

IMPROVING PROCESS QUALITY IN HEALTHCARE OPERATIONS MANAGEMENT PRACTICE

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Introduction

Healthcare systems across the globe are plagued by spiraling costs, quality concerns, inordinately long waiting times, increasing customer/patient dissatisfaction, and critical shortages of doctors, nurses, staff, space, and other resources (Umble and Umble, 2006). The healthcare systems of industrialized countries are under pressure to manage the growing healthcare costs better (Karvonen et al. 2004). Healthcare provider organizations are frustrated with their inability to show measurable improvements in the areas of quality, safety, service, and satisfaction.

The purpose of this article is to examine applications for operations management practices in the healthcare industry. The discussion begins with some of the healthcare quality problem areas and root causes of operating issues. The balance of the article presents a systems approach and a discussion of the usefulness of operations management methods in the healthcare field. The conclusion provides some comments on the implementation of managerial innovations.

Spiraling Costs: The concern with process improvement is explained by the escalating pressures to simultaneously increase service efficiency and effectiveness while decreasing associated costs. Productivity improvement reduces budgetary pressures but it is a challenge. Medical service needs to be continuously maintained and depends on the availability of highly trained professionals (Devries et al. 1999). The requirement for continuous service means that, healthcare productivity is not achieved by cost cutting. It is

organizing available resources, e.g. physicians' and nurses' working hours, to produce better health outcomes, such as survival rates (Karvonen et al. 2004).

Quality Concerns: A useful framework for analysis is clinical quality and process quality (Gronroos 1990). Clinical quality is defined as the ability of hospitals to achieve high standards of patient healthcare through medical diagnosis, procedures and treatment, and ultimately creating physical or physiological effects on patients; it is determined by medical outcomes and "what" is delivered.

Process quality results from patients' perception of "how" the service was created and delivered (Marley et al. 2004). It includes making the patient's experience in the hospital proceed efficiently and effectively. Examples of process quality include the level of personalization and patient-service provider interaction, the delivery of medication and food to the patient, the efficiency of admission and checkout, and the timeliness and accuracy of hospital bills (Marley et al. 2004).

Wait times: Meiland et al. (2002) explain that waiting lists are used to justly distribute the 'burden' of waiting and the possible health risks of the listed persons. Three criteria are often used to obtain a fair distribution among the scarce healthcare facilities: 1) 'first-come, first serve' criterion, which aims at a fair procedure of allocation; 2) priority for urgent cases, which aims to prevent extra damage caused by longer waiting times – i.e. deterioration in health status during the waiting period may result in an irremediable condition or in death; and 3) those with the highest chance of success are selected first.

Waiting times for many healthcare services are increasing. A 2002 healthcare survey of the UK, US, Canada, Australia, and New Zealand conducted by the Commonwealth Fund (2003) found that waiting times are the most widely cited cause for customer (patient) dissatisfaction with the UK healthcare system. For instance, only 38% of Britons waited less than 1 month before receiving surgery, and 38% waited more 4 months or more. The survey also found that many people experienced difficulty getting an appointment with the regular

doctor, seeing a specialist when needed, being admitted to the hospital, or using emergency care.

Medical Errors: Healthcare organizations are challenged to reduce medical errors that range between 44,000 and 98,000 deaths each year (Revere, 2003). Healthcare provider organizations deal with different kinds of medical errors¹ and opportunities that can be classified into three categories: prescription errors, dispensing errors, and administering errors. Prescription errors include several opportunities for error: drug-knowledge deficit, miscalculation of dosage, poor oral communication, and poor written communication. Dispensing errors include other opportunities for error: misinterpretation of order, name confusion, poor labeling, and poor packaging and design. Administering errors include more opportunities for error: wrong time, inappropriate dosage (including omission), incorrect drug, improper route of administration, and wrong patient (Phillips et al. 2001, Mullins 2002).

Root causes of operating issues in healthcare systems

Three root causes of operating issues are: silo mentality, dysfunctional performance measurement and incentives, and an aversion to reporting errors. Like any highly interdependent system, problems in one department or sector can impact performance in the other links of the supply chain. The existence of significant system-wide variability – coupled with these root causes - combine to yield an inefficient system that leads to an underutilization of capacity throughout the entire system.

