

# **Analysis of Medicare Spending Per Beneficiary (MSPB)**

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## **Abstract**

Medicare Spending per Beneficiary (MSPB) measures a hospital efficiency, based on the Medicare payments made during an episode or stay. An episode is comprised of three days before, during, and 30 days following the patient's stay in the hospital. An MSPB episode includes all claims made from the prior three days of the inpatient stay to the post 30 days following the stay. The MSPB index is the ratio of the hospital's payment-standardized risk-adjusted MSPB amount to the episode-weighted median across all hospitals. The Medicare payments are revised and adjusted to decrease and remove any variation that is not related to the care. In this paper, we analyze MSPB in a local hospital and use process improvement tools to reduce the Medicare cost and improve hospital efficiency. The study investigates the root causes of the high MSPB index and propose actions to reduce it from 1.03 to below 1.00, the current state average. Root cause analysis was performed to identify the factors that directly affect the costs. It was found that a significant contributor of the high Medicare costs, and hence high MSPB index, is the readmission of patients to the hospital within seven days of discharge. Solutions were proposed to reduce the readmissions and reduce the MSPB Index to below 1.00.

## **Keywords**

Healthcare, Medicare spend per beneficiary, process improvement, readmission.

## **1. Introduction**

The use of process improvement methodologies in healthcare is gaining more attention because of the increasing market pressures on hospitals from competitors (e.g., other surgical suites including office based surgery) and from payers seeking lower prices (Aqlan et al., 2016). Across the nation, many hospitals are facing both budget and reimbursement cuts. These financial constraints are forcing hospitals to improve their efficiency and find ways to cut costs. Several studies in the literature have discussed the implementation of process improvement methodologies in healthcare (Robinson and Kirsch, 2015; Mullaney, 2010; Bender et al., 2015; Cima et al., 2011).

Medicare Spending per Beneficiary (MSPB) measures a hospitals' efficiency, based on the Medicare payments made during an episode or stay. An episode is comprised of three days before, length of stay, and 30 days following the patient's stay in the hospital. An MSPB episode includes all claims made from the prior three days of the inpatient stay to the post 30 days following the stay. The Medicare payments are revised and adjusted to decrease and remove any variation that is not related to the care. The MSPB measure is the ratio of the hospital's payment-standardized risk-adjusted MSPB Amount to the episode-weighted median cost across all hospitals. The actual cost is the adjusted amount and the expected cost is how much the hospital believes the episode will cost based off of the weighted median across all hospitals. It is desired that the adjusted amount is lower than the expected amount. This a measure by a ratio, therefore anything above 1 is bad and anything below 1 is good. The MSPB measure of below 1 means that the hospital is not losing any money by not spending as much as they initially expected. Having a measure of 1

means that the adjusted amount and the expected cost are roughly the same and the hospital will not be losing any money. Any value above 1 results in a loss of money to the hospital because the expected amount was less than the actual adjusted amount. The average spending per episode at the local hospital is \$21,404.04 and the MSPB amount is \$20,971.38. While it may seem like decreasing the ratio by a hundredth is not a big deal, the hospital actually saved millions of dollars by doing so.

Process improvement techniques can effectively be used to improve healthcare management systems. In order to identify and eliminate the process inefficiencies, activities are divided into three categories: value add activities, non-value add activities, and non-value add essential activities. Lean process improvement methodologies focus on eliminating non value-add work and minimizing non value-add essential work. Non value add, and therefore unnecessary, steps add paid employee time and drive up costs which raises the MSPB ratio.

