An Integrated Approach to Lean, Six Sigma and the Model for Improvement

Richard Scoville, PhD
Helen Zak, MS
Shaghayegh (Sherry) Norouzzadeh, Ph.D.

December 8, 2013
1:00 – 4:30 PM

Warmup: What’s Your Problem?

Helen Zak, MS
President & COO, ThedaCare Center for Healthcare Value
Questions for Organizational Dialogue

The current quality improvement strategy/model(s) we follow in my organization allow(s) us to meet all of our strategic objectives and targets.
- Strongly Agree
- Agree
- Not Sure
- Disagree
- Strongly Disagree

Our current quality improvement strategy/model provides an integrated approach to QI that is sustainable.
- Strongly Agree
- Agree
- Not Sure
- Disagree
- Strongly Disagree

What’s Your Problem?

Instructions:
1. Use the worksheet provided, answer questions for a problem you are currently working on within your organization (10 minutes).

2. Share answers and discuss with your workshop partner (10 minutes).
A Brief History of QI

Richard Scoville, PhD
Improvement Advisor / Consultant, IHI

Francis Bacon

“command nature ... by obeying her”

There are and can be only two ways of searching into and discovering truth. The one flies from the senses and particulars to the most general axioms, and from these principles, the truth of which it takes for settled and immovable, proceeds to judgment and to the discovery of middle axioms. And this way is now in fashion. The other derives axioms from the senses and particulars, rising by a gradual and unbroken ascent, so that it arrives at the most general axioms at last. This is the true way, but as yet untried. (Bacon IV [1901], 50: Novum Organum, I, Aphorism XIX)
The Scientific Method

Deductive Phase

(general to specific)

Inductive Phase

(specific to general)

Observation

Theory

Prediction

Analysis

Louis Agassiz (après Cuvier)

- Animal and plant species were created by God as immutable types that do not change over time.
- Individual organisms are ‘degenerate’ instances of those types.
- Human races are examples of types.
- Taxonomy reflects the hierarchical (and Divine) organization of types.
- Ontogeny recapitulates phylogeny – and proves the hierarchy!
Adolphe Quetelet

- Sur L’homme et le Développement de Ses Facultés. (1835)
- Adapted sampling methods developed by Laplace in astronomy to human demographic data (the murder rate in Paris is predictable!)
- The average man (“l’homme moyen”): The model – perhaps ideal – of his group.
- Statistical distributions can reveal systems of cause and effect
- Distribution of qualities influenced by environment and behavior, not ‘type.’

John Snow

- Used a spatial analysis of variation to infer the cause of a cholera epidemic in London, 1854.
Charles Darwin

- **On The Origin of Species by Means of Natural Selection** (1859)
- Species as population with a distribution of characteristics
- Artificial selection ‘steers’ the emergence of qualities by selecting from the tails of those distributions.
- There is no ideal ‘type’ that defines the species, only modal points in the distributions.

Pragmatism

- Darwinian notions of variation, population, and selection infiltrated a wide range of disciplines
  - Epistemology – C.S. Pierce
  - Psychology – William James, Thorndike
  - Sociology and education – John Dewey
  - Development – Baldwin, Piaget
  - Law – Oliver Wendell Holmes
- Some key notions
  - Belief is observable only through action
  - Action is inherently prediction: a ‘bet’ on its results
  - Routinely successful action = ‘habit’ = ‘knowledge’
Frederick Taylor

- Principles of Scientific Management (1911)

“It is only through enforced standardization of methods, enforced adoption of the best implements and working conditions, and enforced cooperation that this faster work can be assured. And the duty of enforcing the adoption of standards and of enforcing this cooperation rests with the management alone.”

- Taylor’s work disseminated in Japan in 1920’s

Walter Shewhart

- Bell Labs statistician 1925-1956.
- Inventor of the control chart
- Mentor to Deming and Juran
- Applied theories of statistical variation to industrial production & quality
- Pragmatism meets production!
Shewhart: Quality is a Bet on the Future

“The judgment that the quality of any thing is such and such is from a practical viewpoint equivalent to a judgment that it will be such and such. Moreover, such a judgment is based upon ... evidence obtained through certain operations on the thing or similar things in the past and implies that certain experience will result if certain operations are carried out on the thing in the future... Hence we shall consider the first origin of standards of quality ...as relating past to future experience.”

- Shewhart (1935) p. 9

Edwards Deming

- Student of Shewhart
- Worked at USDA, Census Bureau
- Taught and studied in Japan beginning 1950 with immense impact on Japanese industry
- Popularized Shewhart’s statistical process control & Shewhart cycle (PDSA)
- System of Profound Knowledge is foundation for Model for Improvement
- Mutual influence SOPK ⇔ Lean is debated today
- Mentor to Associates in Process Improvement (Moen, Nolan, Provost, Langley, Norman)
System of Profound Knowledge

"Without theory, there are no questions; without questions, there is no learning."


