

# Application of Operational Management Methodologies to Healthcare: A Call to Appropriate Action

*White Paper*



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Hospitals and physician practices can benefit from using operations management techniques, such as Lean Process Improvement and Variability Management, proven to be useful in other industries, particularly in the manufacturing sector. Understanding these methodologies is necessary to apply them appropriately to an organization's operational challenges. This article will define both methodologies and describe operational issues within healthcare facilities that can be best remedied by using one or the other, or sometimes both.

**Objective:** Provide an understanding of the methodologies and illustrate how to implement them appropriately within a healthcare organization.

**Methods:** Describe Variability Management and Lean Process Improvement and how they would be beneficial on their own and together.

**Results:** A case study will show the results of using Lean Process Improvement and Variability Management in healthcare operations management.

**Conclusions:** The article concludes by relating these methodologies to the rapid switch from volume-based to value-based reimbursement models.

**Key Words:** Variability Management, Lean Process Improvement, Operations Management, Patient Flow

## INTRODUCTION

Hospitals and physician practices can benefit from using operations management (OM) techniques, such as Lean Process Improvement (LPI)<sup>[1]</sup> and Variability Management (VM)<sup>[2]</sup>, proven to be useful in other industries, particularly in the manufacturing sector. An understanding and an appropriate deployment of these OM methodologies are necessary, however, for organizations to apply them successfully to their operational challenges. For instance, many hospitals believe that problems with patient flow, such as prolonged lengths of stay in the emergency department (ED), can be remedied by the application of a Lean process improvement initiative. Instead, slow-downs in patient flow have been shown to be more amenable to managing the variability within that flow. Therefore, applying Lean to this problem is unlikely to help.<sup>[3]</sup>

This article will define both VM and Lean methodologies and describe operational issues within healthcare facilities that can be best remedied by using one or the other, or sometimes both.

## METHODS

### VARIABILITY MANAGEMENT

Variability is classified into two major types: artificial and natural. Artificial variability is man-made; natural variability occurs spontaneously. Patient flow, for instance, may contain variation due to the way patients are scheduled within the system. In many hospitals, most surgeons like

to operate on Tuesday through Thursday, and they abhor operating on the weekends. The resulting increase in the number of patients flowing through the surgery schedule during the middle of the week would be artificial variability. Patient flow may also contain natural variability, such as an uptick in the number of patients that flow through an emergency department during flu season.

The point of variability management is then to decrease the artificial variation, since natural variability is not amenable to variability management techniques. This process commonly starts by separating the flow into more homogenous streams. The flow of patients into a primary care physician practice demonstrates a good example here: The patients that are demanding access to the practice on any particular day may include regularly scheduled patients and those with urgent or even emergent problems. Separating the flow into scheduled and urgent/emergent flow streams can allow both scenarios to be managed much more efficiently and effectively.

#### LEAN PROCESS IMPROVEMENT

The very essence of Lean process improvement is to eliminate waste and inefficiency from the process at hand. Lean methodology systematically identifies and attempts to remove all types of waste to include wasted time, wasted motion, defects, duplications, and misutilization. The goal is to maximize efficiency and efficacy.

A good example of Lean process improvement in healthcare delivery might have to do with a surgical procedure. One can easily see how coordinating efforts between anesthesia, nursing, and the surgeon could eliminate wasted time. Likewise, making sure the equipment in the room is adequate for the task, optimally utilized, and appropriately placed would also demonstrate Lean process improvement activities.

The use of LPI to eliminate errors often is combined with a technique called Six-Sigma, which attempts to decrease the number of errors in a manufacturing or service procedure to six standard deviations from the mean number of errors at the start of the improvement process. The Lean Six-Sigma methodology is also sometimes applied to healthcare delivery, although it is much more common in the manufacturing sector. <sup>[4]</sup>

#### COMBINING VARIABILITY MANAGEMENT WITH LEAN PROCESS IMPROVEMENT

Very little has been written about the combination of variability management and Lean process improvement. Interestingly, perhaps the best results in improving healthcare delivery are occurring in those organizations that have learned how to combine these two OM techniques. The combination of methodologies allows the user to apply the proper technique to the root problem of the inefficiency or inefficacy being addressed and achieve better outcomes.