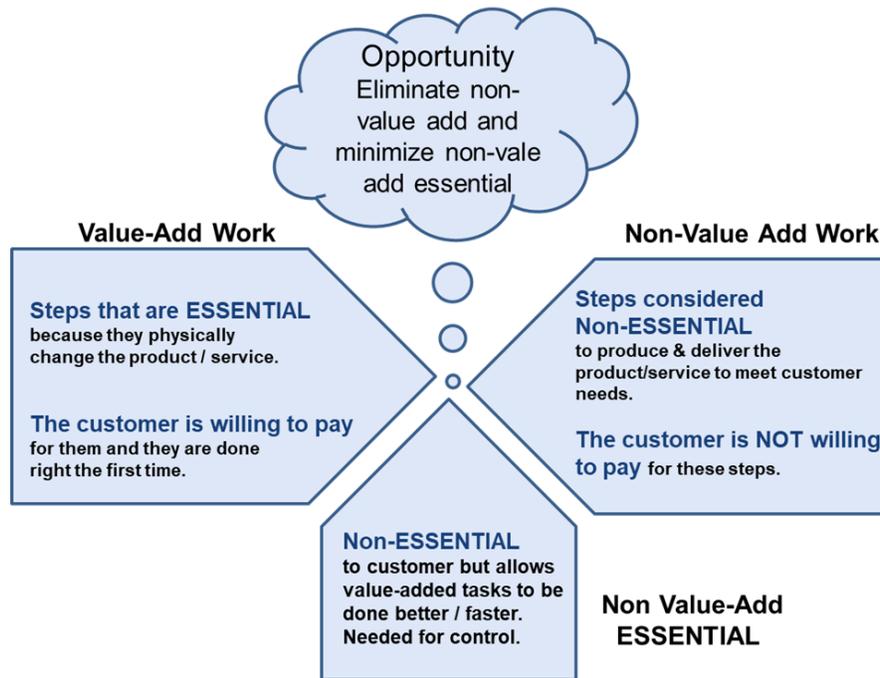


Figure 1. Value add analysis

## 2. Analysis of Current System

The hospital under consideration has historically maintained a high value of MSPB measure. However, recently the hospital has started taking some improvement actions that improved the quality of care and reduce Medicare costs. The current MSPB measure is 1.03. The average MSPB measure for Pennsylvania is 1.00 and the national average is 0.98. The hospital's goal is to lower the MSPB index to below 1.00.

In this study, we studied and mapped the processes and performed analysis of the process tasks. In Figure 2, we map the process steps for the medical billing. Value add analysis of the process steps is shown in Table 1. The activities are categorized into: value add, non value add, and non-value add essential based on the criteria shown in Figure 1.

As indicated earlier, MSPB ratios are calculated based on data related to the patient that occurs 3 days prior to admittance and 30 days after the patient released. Some patients during this time are readmitted to the hospital after they are released. Readmittance of patients not only increases cost of care but is also devalues quality of patient care. Readmission of patients is one form of waste that needs to be eliminated as it is an excess of processing and talent. Long waiting times are another form of waste as it is a form of waiting that does not add value to the process. Transportation of patients through different departments as well as transportation of equipment and lab materials is another example of lean wastes. Hospitals keep inventory of medicine, tools, equipment, and supplies. Any excess of this inventory is a form of lean waste as an excess of inventory increases cost and takes up storage space. Also

related to inventory, any waiting for specific materials in the hospital is a waste. When hospitals discharge patients, any excess processing that may include extra papers, waiting for approval, or extra documents is also a waste that should be eliminated. Table 2 shows the identified Lean wastes.