1. Silo mentality (Lack of coordination within the supply chain)

Disappointing results are not reflect a lack of effort or commitment to improvement. They are the outcome of ignoring the underlying systemic nature of the healthcare system. The lack of a system-based perspective leads to the application of management methods that are inappropriate (Umble and Umble 2006). Medical training prepares people to work in a silo, but much of their work must be done outside their silos. They do not understand that they are essentially

interdependent and connected with all other parts of the medical system (Crawford-Mason 2002). Hospitals have relied on a dedicated and highly skilled professional workforce to compensate for operational failures that might occur during the patient care delivery process: great doctors and nurses, not great organization and management, are seen as the means for ensuring that patients receive quality care (Tucker and Edmonson 2003).

Lack of coordination contributes to waste and delays (Umble and Umble, 2006). Many organizations avoid embracing quality practices because in their own words, “we’re different,” implying that their organization’s mission, structure, challenges, and practices create barriers to the use of quality tools and techniques (Juran, 2002). Walshe and Rundall (2001) highlight that healthcare managers are a highly diverse group drawn from different professional and disciplinary backgrounds that often lack a shared terminology with which to describe and discuss issues. They may have some qualification in management or healthcare administration, but there is no specified formal body of knowledge, training, or registration required to become a healthcare manager. Many clinicians take on healthcare management roles without formal management training.

2. Dysfunctional performance measurement and incentives

Resource allocation in the healthcare industry is biased by conflicting incentives. In the commercial sector, revenues are increased by boasting of achievements; but in the public sector one gains more revenues by saying how terrible things are and thereby embarrassing the government to increase your budget (Willets, 1989). The ultimate outcome is that the worst performers are rewarded the most. Even when a good performer has generated extra funds, those funds may be taken away from them to compensate for deficits or poor performance elsewhere.

3. Aversion to reporting errors

Hospital staff are typically reluctant to raise even the slightest possibility of problems with the way their work is conducted, even if

they personally did nothing wrong (Schyve 2000; Lawton and Parker 2002; Landro 2003). Many researchers note that the cultural aversion to assigning blame has played a key role in restricting improvements in the quality of medical care provided (Kohl et al 1999; Enthoven 2000). Tucker and Edmondson (2003)'s study shows that it is difficult for hospital workers to use problems as opportunities for improvement.

Understanding healthcare operates issues: a systems approach

A systems model of management processes shows that managers must interact internally in the organization and externally with the environment. The central message of Deming's (1982) 14 points is that poor quality is rooted in poor systems. He stressed building quality into processes, thereby reducing variation (errors) and its associated costs. Deming advocated the use of statistical methods for controlling process variation. This systems-level approach stresses that management's responsibility is to establish an abiding sense of purpose toward constant improvement and to remove all fear from the workplace so that people can work productively (Deming 1982).

In a systems approach, the focus is set on the end product, i.e. health outcome, rather than the specialized resources needed in individual steps of the treatment. Larson and Muller (2002) explain that the management of the quality of care is an iterative process. It requires systematic attempts to change certain behaviors and reinforce others. It requires attention to feedback from measures of outcome and patient satisfaction and may require structural modifications.

In a systems approach, front-line employees in service organizations are well positioned in the efforts to help their organizations learn, that is, to improve organizational outcomes by suggesting changes in processes and activities based on their knowledge of what is or is not working (Tucker and Edmondson 2003).

This approach allows waste from overproduction, waiting, and rework to be identified more easily. For example, analyzing examinations together with the next step in the treatment process,

surgery, reveals the potential to reduce queuing time and improve resource efficiency (Karvonen et al. 2004). Karolinska, one of Sweden's leading teaching hospitals, found that by redesigning treatment processes around outcomes, it was possible to cut queuing times from months to weeks and at the same time increase the number of patients treated without increasing resources (Hout and Stalk 1993).

A clear need exists to encourage and promote the successful transfer and application of relevant scientific management methodologies to healthcare environments (Umble and Umble, 2006). Although some techniques from quality management have been adapted to the healthcare field, it has been a struggle for professionals, hospitals, and their monitors to come up with consistently successful methods that ensure better patient safety and better quality (Sheldon 1998; McKeown et al. 1999; Enthoven, 2000). The usefulness of production and inventory management techniques to improve healthcare quality and productivity is largely unexplored (Karvonen et al. 2004).

The operations management initiatives studied in healthcare belong to five broad categories: (1) quality management (continuous quality improvement, total quality management, six-sigma), (2) capacity management, (3) information technology integration (telehealth, remote consultation, supply data synchronization), (4) business process redesign, and (5) knowledge process outsourcing.

