

Deployment of Lean Six Sigma in Care Coordination

An Improved Discharge Process

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ABSTRACT

Purpose/Objectives: This article presents a quality improvement project to reduce readmissions in the Medicare population related to heart failure, acute myocardial infarction, and pneumonia. The article describes a systematic approach to the discharge process aimed at improving transitions of care from hospital to post-acute care, utilizing Lean Six Sigma methodology.

Primary Practice Setting: Inpatient acute care hospital.

Findings/Conclusions: A coordinated discharge process, which includes postdischarge follow-up, can reduce avoidable readmissions.

Implications for Case Management: The quality improvement project demonstrated the significant role case management plays in preventing costly readmissions and improving outcomes for patients through better transitions of care from the hospital to the community. By utilizing Lean Six Sigma methodology, hospitals can focus on eliminating waste in their current processes and build more sustainable improvements to deliver a safe, quality, discharge process for their patients. Case managers are leading this effort to improve care transitions and assure a smoother transition into the community postdischarge.

Key words: *care management, discharge process, Lean Six Sigma, readmissions*

Hospital readmissions contribute to the increasing cost of health care and are the focus of the Centers for Medicare & Medicaid Service's (CMS's) efforts to move toward a pay-for-performance payment methodology. The goal of the CMS strategy is to reduce hospital readmission rates by 20% by 2013. The three diagnoses currently selected by the CMS are acute myocardial infarction (AMI), heart failure (HF), and pneumonia. The plan is to develop and implement a discharge process that assures better compliance with the discharge plan of care and can result in better outcomes for the patients.

To address readmissions, hospitals will be held accountable for better discharge programs and improved transitions across the continuum of care. The Institute for Healthcare Improvement has identified four processes shown to decrease readmissions: (1) improved assessment of discharge needs on admission, (2) more effective discharge teaching, (3) improved communication with the patient and family about the discharge plan, and (4) better posthospital follow-up. Through the use of a holistic approach, care management teams can impact this escalating problem with better discharge planning and improved postdischarge follow-up. Case management departments are at the center of the readmission prevention effort in acute

care facilities. According to Askren-Gonzalez and Frater (2012), failed discharge plans are a major contributor to hospital readmissions. Lack of follow-up care postdischarge, with a primary care practitioner, was found to have the most influence on readmissions within 30 days. In addition to the concerns with the cost of readmissions, they are often associated with lower quality of care (Askren-Gonzalez & Frater, 2012). Poor quality of care reflects on the hospital and can affect the choices patients make when seeking care. An improved discharge process based on effective coordination of postdischarge care can result in lower readmission rates and better outcomes for patients.

SCOPE OF THE PROBLEM

Since the publication of the Institute of Medicine's report in 2001, there has been increasing focus within

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acute care hospitals on quality and safety (Institute of Medicine, 2001). In today's pay-for-performance environment, hospitals are under increasing pressure to improve quality and safety, while containing cost. According to the 2005 Medicare Payment Advisory Commission, as many as 18% of all Medicare patients are readmitted within 30 days of discharge (Watkins, Hall, & Kring, 2012). This statistic suggests that patients are not adequately prepared at discharge to care for themselves at home. Four areas have been identified by IHI to decrease readmissions: (a) improved assessment of discharge needs on admission, (b) more effective discharge teaching, (c) improved communication with the patient and family about the discharge plan, and (d) better post hospital follow-up (Institute for Healthcare Improvement). Patients continue to experience the same or different symptoms related to their illness, requiring them to return to the hospital for treatment. Health reform is aimed at improving patient outcomes and increasing efficiency by decreasing preventable readmissions (Mulder, Tzeng, & Vecchioni, 2012). By better preparing patients at discharge and assuring adequate post-acute care, patients can experience better outcomes. For hospitals to avoid penalties for readmissions, the focus needs to shift to the acute care setting for better discharge planning and post-acute care follow-up. Today, HF is the most common diagnosis requiring frequent trips to the emergency department, resulting in readmissions. In some cases, HF readmissions have increased (Annema, Luttik, & Jaarsma, 2009). Despite the efforts by health care providers to address readmission through patient education and better discharge planning, there has been little improvement. Patients continue to return to emergency departments to relieve their symptoms, resulting in increased rehospitalizations.