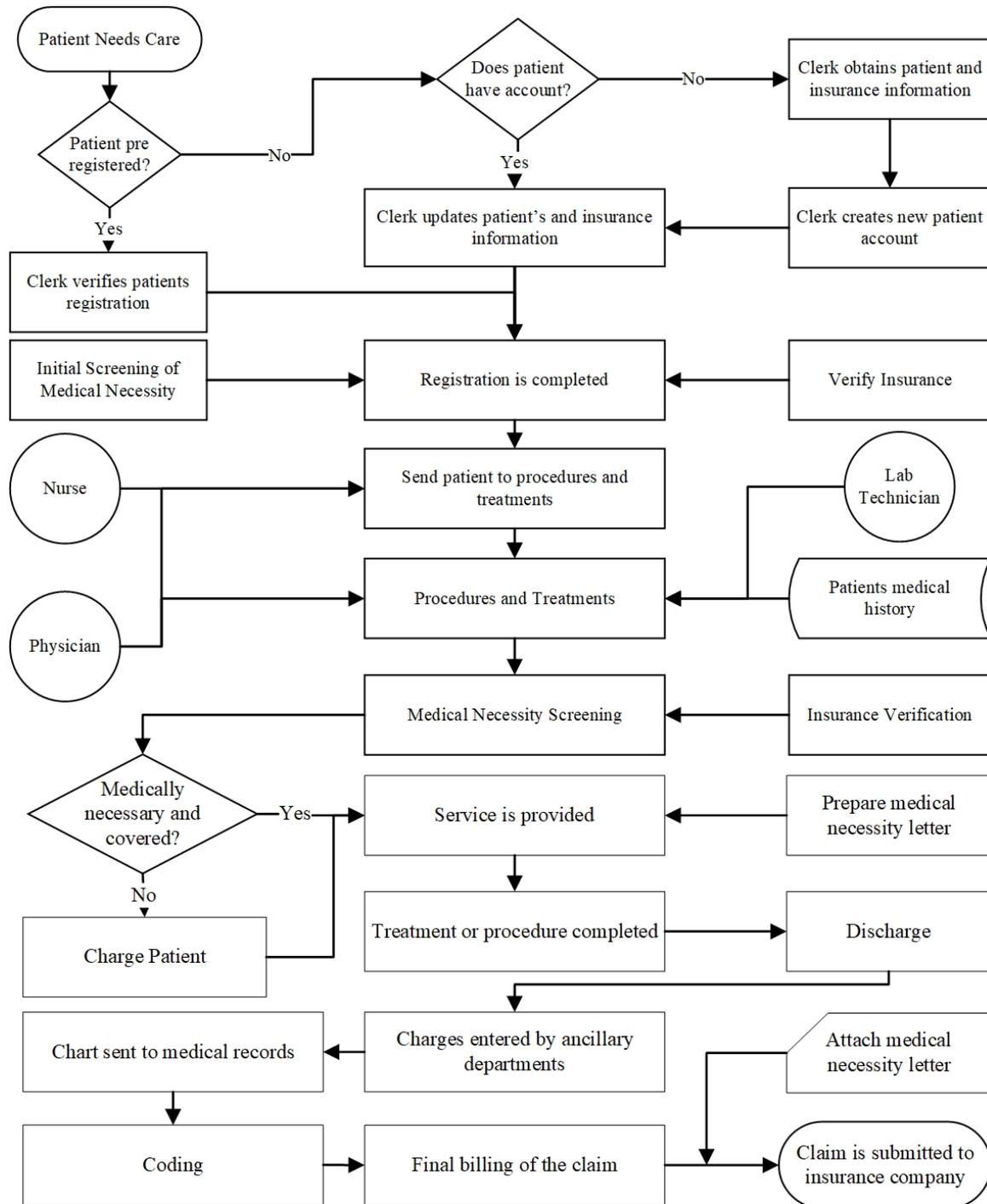


Figure 2. Process flow chart

Table 1. Value add analysis of the process steps

Process Step	Activity	Value-Add	Non Value-Add	Non Value-Add Essential
Arrival	Patient arrives at the hospital			X
Registration	Clerk verifies patients registration			X
Registration	Clerk obtains patient and insurance information		X	
Registration	Clerk updates patient and insurance information		X	
Registration	Clerk creates new patient account		X	
Pre-Treatment	Initial screening of medical necessity	X		
Pre-Treatment	Verify insurance		X	
Pre-Treatment	Registration is completed			X
Pre-Treatment	Patient sent (travels) to procedures and treatments		X	
Pre-Treatment	Patients medical history is looked up		X	
Treatment	Procedures and treatments	X		
Treatment	Medical necessity screening	X		
Treatment	Insurance is verified		X	
Treatment	Service is provided	X		
Billing	Non covered patients charged		X	
Treatment	Medical necessity letter prepared			X
Treatment	Treatment and procedures are completed	X		
Billing	Charges are entered by ancillary departments			X
Billing	Chart is sent to medical records			X
Billing	Medical codes are referenced and coding is done			X
Billing	Final bill is prepared for the claim	X		
Billing	Medical necessity letter is attached		X	
Billing	Claim is submitted to insurance company	X		