- ***Continuous Quality Improvement (CQI) in healthcare***

Continuous Quality Improvement (CQI) has been applied in the healthcare industry since the late 1980s. CQI can be defined as a customer-driven leadership approach based on continual improvement of the processes associated with providing goods or services. When properly implemented, CQI can reduce waste in processes, as well as increase the quality of outcomes (Berwick 1989). Effective service recovery is an aspect of process quality that involves development of a strategy to resolve customer complaints and dissatisfaction, with the ultimate goal of motivating the customer to continue to use the service (Schweikhart et al. 1993). Involving

patients' preferences and values in making improvements in the level of care delivered is an essential element to increased process quality as well as a more empathic, honest, and sensitive interaction between patients and staff (Giangrande, 1998). Very few case studies in healthcare offer empirical findings to support the value of CQI.

- ***Total Quality Management in healthcare***

Total Quality Management (TQM) was first used in manufacturing firms. In the late 1980s and 1990s, the healthcare industry adopted total quality management (Larson and Muller 2002).

Implementing TQM is a necessary condition to decrease medication errors, but it is not a sufficient condition. For more than a decade, U.S. hospitals have been adopting and implementing various TQM programs that have the potential for reducing medication errors. In fact, 89 percent of hospital organizations claim to have organization wide efforts for improving the medication-use process (ISMP 2002). Despite such efforts, medication errors continue to be a serious and costly problem for hospitals and have become a leading area of concern in ongoing dialogs about healthcare safety. The reason many medical-error reduction initiatives fall short may be the focus of TQM programs. Although TQM encourages data collection and analysis, it is often not implemented to produce the level of detail required to understand process variation.

- ***Statistical Process Control and Six-Sigma in healthcare***

Statistical Process Control (SPC) is a popular method of tracking performance (Ganley and Moxey 2000). It is useful in measuring patient satisfaction because it examines the performance of dynamic processes over time (Bell et al. 1997).

Six-Sigma is a management philosophy that seeks a nonexistent error rate. It is ripe for healthcare because many healthcare processes require a near-zero tolerance for mistakes. Practicing Six-Sigma helps eliminating such problems as long cycle times, high cost, and poor outcomes (Lazarus and Neely 2003).

Six-Sigma has the potential to achieve exponential quality of improvement through the reduction of variation in system processes. A focus on the customer aids in the acceptance on new processes (Thompson and Lewis 2002). The Six-Sigma methodology reduces errors and thereby improves quality through its distinctive metric approach. Kaplan and Norton (1992) suggest that process improvement is more attainable if managers can develop metrics that are influenced by employee activities.

An effective quality management program requires locating the root cause of system defects, not just the symptoms (James 2005). In this way, prevention mechanisms can be enacted in early stages, not after defects are already manifested in the outcome (Gummesson 2001). Appropriate monitoring and measurement tools must be in place to analyze and interpret performance data.

Many medical quality improvement programs rely on outcome figures obtained through summary statistics. Performance indicator reporting systems, such as the “balanced scorecard” used by Mayo Clinic (Curtright et al. 2000) are part of a trend toward outcome-focus only. Benneyan and Kaminsky (1995) are critical of these methods of healthcare quality assurance. A great deal of information about the performance of the underlying systems and subsystems disappears because outcome measurements are computed with aggregated data (James 2005). Combining many random variables into a single random variable inhibits the ability to identify and reduce process variability (Benneyan and Kaminsky 1995).

James (2005) explains that using SPC and Six-Sigma tools for problem-solving and decision making calls for an organizational culture that values statistical data. This requires that the technical and administrative systems are well integrated and mutually supporting.

- ***Knowledge Process Outsourcing (KPO) in healthcare***

Knowledge Process Outsourcing (KPO) has been successfully implemented in the healthcare industry (Sen and Shiel, 2006).

Outsourcing refers to the practice of transferring activities done within a firm to third party providers within the country or “off-shore”. KPO consists of the outsourcing of supply (moving, storing, making and buying of goods and services) and demand (customer selection, acquisition, retention and extension) management, and certain enterprise services (human resources, finance and regulatory, IT and facilities management) (Scholl 2003).

The two following examples of KPO were studied by Sen and Shiel (2006): 1) a firm in India receives cross-sectional radiological images and enhances them in order to improve the productivity of US based radiologists; 2) a subsidiary of a multinational clinical research organization conducts clinical trials for multinational pharmaceutical companies in India and Ireland. According to Sen and Shiel (2006), specific opportunities in KPO exist in the Healthcare / Pharmaceuticals industry such as medical content and services, clinical trials, drug discovery, medical procedures, medical diagnostics, biologics, genetics, bio-informatics.

