Using a Cross-Disciplinary Team to Reduce Transfusion Medicine Errors

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Purpose

This presentation will show how management, quality and lean staff from BloodCenter of Wisconsin used lean and six sigma methodology and tools to create a shared understanding and need for change amongst transfusion service staff and hospital staff.

Objectives

- Explore how lean methods help break down silos and foster "big picture thinking" within a cross-functional team.

- Learn how lean and six sigma principals were used to identify errors and improve the quality of clinical and operational services.

Key Takeaways

- Understand how lean and six sigma methodology and tools can be used to:
  - improve the relationships of key stakeholders
  - implement a process to improve quality at multiple levels
  - develop a proactive rather than reactive approach to error management.

Key Takeaways

- Recognize how a value stream map can help put individuals who are completely unfamiliar with a process and those who know the process well, on the same level of understanding its complexity.

- Understand the importance of establishing metrics to show progress made and measure success.

Background

The Transfusion Service (or Blood Bank) department at Children's Hospital of Wisconsin (CHW) is operated by BloodCenter of Wisconsin (BCW) staff as a contracted service, however we are an integrated department in the CHW laboratory.

Challenges

- With being part of two organizations comes the necessity to make sure we are meeting all regulatory and compliance requirements for both organizations, as well as meeting the needs of patients, physicians, and hospital staff.

- Systems and processes we follow need to abide by criteria from both organizations.

Challenges

- CHW is a teaching hospital and a pediatric institution.
- We are a FDA licensed transfusion service because we perform specific product preparations on site.
- A challenge certainly not unique to us, is the operation of multiple independent hospital computer systems with limited or no interfaces to one another.

All of which contribute to the mix of variation when it comes to whom, what, and how orders to the Transfusion Service are placed.

The resulting situation

- Over time, special orders and heavy reliance on transfusion service staff to provide oversight and multiple checks/balances to the ordering process had created a manual system with layers and layers of "exceptions".

- **The result: no standard processes, poor communication between the MD's, RN's and Transfusion Service and reliance on people to "catch" errors.**

The Problem

The driving force behind our lean adventure:

An increased number of significant errors was being reported out of the Transfusion Service.

Our Goals

- To really understand why we were seeing an increase in errors and what could be done as process improvements.
- To develop a proactive rather than reactive approach to error management.
- To reduce the number of significant errors.
- To improve customer relationships and service.
- To establish that transfusion medicine must take on a multidisciplinary approach and focus.

Methodologies Used

- Lean Value Stream Mapping (VSM)
  - Value Stream Mapping for Crossmatch Process - Receipt of Order to Issue of Product with Decision Trees

- Six Sigma Failure Mode Effect Analysis (FMEA) techniques

Value Stream Map (VSM) – why do it?

- Purpose of a VSM is to visualize the entire process for those directly involved in the process, auxiliary areas, suppliers, and the customer.
- Enable process improvement opportunities to be identified
  - Wait time in excess of process time
  - Rework in order to get a step done correctly. It is not at a level that is acceptable. (First Pass Yield – FPY)
  - Complexity of process
- Allow team to assess the impact of changes on the process before they are made.

Sample VSM
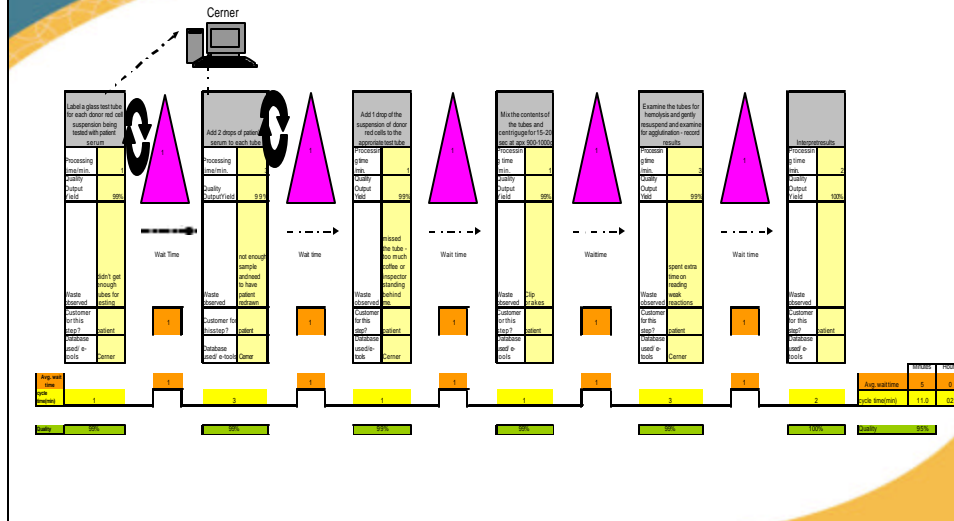
Transfusion Service Current State Value Stream Map BLOODCENTER *of WISCONSIN*