Table 2. Lean wastes identified

No.	Lean Waste Description	Waste Type
1	Readmittance of patients	Excess processing
2	Waiting for registration	Waiting
3	Waiting for triage	Waiting
4	Waiting for procedures and treatments	Waiting
5	Waiting for lab results	Waiting
6	Transportation through hospital departments	Transportation
7	Sending of medical records	Excess Processing
8	Excess of medical supplies and medicine	Excess Inventory
9	Waiting for medical supplies to arrive	Inventory/ Waiting
10	Waiting for approval for discharge	Excess Processing/ Waiting
11	Processing of extra paper and documents during discharge	Excess Processing
12	Mistakes during insurance claims process	Defect

The next step is to conduct root cause analysis to identify the main causes of the high MSPB index or ratio. Through this thorough analysis, we have discovered where some of the high costs leading to a high MSPB measure exist. We concluded that a high cost is associated with patients who are readmitted to the hospital within seven days of discharge. With this conclusion, we have created solutions to reduce the amount of Medicare patients who are readmitted to the hospital in an effort to reduce the MSPB ratio. Figure 4 shows the frequency of Medicare cases per Major Diagnostic Category (MDC).

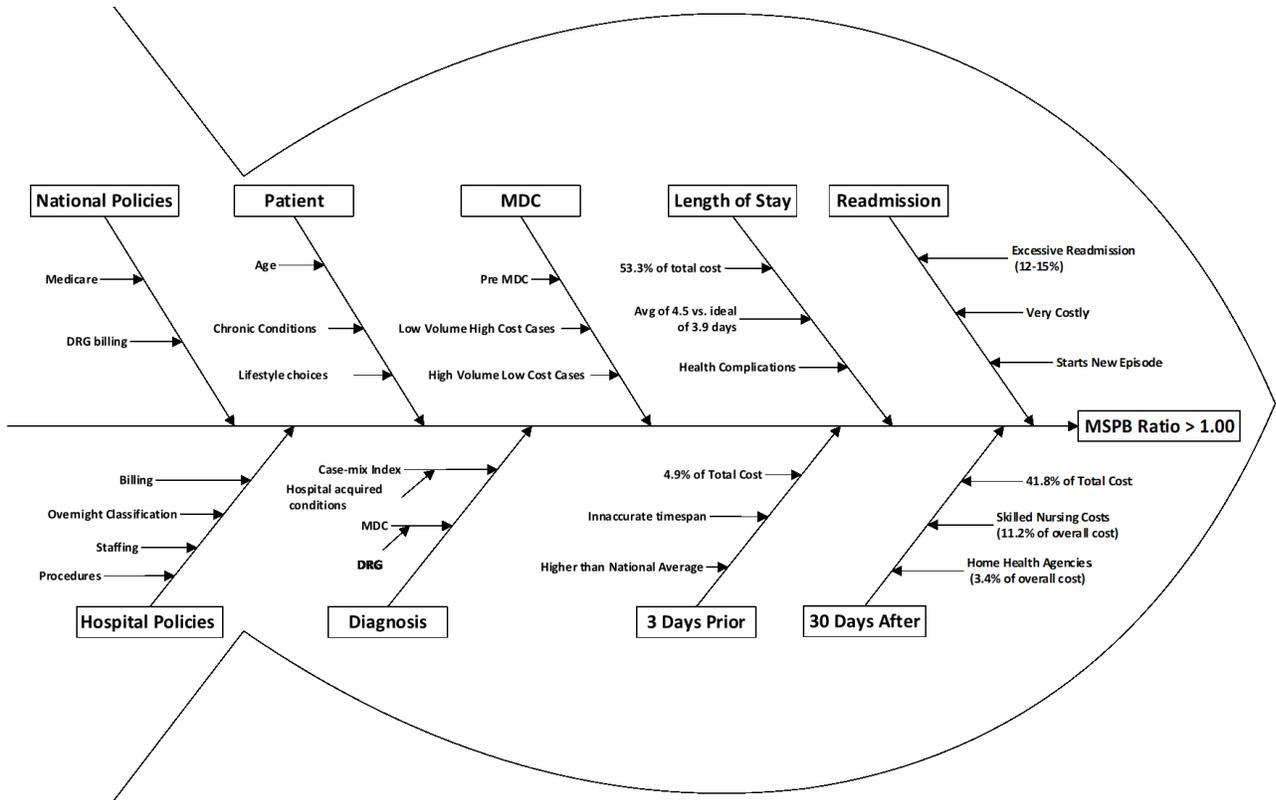


Figure 3. Root cause analysis to identify causes of high MSPB ratio

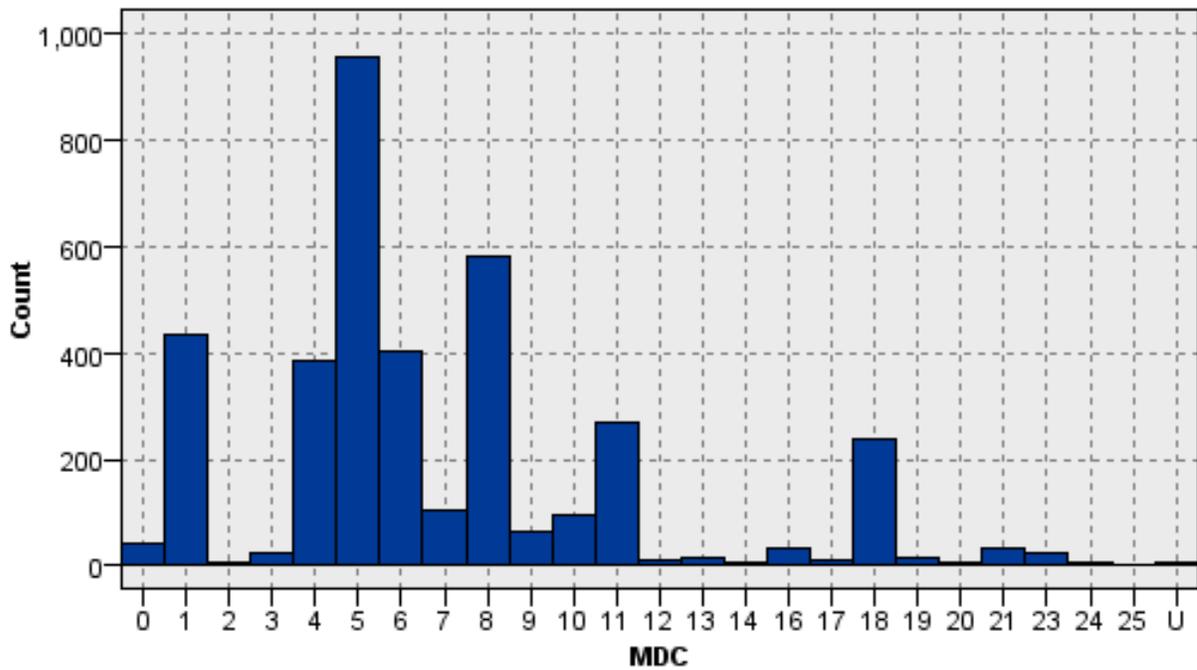


Figure 4. Histogram for number of Medicare cases per MDC

