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Lean Healthcare
Streamlining Primary Care Services

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Abstract

There are a number of articles that explain conceptually how Lean Six Sigma is being used in Hospitals. This white paper will present a case study of how we used Lean Six Sigma tools to improve patient-service at a VA (Veterans Affairs) Medical Center.

Background

This VA Medical Center (located in Erie Pennsylvania) is a small facility focused on the Primary Care, Rehabilitation and Mental Health needs of its Veteran-Patients. Most surgeries and other specialties are handled at the regional hub medical center in Pittsburgh.

Given the focused mission of this medical center they decided to focus Lean Six Sigma on improving patient service in Primary Care. The quality of care in this medical center was excellent, but seeing patients at their appointment time was poor. Only 9% of patients were seen on time for their primary care appointment. This caused stress for patients and for the healthcare providers (Support Staff, Nurses and Physicians).

Project Overview

- Initial Assessment
- Performance Scorecard
- 5S Visual Management
- Spaghetti Diagrams
- Time Study / Quickchangeover

We used a variety of Lean tools, over an 8 week period, to improve on-time delivery of care to patients. Each one will be covered separately.

However, before we go into the details, I will cover how we decided to use the tools show above. An initial assessment of the department showed three problems.

The first was a lack of awareness of how the department was performing. Doctors, Nurses and support staff worked all day, went home and had no idea how the overall department had performed that day. They know how they did, and how their patients were feeling, but there was no connection with the overall Primary Care organization. Everyone worked in their own silo.

The second problem was a general lack of organization and standardization in the workplace. The hallways were cluttered and every exam room was set up differently. It was hard for patients in wheelchairs to maneuver around hallway obstacles. Providers had to walk around, from room to room looking for instruments and information.

Finally, there was an on-time delivery of care problem due to rooms being used for exams, longer than scheduled. The department was properly staffed, and technically has enough space, but there was often a lack of rooms available when a patient was ready scheduled to be examined.

Consequently, patients were rarely seen at their appointment time. Not seeing patients on time caused them to wait longer and leave the exam later than expected. This resulted in a culture of inefficiency, disorganization and a lack of timeliness. Patients learned to come late to appointments, because they knew they wouldn't be seen on time. Providers got frustrated at the lack of organization in the workplace and had to stay at the hospital longer than their normal shift

Performance Scorecards

Lean is a set of tools to identify and eliminate non value added activities. It creates visibility. The first step in our Lean journey was to create visibility. The Lean Team (Doctors, Nurses, Support Staff) created the Primary Care Performance Scorecard. This scorecard represents a few key performance indicators.

You will notice that there are just five measures. The fewer the number of measures, the more focus each one gets.

We started with the Purpose, or Mission, of the Primary Care department. The team then brainstormed their key performance measures. We weighted them to show which measures are most important in achieving the Mission. Finally, we gave each measure a "Below" and "Exceed" goal.

This Scorecard is reviewed by the head of Primary Care each month with the entire Primary Care staff. It is a 15 minute meeting to review prior month and year-to-date performance.

Primary Care Performance Scorecard – Post Lean Project

Purpose: To Provide Comprehensive, Efficient Primary Care that Exceeds Veterans Expectations	0%	100%	200%			
Measure of Success Description	Below	Expected	Exceed	Weighting	Prior Month	Year-to-Date
Completing Clinical Reminders	70%		90%	35%	50%	50%
Customer Service Survey (% Excellent)	70%		90%	30%	84.3%	85%
Utilization of Access Appointments	75%		95%	15%	78%	73%
1st Patient of the Day roomed and ready by 8 AM	80%		95%	10%	56.3%	61.1%
1st Patient of the Day seen by Physician by 8 AM	80%		95%	10%	62.5%	66.7%

This is the scorecard, six months after we completed the project. Note, our project worked primarily on the two on-time-delivery measures. While still far below the goal of 95%, both measures increased from below 10% to the levels shown above.

5S Visual Management

- Sort
- Set-In-Order
- Shine
- Standardize
- Sustain

We first addressed the physical disorganization using 5S Visual Management. The first step in the 5S Visual Management system is to sort through everything in the workplace to determine if it is a Green, Yellow or Red item.

Green – Used frequently, needs to be easily accessed
Yellow – Used, but infrequently, can be stored in a storeroom
Red – Not used, should be reviewed to see if another department needs it and if not thrown away

We worked on 2 exam rooms and the hallway. The hallway had 9 bulletin boards with random information. Both exam rooms were set up differently and didn't have a list of instruments, supplies and pamphlets (patient information).

We completed the 5S's by labeling everything that needed to be in the room and creating a standard list of instruments, supplies and pamphlets that each room should always have. We removed every bulletin board in the hallway, except the one by the phone, which got an updated internal phone list and emergency numbers.

The exam room standardization is sustained by making the standardized supply list part of the monthly housekeeping and safety audit.