Current State VSM First Pass Yield BLOODCENTER *of WISCONSIN*

Results of the current state value stream map of the Type and
Crossmatch process was an alarming

First Pass Yield – 1.3%

Current State VSM First Pass Yield

What does this mean?

98.7% of the time our process requires rework, clarification, or follow-up to ensure we get the right product to the right patient.

Process steps to focus on

Order Received from Sunrise

Processing time /Min.	0.5
Available work time	1440
Quality Output Yield	10%
Database used/ e-tools	SunRise /Sunquest

Label check and spin down sample

Processing time /Min.	3
Available work time	1440
Quality Output Yield	66%

Label Product

Processing time /Min.	2
Available work time	1440
Quality Output Yield	85%
Database used/ e-tools	Sunquest/Hematrax

Receive Order To Transfuse

Processing time /Min.	0.5
Available work time	1440
Quality Output Yield	50%
Database used/ e-tools	Sunquest

Verify Order to Transfuse

Processing time /Min.	0.5
Available work time	1440
Quality Output Yield	90%
Database used/ e-tools	Sunquest

Receive and verify Order to Transport

Processing time /Min.	0.5
Available work time	1440
Quality Output Yield	80%
Database used/ e-tools	Sunquest

Supporting Data

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Ordering Errors: Failure Modes
defined

Data was collected for a two week
period to demonstrate the volume
and types of ordering errors TS
staff had to investigate

Number	Error/Failure Mode
1	Incorrect date and/or time on order
2	Order entered for incorrect patient
3	Order entered for incorrect product or amount
4	Amount or volume ordered not appropriate for age/weight of patient
5	Amount or volume ordered not appropriate for product requested
6	Transport order entered, need Transfuse order
7	Transport order entered, need XM order
8	Transport order entered, need Add on order
9	Wrong or no BB number on Transport order
10	Transfuse Order entered, need XM order
11	Transfuse order entered, need Add on order
12	Add on order entered, need XM order
13	XM order entered, need Add on order
14	Wrong XM order entered, NEOXM vs. Adult XM
15	Duplicate order
16	Special need required per policy or BAD, not on current order
17	Special need requested but not indicated per policy or BAD file
18	Test results incomplete or do not indicate need for TX
19	XM order entered, need transfuse or transport order

Outcomes

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Key accomplishments:

- **The determination and recognition that the Transfusion Service is not alone in this process.**

- Development of a CHW cross-disciplinary FMEA team to look at the "blood process" from order to transfusion.

Outcomes

- Transfusion Service department FMEA

- The development of an Error Task Force

- A revision to Transfusion Service Error Management

Outcomes

- Education and clear expectations to Transfusion Service staff on their roles in error management.
  - A truly non-punitive error management program
  - FDA "Guidance for Industry, Biological Product Deviation Reporting for Blood and Plasma Establishments"
  - What we have to report (FDA reportables) vs. what we want to monitor (all errors including near miss)

Outcomes

- Lesson learned - A good Error Management program requires on-going commitment, a significant amount of time and resources, and needs to be part of everyday operations.

Outcomes

- Establishing defined metrics for consistent monitoring of Transfusion Service performance and operations.

An AH-HA moment - Without metrics and monitoring to show the big picture you may not recognize patterns and trends or factors contributing to errors.