In 2014, the hospital reported an MSPB ratio of 1.07. Since then, the MSPB ratio has steadily decreased due to some improvement actions that have been taken (see Figure 5). Our goal is to reduce the MSPB ratio to below 1.00 for 2018 and future years. Currently, the hospital has started a Meds to Beds Program to deliver medicine to patients before discharge. Medications are available at hospital pharmacy to ensure that the patient has access to picking up proper medicine before leaving hospital grounds. This program aims to reduce readmission rates, which will ultimately lead to reducing the MSPB ratio as the average cost of readmission is \$7,000. For patients who are readmitted, the hospital now requires those patients to make a follow-up appointment with their Primary Care Physician within 7 days. Another step that the hospital has started to implement to reduce readmission rates is creating a disease management team. This disease management team works to educate patients while the patient is admitted as well as place a follow-up phone call to patients. Expanding this program to all Medicare patients instead of only readmitted patients is an option for the hospital to take proactive measures.

The problem with many patients is their unwillingness to be proactive about their own health. Patients consistently end up being readmitted to the hospital for avoidable complications or things they could have easily managed on their own. Instead of being instructed upon discharge to schedule a follow up with their Primary Care Physician within a seven-day window, the patient will now be assisted in making this appointment. Prior to discharge a member of the hospital staff will confirm that the appointment is already scheduled. If the patient is unable to call or schedule from their smart phone or tablet someone will be available to assist them. Team members propose to have a nurse assist patients in scheduling the appointment or verifying that patients have scheduled them.