5S Before and After Picture – Hallway

5S Visual Management
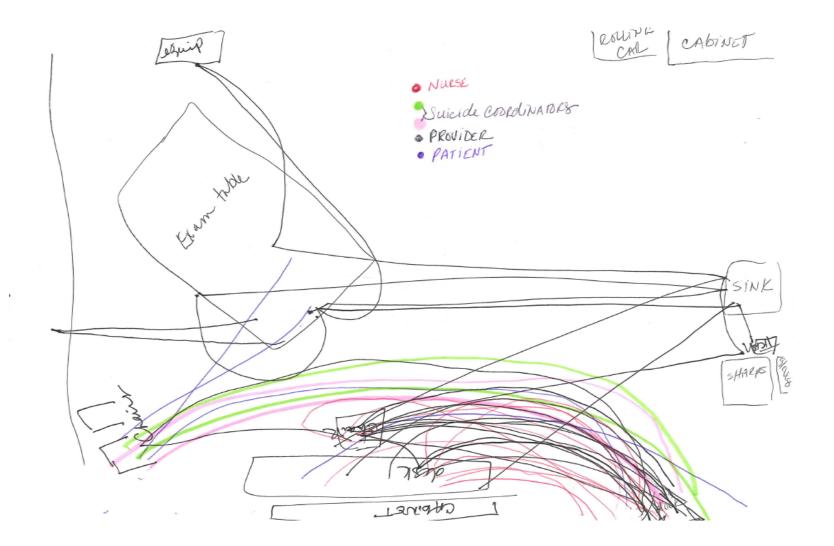
Spaghetti Diagram

Once the foundation of Lean was in place, with the Performance Scorecard and a visually organized workplace we began to analyze the Primary Care Exam process. To do this we used two Lean tools, Spaghetti Diagrams and Quickchangeover Time Study.

Lean is a series of tools to identify and eliminate non-value-added activities. Spaghetti Diagrams track people movement during a process. We use it to find excess movement of the people in the process. In this case we were tracking the Nurse, Patient and Physician. The outcome of the spaghetti diagram is to rearrange the physical workplace to reduce non-value-added move time.

Even after implementing 5S Visual Management and organizing the rooms to have all the instruments, materials and pamphlets, there is excessive movement in and out of the room. The Primary Care Exam process has created too much movement for the Nurse and Provider.

The Spaghetti Diagram also showed that the room is too big. Almost half of it is unused by the providers or patient. If we could rebuild the Primary Care Department we would make the rooms smaller to improve space utilization, fitting more exam rooms into the same envelope. If you recall from the Assessment, a lack of exam rooms being available was key driver for poor on-time-delivery of care. During a facility expansion later that year, this was acted on and the exam rooms were halved in size and doubled in number.

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Quickchangeover Time Study Analysis

At the same time as we were drawing out the "spaghetti" of people movement we were time studying what was happening during the exam process.

This Lean tool is called Quickchangeover. Its outcome is getting the patient in and out of the room faster, while improving the quality of service. Quickchangeover uses time study analysis to understand if there are times when the patient is in the exam process that is wasted time for them. We want to know what exactly is making the exam take longer than scheduled, so we can improve on-time-delivery of care and make sure that patients are seen on time.

Our exact time study is shown below. Each step of the process is written on the left and the corresponding duration is in the column "Min per Seq." The minutes per sequence are put in either the Uncommitted (patient does not need to be in the room) or committed (patient must be in an exam room).

There is one major finding of this analysis and it had a big positive impact. The Provider (Physician or Nurse Practicioner) was spending 17.7 minutes entering data into the computer with the patient in the room. This is called "Completing the Encounter" on the time study below. The patient does not need to be there, but the Provider wants to enter this data as soon as possible after the exam and usually doesn't have access to another computer. So the patient sits and makes small talk, while the Provider enters data.

The team's solution was to make one room in the Primary Care department a computer data entry room for Providers. This would cut 17.7 minutes out of the exam process for the patient and the exam room. With well over 100 exams per day, this gives back the equivalent of 4 exam rooms per day.

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Time Study Analysis

DateTaped: 10/16/08

PC Exam Room

Patient Change

Role	Activity/Step Description	Run time Min	sec	Run Time Sec	Secs per Seq	Min per Seq	NVA	Uncommitted	Room Comitted
N	Nurse Calls Patient		38	38	38	0.6			0.6
N	Weigh in	1	5	65	27	0.5		0.5	
N	PreVisit with Nurse	4	29	269	204	3.4		3.4	
N	Review reminders with Patient and put in computer	6	38	398	129	2.2			2.2
P	Provider Review History with Patient in the room	18	58	1138	740	12.3			12.3
P	Patient Care (talk, exam, labs, talk, soap note, review chronic, think, decide on plan)	34	12	2052	914	15.2			15.2
P	Complete the Encounter	51	54	3114	1062	17.7		17.7	
P	Completing reminders	52	14	3134	20	0.3			0.3
P	Provider Leaves	53	56	3236	102	1.7	1.7		
N	Nurse Enters	54	28	3268	32	0.5			0.5
N	Review what Provider Said	57	23	3443	175	2.9			2.9
N	Do what Provider said (flush ear, ekg, etc.)	73	0	4380	937	15.6			15.6
	Room readied for next pat	75	16	4516	136	2.3			2.3

Results

- Improved on-time delivery of care from 9% to 58% in 6 months

The cumulative effect of this Lean Project was a drastic improvement in seeing patients at their appointment times. While still below the goal, improvements continue to be made in this Hospital's Primary Care department. They are currently experimenting with:

- Staggering breaks
- Starting half the appointments at 7:45 AM
- Adding evening hours

All of these ideas are part of the process of increasing room availability and seeing patients on-time.