Returning to the earlier example of a busy primary care physician practice that has now split its patient flow into two more homogenous flow streams consisting of scheduled and urgent/emergent patients, the next step should be to use LPI to design the optimal process for managing the patients in each flow stream. This process can be done by carefully measuring the flow through each channel and ensuring that the appropriate resources (i.e., labor, space, equipment, supplies, and time) are allocated to each flow stream, without waste, and then utilized to produce high-quality outcomes. (Six Sigma may not be a reasonable expectation; however, outcomes should be measured, and the process should be refined to achieve the lowest numbers of defects possible.)

The combination of OM techniques to healthcare delivery can be applied to a large number of opportunities for improvement. The opportunities include the ambulatory sector, such as in the physician practice setting and other areas where simultaneous smoothing of patient flow and application of well-designed and executed processes can lead to improved patient care delivery. Imaging centers, clinical labs, physical therapy departments, and emergency departments would benefit from this approach. On the inpatient side, applying these techniques to the surgical suites should be emphasized. Studies have shown that smoothing the flow through the ORs produces dramatic effects, not just in the OR itself, but also in remote areas, to include the emergency department and the critical care units (where these changes have been shown to reduce morbidity and even mortality rates).<sup>[5]</sup>

## OBSTACLES AND CHALLENGES

Applying modern OM techniques to healthcare, where providers especially like to think of themselves as skilled craftsmen as opposed to operations managers, is not easy. The methods themselves are not difficult to learn; however, often the results and recommended actions may seem counter-intuitive to those working within the healthcare system. Also, the recommended changes to the delivery system often are seen as onerous and disruptive in a system that prides itself on professional autonomy and sole authority decision-making. The following case study illustrates this point.

## RESULTS

### CASE STUDY

A large healthcare system in the Southeast was having many problems common to most institutions of its size. Wait times in the emergency department were high, with many patients leaving before being seen by a physician. There were many times when bed capacity levels required the hospital to go on diversion to try and decompress their high census. Patients caught up in this slow flow through the facility consistently rated the hospital poorly on patient satisfaction surveys. Sluggish throughput through the ORs, radiology, and other departments, along with high rates of overtime, were leading to lost revenue and higher operating expenses.

Finally, and of greatest concern, patient-to-nurse ratios on many of the units were way too high at certain times of the day or the week. During these times, errors were occurring that resulted in serious harm events, some of which even led to avoidable deaths in the facility.

The hospital first attempted to apply Lean process improvement methods to their inpatient units only to find that even well-designed and effectively executed processes could be easily overcome by high numbers of patients flowing through the system. As the physician then in charge of performing root-cause analyses on all serious occurrences within the system put it, “It was like a broken record. The description of each event always started with the same words: ‘It was an especially busy day.’”

Next, the system decided to try to smooth out the number of elective surgery patients admitted to the hospital each day from the OR. First, they separated the flow of patients within the OR into elective cases and urgent/emergent cases and then focused their smoothing efforts on the elective case flow. Unfortunately, this did not work, as the surgeons who were asked to begin operating on days other than their most preferred days of the week (Tuesday through Thursday) resisted the change in scheduling and threatened to take their elective cases to the competition, which was plentiful in this over-bedded community. The hospital administration, out of fear of losing lucrative surgical referrals, capitulated to the surgeons’ wishes, and the problems continued to plague the institution.

Several years have now passed since the initial attempts at scheduling improvements were made. Today, more of the recalcitrant surgeons are employed by the hospital system, and the hope is that their employment relationship with the facility will allow the hospital to have better leverage over the surgery schedule. However, significant progress has not yet been fully demonstrated, and focused efforts to improve clinical outcomes across the system have failed. Finally, these poor quality markers are costing the system money, as value-based reimbursements from both government and commercial payers become more the norm.

## Discussion

### CONCLUSION

A relentless push to drive higher value in the American healthcare system is underway. Payers are rapidly switching from volume-based to value-based reimbursement models for both hospitals and physicians. Nevertheless, providers are not responding to these incentives with the operational changes necessary to truly drive higher quality and lower costs. Much of this resistance to change is understandable; many in the industry still believe that “this too shall pass” and that value-based reimbursement won’t become the norm. What is less easy to understand is the turning away by those who claim to be true healthcare professionals from methods and techniques that have been proven time and time again to eradicate the underlying cause of what ails the system.

If the healthcare industry were a dying patient, those who failed to administer a proven cure would be committing malpractice. Hopefully, more facilitators will see clearly that appropriate application of OM principles represents just such a cure. Further, it must be administered quickly before the patient succumbs to a fatal illness, and we all have to face the reality that our inaction allowed this failure to happen.

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