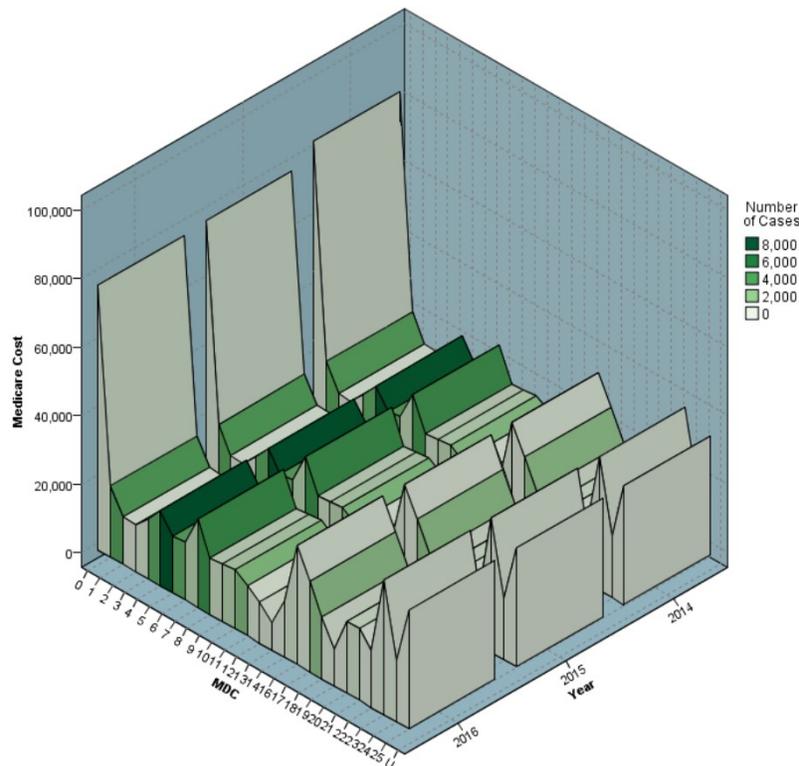


Figure 5. Trend of Medicare cost per MDC

### 3. Proposed Countermeasures

Based on the previous analysis, several countermeasures or solutions were proposed. The five proposed solutions are shown in Table 3. The solutions were prioritized based on ease of implementation and business impact using 2x2 matrix. The rating for business impact was determined by the level of importance for each concept from 1-10 where 1 being the least important and 10 being the most crucial. The ease of implementation rating was also determined by a rating of 1-10 where 1 being the hardest to implement and 10 being the easiest. Following the ratings, each concept was graphed into a selection quadrant as coordinates (see Figure 6). The ease of implementation is the x-coordinate and the business impact is the y-coordinate. Each quadrant has a rating that describes if the concept is a

good or poor choice to select. Concepts 2 and 5 are in the quick minor wins quadrant of the standard recommendation selection quadrant. Concepts 2 and 5 can effectively be integrated into concept 3, a quick major win. The combination of these three concepts will allow for an easy effective solution to reduce the MSPB Measure.

Table 3. Proposed solutions for improving readmission

#	Root Cause	Solution	Impact Business Value	Ease of Implementation
1	Readmission/Patient	Expand Meds to Beds Initiative	5	4
2*	Readmission/Hospital Policies/30 Days After	Standard Procedure to Schedule Follow up Appointments	4	9
3*	Readmission/Patient/Hospital Policies/30 Days After	Patient Education Program	7	6
4	Length of Stay/National Policies/Hospital Policies	Classification of Patients	7	2
5*	Patient/30 Days After/Hospital Policies	Scheduling Rides to Appointments	3	8