PURPOSE

The quality improvement team developed a team charter and identified the purpose of the project. The team elected to use Lean Six Sigma as the model for this quality improvement effort. The need to reengineer the discharge process was the strategy chosen for this project, with the following initiatives:

- To create a comprehensive approach to discharge that will reduce avoidable readmissions.
- To align inpatient and outpatient services to provide care across the continuum from acute care to post-acute care.
- Through the application of Lean Six Sigma principles, eliminate waste in the current process.

To avoid unnecessary rehospitalizations for this vulnerable population, the focus needs to shift to the acute care setting for better discharge planning and post-acute care follow-up.

- Reduce rates of readmissions for three key diagnoses of HF, AMI, and pneumonia.
- Improve patient satisfaction with the discharge process.

For hospitals to avoid payment penalties, more effective strategies need to be deployed to prevent excess readmissions. According to the Agency for Healthcare Research and Quality (2008), hospital costs for avoidable readmissions represent 20% of total health care spending in the United States. Hospital readmissions are a focus of the Patient Protection and Affordable Care Act of 2010 (CMS Office of the Actuary, 2010). The 2010 Affordable Care Act established a hospital readmission reduction program that would reduce Inpatient Prospective Payment System payments to hospitals that demonstrate excess readmissions on or after October 1, 2012. The excess readmission rates will be used to determine the payment adjustment for each eligible hospital.

NEED FOR CHANGE

To avoid unnecessary rehospitalizations for this vulnerable population, the focus needs to shift to the acute care setting for better discharge planning and post-acute care follow-up. One of the outcome measures monitored and reported to the CMS is readmissions. Readmissions are costly to the hospital and the patient. Hospital readmissions are a health care concern that drive up costs and inefficiencies that are largely avoidable (Kocher & Adashi, 2011). The organization selected for an improved discharge program is a private not-for-profit health care system in Atlanta, GA. The three-hospital system includes two acute care facilities and a long-term acute care hospital. Of the approximately 35,000 annual admissions to this health care system, the targeted population of Medicare patients represents 30% of total admissions. Efforts to improve outcomes and avoid readmissions have been ongoing for several years. Despite those efforts, readmissions continue to represent a challenge for the organization. Despite the efforts by health care providers to address readmission through patient education and better discharge planning, there has

been little improvement. In some cases, heart failure readmissions have increased (Annema et al., 2009). It became evident to the team early in the project that the inpatient work was not sufficient to assure patients were compliant with the discharge plan. The inpatient team needed to address better transitions of care into the community. The need for post-acute care follow-up would be a key factor in the success of the project. According to Jencks, Williams, and Coleman (2009), more than 50% of patients readmitted for a medical diagnosis had no record of an appointment with a post-acute care provider between hospitalizations. The lack of follow-up care between hospitalizations contributed to the likelihood of a readmission.

As part of the Affordable Care Act (2009), avoiding preventable readmissions has been identified as a measure that can improve quality and lower health care costs. The two most common reasons for readmission were congestive HF and pneumonia. Together, these two diagnoses were responsible for half of all hospital costs for preventable readmissions. This hospital's CMS pay-for-performance readmission rates for HF, AMI, and pneumonia are consistent with risk-adjusted national rates. However, as hospitals across the United States continue to reduce readmission rates, continuous improvement will be needed to stay competitive. Table 1 illustrates the publicly reported hospital data on readmissions for AMI, HF, and pneumonia.

COST ANALYSIS

To quantify the opportunity for improvement, an analysis of the current state of readmissions was conducted. This analysis found that the total number of patients readmitted in the identified diagnoses, over

a 1-year period, was more than 1,500. Of the total patients readmitted in these diagnoses, 400 were within 30 days of discharge. The assessment included financial data, such as the cost of a readmission, the likely penalties incurred if readmissions were not reduced, and the cost to the health care system for repeated rehospitalizations.