Metrics

Service metrics:
- Staff benchmarking
- Error management/safety reports
- # of transfusions/usage

Performance (customer) metrics:
- Turn Around Times
- QI improvement initiatives
- Productivity

Satisfaction Metrics:
- Employee feedback
- Retention and Turn Over
- Recognition
- Career development/Education
- Customer Surveys

Why do all this?

- Having defined metrics provides you with consistent, informative data to share at hospital committee meetings.

- You do not have to have an Error Task Force, most hospitals have Quality, Blood Utilization, or Safety committees which are all great venues to get your information heard at an administrative level.

Failure Mode Effect Analysis (FMEA)

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What is it?

- FMEA or Failure Mode and Effects Analysis is a proactive tool, technique and quality method that enables the identification and prevention of process or product errors before they occur.
  - Within healthcare, the goal is to avoid adverse events that could potentially cause harm to patients, families, employees or others in the patient care setting.
- A tool being recommended for Joint Commission on Accreditation of Healthcare Organizations
- A structured approach to identify the ways in which a process can fail to meet critical customer requirement.

Failure Mode Effect Analysis (FMEA)

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Why do it?

- Historically, healthcare has performed root cause analysis after sentinel events, medical errors or when a mistake occurs.
- With the added focus on safety and error reduction, however, it is important to analyze information from a prospective point of view to see what could go wrong before the adverse event occurs.
- Examining the entire process and support systems involved in the specific events – and not just the recurrence of the event – requires rigor and proven methodologies.

CHW Blood FMEA

Our Goal/Objective:

Provide suggestions to the hospital safety committee and leadership for change to current ordering and administration process, in order to improve patient safety with blood product ordering and administration.

CHW Blood FMEA

Summary

- The blood FMEA team met for 5 months.
- During the meetings:
  - Current processes were discussed
  - Each step in each process was examined for potential failures, but also potential solutions
  - An "Ideal Process" was created along with solutions ideas that are available currently, and with solution ideas that would need development.
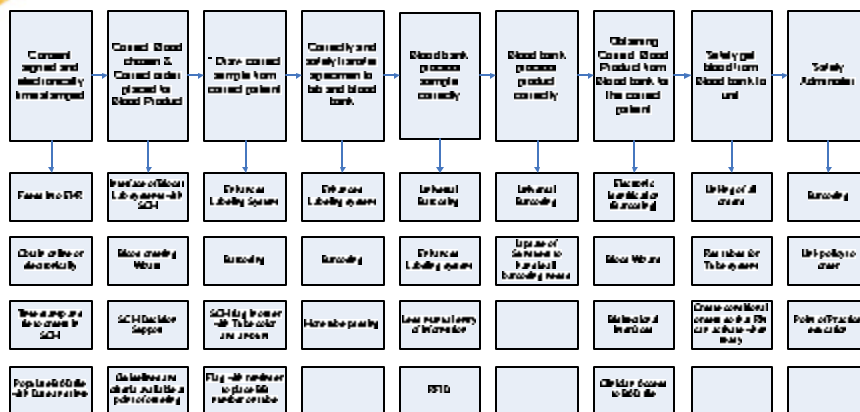
CHW Blood FMEA

Ideal Process Potential Solutions

- Enhanced ordering capabilities
  - Interfaces between hospital and laboratory computer systems
  - Development of a "Blood Wizard"

- Blood administration process
  - Point of care bar-coding for positive identification

CHW Blood FMEA

Ideal Process

CHW Blood FMEA

Next Steps

- The original team will now become a steering committee (or task force) for blood from ordering to administration.

- Smaller project teams have been discussed and will be forming as a result of the more detailed and specialized work that needs be accomplished.

CHW Blood FMEA

- New project teams will be:
  - A Six Sigma team- focused on administration
  - A team to look at a bar-coding at bedside
  - A team will look at ordering support in Sunrise
  - Transfusion Service will continue work within their department
    - Six sigma project planned for Q4 2009

Results

- BloodCenter management, quality and lean staff used lean and six sigma methodology and tools to create a shared need for change amongst TS staff and hospital staff.

- This new level of understanding and breakthrough has positioned the TS for a successful partnership for process improvement and an improved relationship with key stakeholders.

- **We still have a great deal of work ahead of us!**

Thank you

Questions?