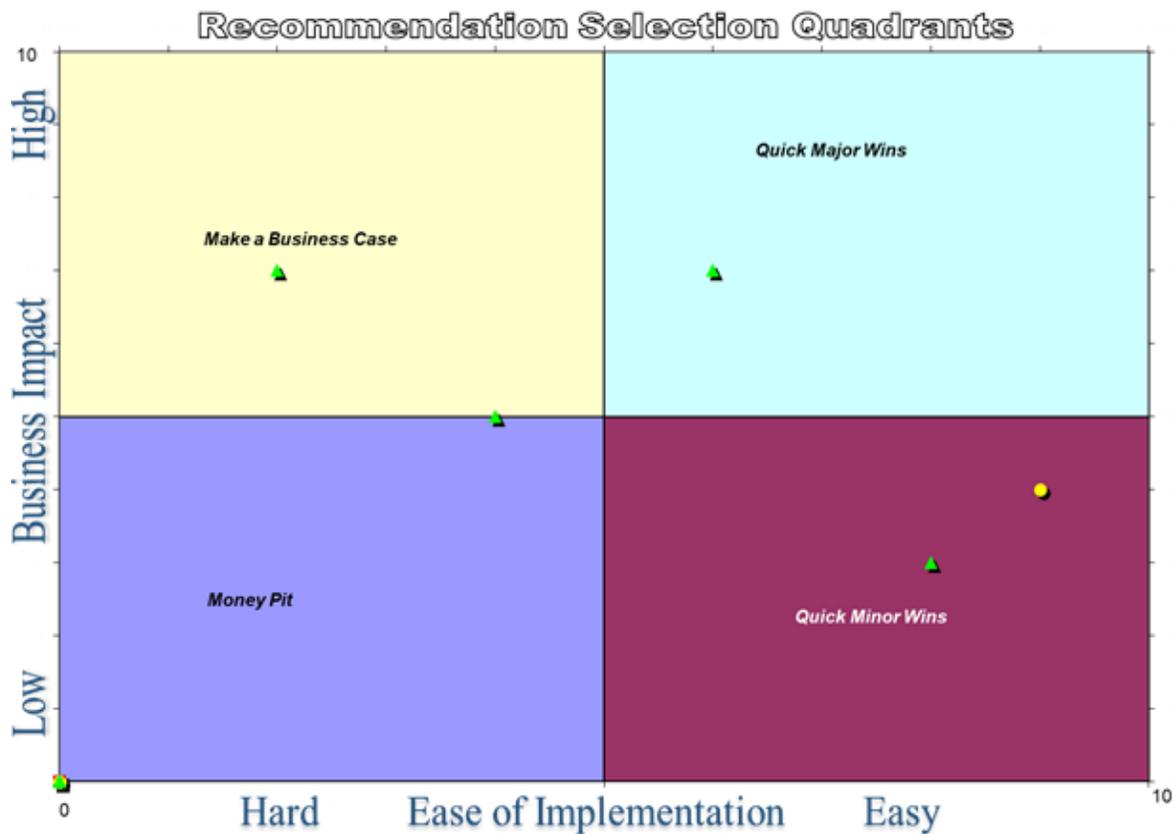


Figure 6. 2x2 matrix for selecting countermeasures

Our idea to educate patients will be an expansion of the disease management team to educate patients regarding Medicare standards as well as disease prevention to avoid unnecessary hospital visits and readmission. Medicare currently only covers specific programs that help patients stay proactive with their health. Those programs are tailored towards specific needs such as diabetes education if the patient has diabetes and medical nutrition therapy if the patient has diabetes or kidney disease. Medicare does cover a one-time "Welcome to Medicare" preventive visit and a yearly "wellness" visit. We suggest that the hospital not only educate patients on any preventive and screening services that Medicare offers and yearly "wellness" visits, but also educate patients on what they can do to stay proactive in order to get well and avoid readmittance to the hospital. This includes informing patients of taking their prescribed medicines and suggesting any other wellness tactics such as vitamins, exercise, and dietary changes. Several options for an education program exist where the hospital could decide if the effects would outweigh the costs. The other option is creating a website where patients could read articles and view videos related to their health issues as well as chat with a representative of the disease management team to become educated on their health and avoid making future unnecessary trips back to the hospital.

Another solution to reduce the high rates of patient readmission would be to provide free rideshare rides, such as Uber, or taxi rides to follow-up appointments. Most of the patients enrolled in Medicare are very elderly and may have issues finding transportation to appointments. Providing transportation for patients will greatly reduce stress on the patient and will provide a reliable way to attend follow-up appointments. The increased rates of follow-up attendance could ensure that any issues relating to the procedures are caught early which will reduce the chance of readmission or an additional admission if it occurs outside of the 30 days post procedure. By knowing the distribution of the patients (see Figure 7), an effective transportation schedule for the patients can be developed.