The unadjusted cost per case related to 30-day readmissions is \$8,033 for HF, \$10,549 for AMI, and \$7,816 for pneumonia. This translates into an annual excess opportunity cost of \$359,505. If the hospital is not successful in reducing 30-day readmissions, the penalties could be severe. The cost in reimbursement for the federal fiscal year 2013 is 1% of total Medicare reimbursements, increasing to 3% by federal fiscal year 2015. For this organization, \$1.8 million is at risk annually.

DEPLOYMENT OF LEAN SIX SIGMA TO CREATE A NEW DISCHARGE PROCESS

The methodology chosen for this project was Lean Six Sigma. According to Lighter (2011), applying lean processes to health care environments has become a method by which hospitals can reduce the probability of errors and improve patient safety. The discharge improvement team (DIT) was led by a Lean Six Sigma Green Belt facilitator. The DIT included nurses, case managers, physicians, nurse practitioners, a discharge call center representative, clinic nurses, and key members of the patient care team. The DIT established a charter and problem statement to define the scope of the project as follows: Complexities of the discharge process results in higher than expected readmissions for Medicare pay-for-performance diagnoses, AMI, HF, and pneumonia and loss in revenue.

TABLE 1

Federal Fiscal Year 2013 CMS Hospital Compare Results Pay-for-Performance Period: July 1, 2008, to June 30, 2011

	National Average Crude Rate	Eligible Discharges	Number of Readmissions	Predicted Risk Adjusted Hospital Rate	Expected Risk Adjusted National Rate	Excess Readmission Ratio
North Decatur						
AMI	19.2	109	25	22.1	21.6	1.0230
HF	24.6	560	125	22.7	23.6	0.9636
CAP	18.5	494	79	16.6	17.6	0.9446
Hillandale						
AMI	19.2	23	3	20.3	21.1	0.9612
HF	24.6	145	31	22.9	23.7	0.9645
CAP	18.5	95	25	19.0	16.6	1.1412

Note: The hospital weighted readmission ratios for the CMS pay-for-performance measures will favorably impact on federal fiscal year 2013 Medicare reimbursement rates with the exception of the pneumonia excess readmission ratio at Hillandale. AMI = acute myocardial infarction; CMS = Centers for Medicare & Medicaid Service; CPA = community acquired pneumonia; HF = heart failure.

