. Following these rules creates the belief that the particular healthcare facility functions in a way that greatly improves the chances of ensuring patient safety. At the same time, it should be recognized that merely having an accreditation does not guarantee anything, and the standards for accreditation do not clearly define specific requirements [13].

The drive to meet accreditation requirements becomes important for an organization only when it is truly an internal motivation and is not swayed by external factors (e.g. increased funding or the implementation of rules tied to organizational changes or a joint-funded project) [14]. Key players in this effort include the leaders of the organization and those managing specific areas of the particular healthcare facility (e.g. wards and clinics). It is crucial to also involve the medical staff, at least as much as the nursing team, along with all other professional groups in the healthcare institution [15-16].

Meeting accreditation standards serves merely as a guideline for shaping organizational culture rather than being a goal in itself. Conversely, the hospital may engage in superficial actions that lack permanence and might even provoke significant pushback from the staff. In such situations, all the advantages linked to the intentional application of accreditation standards are forfeited. Whereas when applied correctly, these standards positively influence not only patient care but also various other aspects of the organization's operations, including financial performance, the frequency of complaints or legal issues, social interactions within the workplace, and even a decrease in employee burnout levels [17-18].

Hospital accreditation requires creating standard procedures (SOPs) that outline methods related to specific clinical problems. These methods must be developed based on the unique situation of the particular healthcare facility, taking into account the details of its infrastructure, workforce, and local solutions. Naturally, the content of the SOPs should be aligned with best practices and adhere to both national and international standards. These methods help clearly define the relationships between the departments and teams, thus offering a strong basis for meaningful supervision and quality improvement efforts that are essential to the third pillar and the connections explained in the fourth pillar.

Third pillar: Task Salaries

The use of civil law contracts in various healthcare facilities has changed net pay for hours worked into gross pay [19]. This change has made it easier to carry out tasks that take long hours and allowed hiring staff from nearby healthcare centers. In addition, this change has created a bidding war among Polish hospital managers and led to higher hourly rates, particularly for specialists in the in-demand medical fields. In some cases, it has led to specialists providing services at several nearby hospitals, greatly exceeding standard work hours and safety. Additionally, the benefits gained by the hospital from hiring these overworked specialists are highly debatable, as tiredness may prevent the specialist from aligning with the hospital's goals, making it unlikely to depend on their participation in quality or organizational efforts. In the end, the hospital loses the opportunity to negotiate or set expectations for the specialists, who can easily quit if they are not happy with the cooperation.

The above-mentioned association, does not create any motivation to do more than work at the particular hospital, as long as the nearby hospital does not pay more per hour. The third pillar we highlight is the pay based on completing a job that has been outlined with a specific contractor or a group of contractors [20-21]. In this particular situation, it involves a job related to quality standards, such as minimal complications, reoperations, or unforeseen readmissions, high levels of patient satisfaction, and lowering treatment expenses. This approach encourages healthcare professionals to prioritize quality outcomes over quantity of services rendered, fostering a culture of accountability and continuous improvement in patient care [21].

Salary tied to the job, and particularly the rewards based on results, encourages the search for ways to improve processes, better accuracy in qualifications, early spotting of potential problems, finding solutions based on best global practices, and following set protocols (see second pillar), which protect against possible mistakes and related liabilities [21]. As a result, the hospital management gains from working with clinician partners to promote quality management within the hospital, a process driven not just by managerial goals, but also by real benefits for individual clinicians. The hospital board's role is to create pay structures that prevent clinicians from favoring nearby competing hospitals, allowing the institution to build its unique competitive edge 22].

A necessary condition for successfully applying this solution is the precise measurement of the contracted tasks, preferably within the hospital's IT system (see the first pillar).

Fourth pillar: Internal Market

The fourth pillar adds to the procedural framework set by the third pillar mentioned earlier. It includes a clear and detailed accounting system that carefully monitors and records all activities performed for patients by different departments in the hospital. This covers important services like medical consultations, along with specialized treatments done by subcontractors, which may involve anesthesiology, surgical units, and invasive radiology services. Additionally, it also considers the roles of support departments that are vital to the hospital's overall functions, e.g. IT, Human Resources, and Accounting. This organized method guarantees that all financial matters are precisely recorded, aiding in better resource distribution, boosting operational effectiveness, and ultimately enhancing patient care results [23-25]. It is essential to strive for the minimal management overhead for the hospital, which is achieved by strategically allocating fixed costs throughout all stages of the diagnostic and treatment processes. All financial transactions must be entirely transparent and available for examination by process representatives who receive the service. Services outsourced within processes should aim for zero profit, necessitating at least biannual assessment of their pricing. This internal market system encourages transparency and accountability, nurturing a culture of cooperation among departments in the core process. This internal market model is consistent with the principles of activity-based costing, which underscores the importance of precise cost allocation and performance assessment in the healthcare environment [25]. By implementing such systems, hospitals can better manage resources and improve patient care outcomes.