Variation
- Sheehart Control Chart 1924
- Design of Experiments Sir Ronald Fisher, 1925
- Enumerative vs. Analytic Studies, Deming, 1966

Systems
- Scientific Management F. Taylor, Frank & Lilian Gilbreth, 1900
- General Systems Theory Ludwig von Bertalanffy, 1949
- Creating the Corporate Future, Russell Ackoff, 1981
- Theory of Constraints E. Goldratt, 1990

Psychology
- Lewin's Equation Kurt Lewin, 1920
- Anthropology Edward Tsim, 1932
- Maslow - Hierarchy of Needs 1952
- Kahneman & Tversky - decision making biases

Knowledge
- Mind & The World Order, C.I. Lewis 1929
- How We Think, Dewey, 1933
- Adult Learning Theory Malcolm Knowles, 1975

Roots

Evolution of the scientific method and PDSA cycle


Branches

Evolution of the scientific method and PDSA cycle

Source: Bob Lloyd
Toyota Production System

Shoichiro Toyoda

“Every day I think about what he meant to us. Deming is the core of our management.”

 Taiichi Ohno

“The key to the Toyota Way is not any of the individual elements... but what having all the elements together as a system. It must be practiced every day in a very consistent manner, not in spurts.”

Development of the Shewhart Cycle

Walter A. Shewhart
(1891 – 1967)

1939

The Deming Wheel

1. Design the product (with appropriate tests).
2. Make it; test it in the production line and in the laboratory.
3. Sell the product.
4. Test the product in service, through market research.

Source: Moen, R. and Norman, C. “Circling Back” Quality progress, November 2010
API's Model for Improvement

**1987**

**Selection of Processes**
- Objectify the Process
- Description of Process Involved

**Current Knowledge of Process**
- Define the Process
- Identify Supplier/Customer Relationships
- Identify Measures of Performance (Outcomes)
- Define/Produce Class Factors
- Document What Was Learned

**Improvement Cycle**
- Action
  - Close the Cycle
  - Implement

- Study
  - Evaluate
  - Summarize
  - What Else Learned?

**Planning and Analysis**
- What Will Be Changed
- What Will Be Tested
- Predict the Results

**Observation and Analysis**
- Observe
- Test

**2009**

**Model for Improvement**

- What are we trying to accomplish?
- How will we know that a change is an improvement?
- What change can we make that will result in improvement?

- **Act**
- **Plan**
- **Study**
- **Do**
M4I Modifications

Theory of Improvement

AIM: What are we trying to accomplish?

MEASURES: How will we know if a change is an improvement?

IDEAS: What changes can we make that will result in improvement?

SYSTEM: How does it work?

Six Sigma Steps

Define
- Establish problem statement, governance and team, Voice of customer, scope, stakeholders

Measure
- Identify current performance baseline, validate measurement system, define capability and stability

Analyse
- Identify root causes validate with data, hypothesis testing

Improve
- Identify improvements based on analyse phase, pilot run PDSA cycles, implement solutions, confirm improvement

Control
- Ensure systems and process are in place to sustain new performance
Six Sigma Overview

- Process Improvement set of tools and strategies
- Developed by Motorola in 1986 – Bill Smith, Mikel Harry
- Business strategy- Jack Welch, General Electric-1995
- Improve quality by:
  - Identifying and removing causes of defects (errors)
  - Minimizing variability in processes
- Uses a set of statistical methods
- Creates an infrastructure
  - Champions, Black Belts, Green Belts, Orange Belts, etc.
- Each project: disciplined sequence and financial targets

Six Sigma Level

<table>
<thead>
<tr>
<th>Sigma Level</th>
<th>Defects Per Million Opportunities (DPMO)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>690,000</td>
</tr>
<tr>
<td>2</td>
<td>308,537</td>
</tr>
<tr>
<td>3</td>
<td>66,807</td>
</tr>
<tr>
<td>4</td>
<td>6,210</td>
</tr>
<tr>
<td>5</td>
<td>233</td>
</tr>
<tr>
<td>6</td>
<td>3.4</td>
</tr>
</tbody>
</table>

Example: Ventilator Associated Pneumonia (VAP)
Defect = 1 VAP  Opportunity = 1 Vent Day
1 VAP per 500 vent days =  2000 per 1,000,000 (DPMO)
4.38 – Sigma Level

What if?
- Surgical site infections are 10 per quarter
- BSIs are 8 per line day
- VAPs are 3 per 1000 line days
- Only 6 days have gone by without a “never event”
Lean Steps

- Identify Value
- Understand Value Stream
- Eliminate Waste
- Establish Flow
- Enable Pull
- Pursue Perfection

- What is “Value” from the customer’s point of view
- Develop “Value Stream (VS)” to determine steps, value added, identify waste
- Improve flow, cycle time and value
- Establish process controls and high reliability

Lean

... a set of concepts, principles and tools used to create and deliver the most value from the customer’s perspective while consuming the fewest resources...