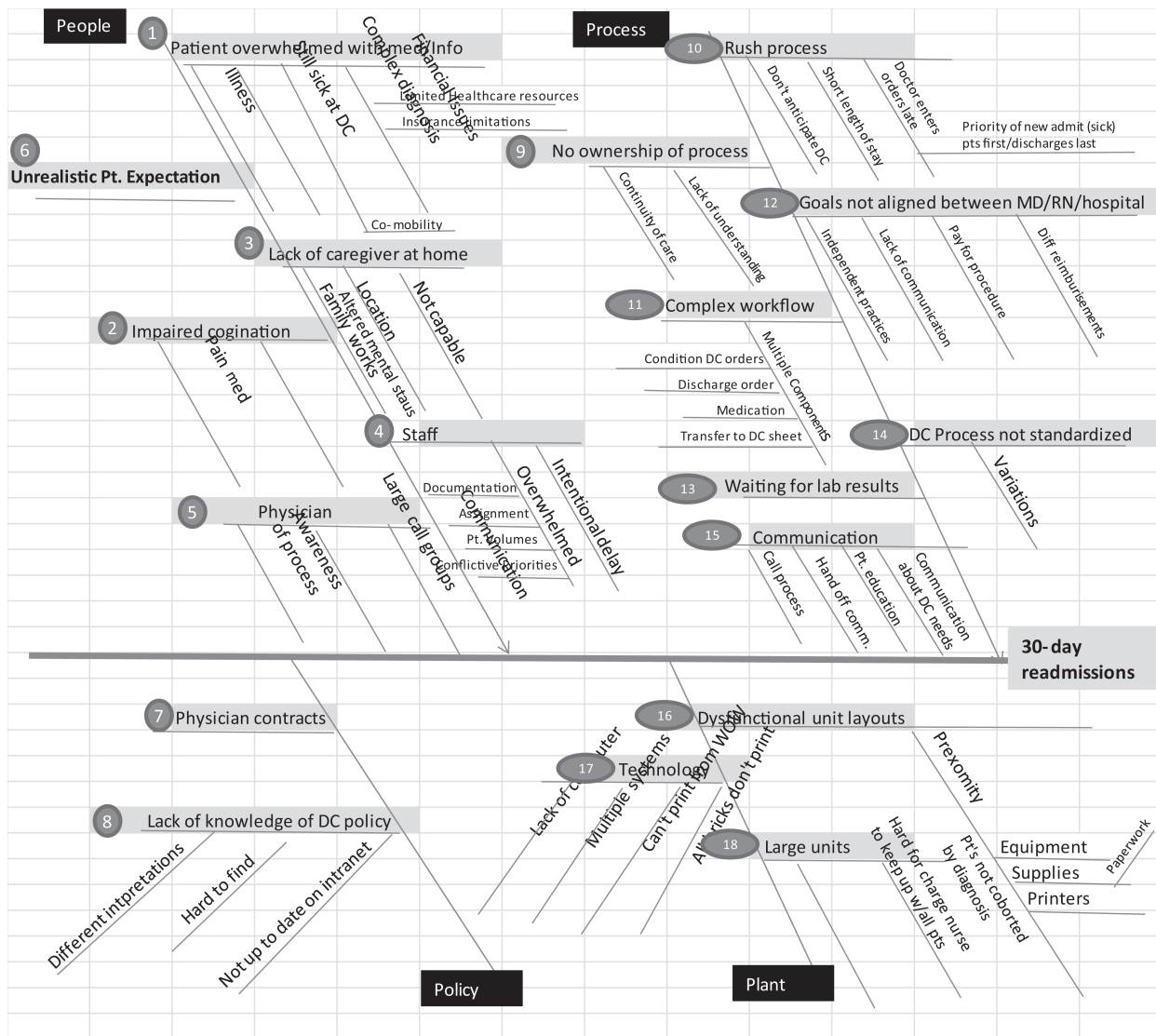


FIGURE 1 Fishbone diagram. Comm = communication; DC = discharge; diff = different; info = information; lab = laboratory; Med = medicine; MD = doctor of medicine; Pt. = patient; w/all = with all.

Initially, the DIT developed a supplier, input, process, output, customer flow diagram, which was used to illustrate the key steps in the discharge process, beginning with admission and ending with discharge. The DIT created an Ishikawa or fishbone diagram (see Figure 1), which illustrates cause and effect relationships between processes, people, policy, and plan. Failure to address these components of the process can result in an ineffective discharge process resulting in increased 30-day readmissions.

Risk assessments conducted for 150 readmitted patients included the voice of the customer interviews to learn about the customer's point of view regarding service issues and gaps that prompt readmission. A full-day kaizen event was held to identify the steps needed to correct waste, gaps, and barriers in the current process. The DIT created a failure mode and effect analysis

for further validation and prioritization. Through the use of brainstorming techniques and multivoting, the process improvement action steps and tools were identified. The DIT used the failure mode and effect analysis to score the severity, probability, and detectability of the discharge process against the reengineered discharge. Reengineered discharge largely focuses on arranging postdischarge appointments, diagnostic testing and results, services, equipment, medication reconciliation, teach-back education, handover communication to post-acute care providers, and postdischarge telephone calls (Jack et al., 2009). As a result, the DIT identified three priorities for improvement in the current discharge process. The key focus areas were (a) need to identify a primary care physician (PCP) for patients before discharge; (b) if the patient did not have a PCP, one would be assigned from the

primary care network; and (c) patients would have a postdischarge appointment with the PCP or the discharge clinic before discharge.