Through the prioritization of the integration of non-clinical services, advancements in technology, and the optimization of processes, healthcare institutions can significantly enhance their overall operational performance and the quality of patient care. This strategic framework underscores the critical importance of aligning non-clinical services with the overarching objectives of hospitals to bolster operational efficiency and improve patient outcomes [26]. By cultivating a process-oriented approach, implementing quality

measures for both clinical and non-clinical domains, and fostering a motivational ethos within the organizational model directed towards personnel and amongst staff, healthcare organizations can adeptly respond to the dynamic demands of patient care and establish a sustainable culture of continuous quality improvement [27].

Table 2. Interrelations between the 4 pillars

	Informatization	Accreditation	Task Salaries	Internal Market
Informatization		Easing the way to get medical records, clarifying medical instructions, checking if medical instructions are followed, accurate timing of instruction execution.	Detailed tracking of spending and revenue, broken down by specific parts of the framework or grouped by related issues (diagnoses, treatment methods).	Documentation of assignments generated among units, comprehensive financial assessment of assignments.
Accreditation	Explaining how IT systems work in healthcare organizations, identifying possible issues, and outlining best practices.		The definition of clinical quality metrics, which increase treatment costs and worsen patient outcomes, highlights principles that help reduce risks in this area or, instead, encourage tailored solutions for specific cellular challenges.	Defining specific requirements for assigned tasks, based on best practices.
Task Salaries	By using IT tools, the doctor-in-charge can effectively manage the ongoing processes, identify weaknesses that could lead to future problems and claims for compensation, and track how well the ideal patient route is being followed, which helps in quickly spotting differences that might cause unexpected costs.	Understanding the elements of a person's medical journey (including complications, long hospital stays, further surgeries, etc.) leads to better financial results. Additionally, in many billing systems, high-quality care is rewarded, suggesting that better long-term outcomes are encouraged.		The pay-per-task principle controls the monitoring of the amount and quality of outside services. Choosing these services is carefully thought out, and their performance is monitored and assessed.
Internal Market	The use of appropriate IT instruments facilitates process leaders in supervising their execution (for instance, the accuracy of documentation), alongside the distribution of human resources to ensure their maximal utilization.	Clearly defining the tasks and responsibilities linked to each part of the interaction between processes is crucial. Process leaders should receive support, using data from studies, to outline the necessary minimum and ideal service levels their teams should provide, which helps improve the main process while also meeting additional quality needs during its operation.	Creating a strong internal service in the market helps ensure fair pay for those providing the service, which leads to more outsourcing. Also, the staff in charge of the internal service are likely to apply their skills to the external market, using the knowledge they've gained from their work and improving how resources are used.	

The table elucidates the manner in which the column delineated in the specific rows influences the pillars represented in the columns.

Table 3. Modifications in the operations of the UCK hospital over recent years – the effects of adopting the 4 pillars paradigm

Year	Income	NoH	NoDCH	NoOPV	NoO	EBIDTA
2024	569 m€	143.323	57.331	493.483	19.869	+42.48 m€
2023	456 m€	134.915	50.035	456.594	20.163	+38.88 m€
2022	293 m€	127.242	42.378	391.551	19.675	+19.29 m€
2021	246 m€	128.325	37.014	351.346	17.694	+5.62 m€
2020	192 m€				15.502	+0.41 m€
2019	173 m€				13.169	-0.34 m€
2018	149 m€				13.271	0.08 m€
2017	130 m€				12.643	-0.20 m€

EBIDTA – earnings before interest, depreciation, tax and amortisation; m€ – milion Euro; NoDCH – number of day-case hospitalizations; NoH – number of hospitalizations; NoO – number of operations; NoOPV – number of out-patient visits

Conclusion

The 4 pillars framework helps us create a detailed plan for improving healthcare organizations, regardless of their size or specific characteristics. It highlights the need for a systematic approach to hospital management, clear relationships, and rewards for ongoing improvement. Developing hospital staff and encouraging new ideas in both care and management methods are essential. This system allows for combining individual reports (incidents), sharing best practices, and proactively addressing issues that have arisen in certain situations, thus protecting the hospital from facing the same problems. The successful implementation of these four pillars is crucial for fostering a culture of continuous improvement and ensuring that hospitals can effectively meet the evolving demands of patient care.

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