- ***Business process redesign (BPR) in healthcare***

Jansen-Vullers and Reijers (2005) show a significant reduction of throughput times and service times by exploiting business process redesign (BPR) techniques, i.e. rules of thumb that aim to optimize a business process by improving its tasks, its routine structure, the resource organization, etc. This result is in line with the findings of Buchanan (1998)’s study focusing on BPR for acute hospitals to schedule patients to the operating theatres and to their surgical teams in a manner that avoids both delays and overruns to schedule. Buchanan concludes that a reengineering frame of reference is of great help to support the redesign of such processes.

- ***Buffer management in healthcare***

Buffer management is a systems analysis technique that originally derived from examining causes of variability occurring in Theory of Constraints (TOC) logistical systems known as drum-buffer-rope (Goldratt and Cox 1986; Goldratt 1990; Umble and Srikanth 1990).

In health care systems, the “buffer manager” could ensure that all necessary prior processing steps, tests, procedures, etc. are completed and checked before the patient reaches the constraint resource. A synchronized rope mechanism controls the flow of incoming patients to match the rate at which the constraint can process them.

Process variation causes significant disruption in the process flow, resulting in system sub-optimization. Buffer management theory was originally developed as a mechanism to identify and eliminate the most significant sources of variation that cause major delays in the timely flow of materials in a drum-buffer-rope system. Buffer management should be viewed as a powerful tool that fully complements Deming’s Theory of Profound Knowledge (Lepore and Cohen 1999).

- *Information technology in healthcare*

Investments in information technology (IT) are expensive, but a large initial investment can result in substantial operational savings in the long run. It is argued that implementing IT projects to improve the quality of care could potentially reduce the number of law suits resulting from medical errors (Brewin 2004), resulting in a huge cost reduction for providers (Bernstein et al. 2007).

Tucker and Edmondson (2003) report that the American medical community has responded to increased public awareness of shortcomings in healthcare delivery by calling for systematic, organizational improvements to increase patient safety. Examples of such initiatives include creating shared databases of medical errors to facilitate widespread learning from mistakes and focusing renewed attention on hospital processes, culture, and reporting systems.

- *Telehealth*

Healthcare providers can incorporate patient data, test results, medication data, and treatment histories into a cohesive system to thoroughly evaluate each patient’s health situation and determine the safest and most appropriate course of action (Bernstein et al. 2007).

Despite the great promise that telehealth holds for improving cost, quality and access, there is currently a disjunction between opinions on telehealth vis-à-vis its benefits and costs, and system growth and performance. In the absence of solid empirical evidence, key decision makers entertain doubts about telehealth's effectiveness, which, in turn, limits public leadership, private investment, and the long-term integration of telehealth into the health and technological mainstream (Miller 2007).

- *Remote consultation*

Telecommunications have created a novel means of contact between patient and healthcare worker: the remote consultation. The unique feature of remote consultations is the simultaneous flow of services to the production line from different organizations that are not co-located. The organizational consequences of IT are well-known, and it has been proposed that the potential of telecooperation systems can only be fully realized if their use is accompanied by organizational changes (Sandkuhl and Fuchs-Kittowski 1999, Eason 2001).

Implementation process of managerial innovations

The study of variables that affected decisions to initially adopt innovations was emphasized in the early 1970s. The focus has largely shifted away from why organizations respond to the introduction of an innovation differently toward trying to better understand problems that arise in the implementation of an innovation. In initiatives that require people to modify job behaviour, the most critical success factors are proper upfront education and training, a respected leader to champion the project, and the active involvement of key players to help formulate and implement the new system (Umble et al. 2003).

Successful implementation requires effective communication. Typically the major problem is not the degree of change required but achieving a consensus among the players in the system (Athanasopoulos and Gounaris, 2001). Communication is the key to success in any relationship, but this is especially true in the healthcare

industry with respect to IT. If executive leadership supports a project from the beginning, the project is more likely to be considered for implementation.

Resistance to change requires management. The added-value of an innovation must be highlighted to reduce objections to change from the employees' side, particularly the interruption in their routines or regular duties. Resistance can be mitigated if the new project is presented as a means of improving current processes and making employees duties easier and more effective (Bernstein et al. 2007).

Research in healthcare management suggests that opportunities for productivity improvement exist that require only better use of available resources. Operations management techniques have been developed in the fields of manufacturing and supply chain management. The customer service focus of logistics can be applied to improve the quality and efficiency of healthcare to the general benefit of patients and government budgets.

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ⁱ According to Tucker and Edmondson (2003), an error is "the execution of a task that is either unnecessary or incorrectly carried out and that could have been avoided with appropriate distribution of pre-existing information" (p. 56).