During the course of this project, a number of barriers were identified in implementing the new discharge process:

- The discharge clinic needed to be approved by administration, funded, and staffed.
- Case management would need to change the current discharge process to include scheduling the appointment with the PCP.
- The discharge call center would take responsibility for assigning a PCP if none was on record.
- Staff needed to be educated on the new process.

REDESIGNED DISCHARGE PROCESS

A key component of the redesigned discharge process was the ability to incorporate a postdischarge clinic. The clinic was designed to see patients discharged with or without a PCP who were cared for by the hospitalist service. The hospital already had a post-discharge clinic in place for patients requiring anticoagulation management. Although this clinic was successful in providing anticoagulation management, it was felt that a discharge clinic could continue to see patients on anticoagulants and provide postdischarge follow-up for a larger population of patients. The nurse practitioner was transitioned from the anticoagulation clinic to the discharge clinic. In addition to the nurse practitioner, a small office staff was hired, and a practice manager/case manager was transitioned from the hospital case management department. In addition, two nurse patient care coordinators were recruited to work closely with the hospitalists. These nurses serve a vital role in communicating the plan of care to the patients, assisting with the discharge plan and following up on any questions the patients might have about their care. They are also responsible for setting the discharge appointment with the discharge clinic. The clinic case manager calls patients who do not keep their appointment to arrange another appointment, refer them to a PCP, or refer them to community mental health services. To

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assure continuity of care, the hospitalists have access to the patients' record through the electronic medical record. The hospitalists have access to their patients' record throughout the inpatient stay as well as post-discharge. Following the visit, the PCP is contacted directly by the case manager to provide information about the patient visit. In addition to the call, a note is faxed to the primary physician.

Funding for the clinic comes from two sources. The clinic was set up as an outpatient clinic with billing capability. If the patient has insurance, the insurance company is billed for an office visit; however, no patient is turned away due to inability to pay. The hospital bears the cost of the inpatient care coordinators and provides a subsidy to the clinic for the office space and the personnel.

RESULTS

For this project, various Lean Six Sigma tools were used to outline the current process and identify areas for implementation of lean processes. Currently, discharge appointments are made for 6 to 8 patients per day, who are discharged from the pilot unit. In the first 30 days of the pilot, 86 patients have been referred to the discharge clinic with a 50% no-show rate. The discharge clinic staff calls all of the no-show patients to follow up on their status. As part of that phone call, the discharge plan is reviewed, including medications, and a follow-up visit is confirmed with either the discharge clinic or the PCP. In the first 30 days, the clinic contacted 40 patients, 20 of whom intended to keep their PCP appointment. Early results suggest that the new process is having an impact on readmissions. After 30 days, the readmission rate for the 46 patients seen in the clinic was 6.5%, compared with baseline readmissions rates for the pilot unit of 16.2%. It is still too early to predict the long-term effects of the new discharge process. If the project continues to show success, the plan is to deploy the same process across the organization.

Another aim of the project was an increase in patient satisfaction with the discharge process. The pilot unit has achieved a significant improvement in patient satisfaction on the questions regarding satisfaction with discharge information. The patient satisfaction score for this indicator exceeded 90% during the second quarter of 2013, compared with 76% in the last quarter of 2012.

FUTURE IMPLICATIONS FOR CASE MANAGEMENT

Health care is rapidly moving from the 1990's era of managed care to today's environment of care management. This project exemplifies the need for case

managers to focus on disease-specific care across the continuum from acute care to post-acute care. Inpatient case managers are charged with establishing connections in the outpatient arena to assure care is timely, effective, safe, and appropriate. According to the Health Care Advisory Board (2013), there are four key principles guiding the care management of the future:

1. Patient-centered care is matched to the individual patient population.
2. Care is provided across the continuum from hospital to post-acute care provider.
3. Primary care is accessible.
4. Metrics are used to align cost and quality. Benchmarking is used to assure that the program is meeting national benchmarks for effectiveness.