The average length of stay is above the national and state averages. Reclassifying how the hospital identifies and assigns a patient as an outpatient or inpatient can reduce the length of stay. Currently, the hospital classifies a patient as an inpatient if they remain in the hospital until the clock hits 12:00am the next day. This causes an issue with billing because inpatients are more-costly to the hospital than outpatients are. If an outpatient remains in the hospital for an extended time without officially becoming an inpatient, the costs for that specific patient will far exceed the cost that would be associated if the patient was classified as an inpatient. A possible solution to the issue of classifying patients as outpatients or inpatients could be developing an algorithm that accounts for all factors once a patient is checked into the hospital. The algorithm would be more time based instead of clock based

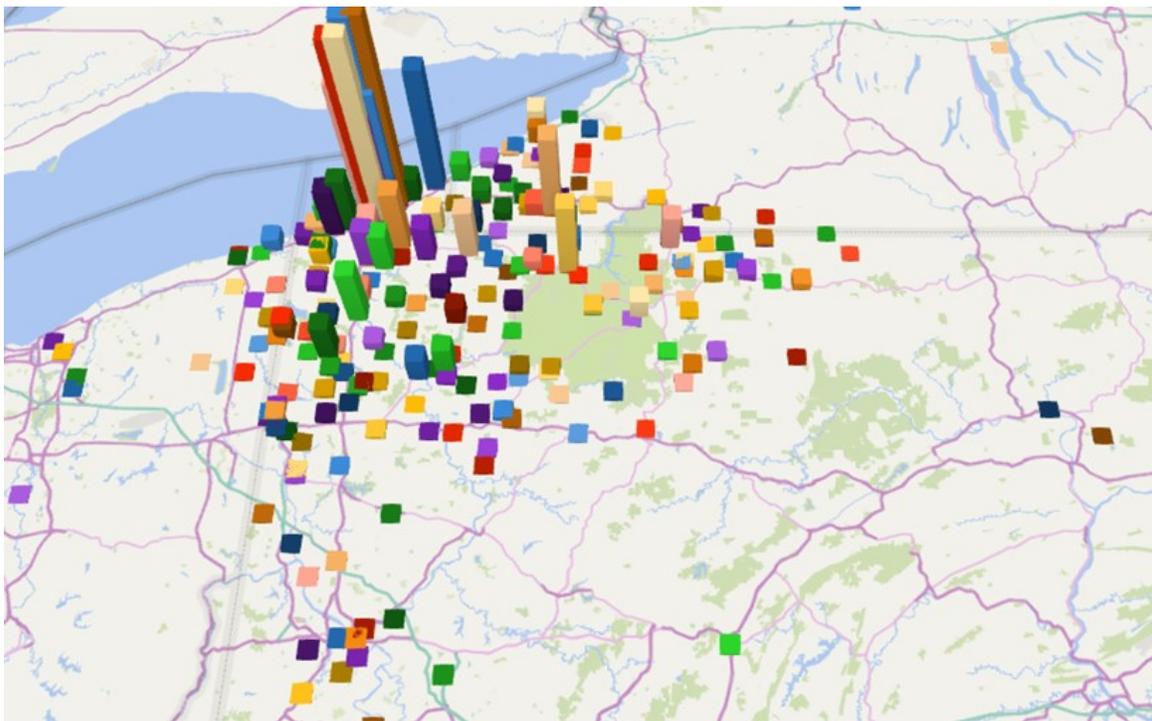


Figure 7. Patient distribution

## 4. Conclusions

This paper discussed the Medicare spend in a local hospital and proposed potential solutions to reduce the associated cost. Process improvement tools were utilized to identify the root causes of the high MSPB index. The main root causes identified are high readmission rate, hospital policies on length of stay, and patient cooperation. Recommended countermeasures were evaluated and prioritized based on impact and ease of implementation. The solutions focus on developing a standard procedure to schedule follow-up appointments, a patient education system, and scheduling rides to follow-up appointments. These new implementations will help ensure quality care for patients and reduce the rate of readmitted patients.

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## Biographies

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