As case management evolves into an expanded role in managing patients through the transitions of care, resources need to be reallocated to match patient populations with the most appropriate care model. The discharge process is one area for more focused efforts to align care with the post-acute care setting. The need to change current discharge processes or face penalties was the impetus for the change project. However, the frequency of readmissions reflects poorly on the care provided in an organization and can lead to a loss of trust within the community served. With the onset of public reporting of quality data, such as readmissions, the public has the information readily available to make decisions about care. The pressure on case management departments today to reduce cost by reducing length of stay and reducing avoidable readmissions has put this specialty on the forefront of the evolving health care arena.

CONCLUSION

The purpose of this quality improvement plan was to prevent patient harm and improve outcomes by implementation of a comprehensive discharge process aimed at avoiding readmissions. The level of patient education provided, implementation of the discharge plan and coordination of care following discharge can be predictors of whether a patient will be readmitted (Aspenson & Hazaray, 2012). The methodology chosen for this project was Lean Six Sigma. The decision to use Lean Six Sigma methodology was effective and provided the tools and structure for this project. The discipline and the tools resulted in a comprehensive approach to the problem of readmissions. The integration of acute care and post-acute care providers on the team assured that patients received safe, timely, and effective care across the continuum. Readmissions can be reduced as the result of a discharge plan that assures follow-up postdischarge with a PCP or a transitional care clinic.

REFERENCES

- Agency for Healthcare Research and Quality. (2008). *Hospital readmissions: In search of potentially avoidable costs*. Paper presented at the AHRQ 2008 Annual Conference. Retrieved from <http://www.ahrq.gov/about/annualmtg08/090908slides/Friedman.htm>
- Annema, C., Luttk, M. L., & Jaarsma, T. (2009). Reasons for readmission in heart failure: Perspectives of patients, caregivers, cardiologists, and heart failure nurses. *Heart Lung, 38*(5), 427–434.
- Askren-Gonzalez, A., & Frater, J. (2012). Case management programs for hospital readmission prevention. *Professional Case Management, 17*(5), 219–226.
- Aspenson, M., & Hazaray, S. (2012, July). The clock is ticking on readmission penalties. *Healthcare Financial Management, 66*, 58–63.
- Centers for Medicare & Medicaid Services. Retrieved from <http://www.hospitalcompare.hhs.gov>
- CMS Office of the Actuary. (2010). Affordable Care Act update: Implementing Medicare cost strategies. Retrieved from <http://www.healthcare.gov>
- Health Care Advisory Board. (2013, March). 2012–2013 National Meeting Series. *Risk and reward: Positioning your health system to deliver value in a transforming health care marketplace*. Washington, DC: The Advisory Board Company.
- Institute for Healthcare Improvement. Reducing Avoidable Readmissions by Improving Transitions of Care. Retrieved from <http://www.ihl.org>.
- Institute of Medicine. (2001). *Crossing the quality chasm: A new health system for the 21st century*. Washington, DC: National Academies Press.
- Jack, B. W., Chetty, V. K., Anthony, D., Greenwald, J. L., Sanchez, G. M., Johnson, A. E., ... Culpepper, L. (2009). A reengineered hospital discharge program to decrease rehospitalizations: A randomized trial. *Annals of Internal Medicine, 150*(3), 178–187.
- Jencks, S. F., Williams, M. V., & Coleman, E. A. (2009). Rehospitalizations among patients in the Medicare fee-for-service program. *The New England Journal of Medicine, 306*(14), 1418–1428.
- Kocher, R. P., & Adashi, E. Y. (2011). Hospital readmissions and the Affordable Care Act: Paying for coordinated quality care. *Journal of the American Medical Association, 306*(16), 1794–1795.
- Lighter, D. E. (2011). *Advanced performance improvement in health care*. Sudbury, MA: Jones and Bartlett.
- Mulder, B. J., Tzeng, H., & Vecchioni, N. D. (2012). Preventing avoidable rehospitalizations by understanding the characteristics of “frequent fliers.” *Journal of Nursing Care Quality, 27*(1), 77–82. doi:10.1097/NCQ.0b013e31822fddc
- Watkins, L., Hall, C., & Kring, D. (2012). Hospital to home: A transition program for frail older adults. *Professional Case Management, 17*(3), 117–123.

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