Lean Enterprise Institute (lean.org)
Lean Organizations Deliver

...exactly what is needed, at the **right time**, in the **right quantity** without defects, and at the **lowest possible cost**...

---

**Three Types of Work**

- **Value Creating Work**: work that produces something of value to the customer.
- **Incidental Work**: work that does not in itself provide value to the customer, but is necessary to do the value creating work.
- **Waste**: work that adds no value to the customer.
The Model for Improvement

AIM: What are we trying to accomplish?

MEASURES: How will we know if a change is an improvement?

CHANGE: What changes can we make that will result in improvement?

M4I Roadmap

Implement a change

Test / Pilot a change

Develop a change

Test diverse ideas

Embed in daily operations; adoption & scale-up

Adapt & implement in additional sites

Spread change throughout the system

Belief that change is effective
Change Concepts

1. Eliminate things that are not used
2. Simultaneous multiple entry
3. Reduce or eliminate overkill
4. Reduce costs on the system
5. Recycle or reuse
6. Use substitution
7. Reduce classifications
8. Remove jamming activities
9. Match the amount to the need
10. Use sampling
11. Change target or set point
12. Reduce waste
13. Schedule into multiple processes
14. Minimize handoffs
15. Move steps in the process closer together
16. Pull and ensure feedback
17. Use automation
18. Smooth workload
19. Do tasks in parallel
20. Consider people as the same system
21. Use multipurpose controls
22. Adjust to pre-determined demand
23. Match inventory to predicted demand
24. Use pull systems
25. Reduce change of form
26. Reduce multiple trips of the same line
27. Use people across a line to improve information
28. Use people across a line to improve information
29. Use people across a line to improve information
30. Reduce administrative aspects of the process
31. Conduct training
32. Implement new training
33. Invest more resources in improvement
34. Focus on core process and purpose
35. Reduce waste
36. Eliminate waste

Six Sigma, Lean, MFI

**Six Sigma**
- Define
- Measure
- Analyze
- Improve
- Control

**Lean**
- Identify Value
- Understand Value Stream
- Eliminate Waste
- Establish Flow
- Enable Pull
- Pursue Perfection

**Model for Improvement**

**What are we trying to accomplish?**

**How will we know that a change is an improvement?**

**What change can we make that will result in improvement?**

**Act**

**Study**

**Plan**

**Do**
Similarities

- Have disciplined processes and approaches
- Rely heavily on detailed measures
  - Lean – process steps, value
  - Six Sigma – Defects per 1,000,000 opportunities
  - MFI – Measures linked to theory of improvement
- Have a specific language and tools
- Share many common tools for improvement, notably statistical process control
- Shewhart and Deming are intellectual forebears

Comparison: Tools and Methods

See The Handout
Process Mapping

Shaghayegh (Sherry) Norouzzadeh, Ph.D.
North Shore Long Island Jewish Health System

Process Map Descriptions

• Definition
  A visual tool to illustrate the flow and relationship between working steps

• Reasons to Apply
  Emphasize the focus on the process fragment of interest, helping to understand the process and showing the interactions and un/necessary activities and redundancies
A Process Has At Least 3 Versions

Walk-Through and Experience the Actual Process with Entire Team. Change Process Map to Correspond With Actual Process

Process Map Principles

1. The current process should be mapped regardless of right or wrongs
2. The process should be mapped for each product/service family (e.g., ED Sepsis, Floor Sepsis)
3. The process should be mapped based on routines not exceptions (80/20 rule)
4. The process should flow there shouldn’t be a gap/disconnection in the process
5. Value/Waste is specified from the standpoint of the end customer
How to Choose the Effective Visual Design?

**SIPOC/ High Level Process Map**

Value Stream Map (VSM)
Flowchart/Process Map
Swim Lane/ Cross Functional Process Map
Metric Based Cross Functional Process Map

### Attributes
1) Major Steps of the Process
2) Sequence of Major Steps of the Process
3) Major Roles and Responsibilities
4) Major Inputs and Outputs

### Usage
1) Understand the process
2) Determine the scope
3) Identify bottleneck
4) Clarify Process input/output
5) Major Handouts between different roles/departments
6) Identify resources that are used
Value Stream Map (VSM)

**Attributes**
1) Steps of the process
2) Sequence of the process
3) Value of each step in the process
4) Process Time (Avg, SD)
5) Waiting Time

**Usage**
1) Understand the process
2) Determine the scope
3) Identify bottleneck
4) Streamline the Process
5) Identify wastes
6) Determine Cycle Time
7) Determine Delays

---

Swim Lane/ Cross Functional Process Map

**Attributes**
1) Steps of the process
2) Sequence of the process
3) Roles and Responsibilities
4) Time of occurrence for each step

**Usage**
1) Understand the process
2) Determine the scope
3) Identify opportunities for improvement
4) Handouts between different roles/ departments
5) Identify resources that are used
Process Mapping Steps

Step 1: Define problem statement
Step 2: Identify the core service and scope
Step 3: Set goal and expectations
Step 4: Select the team of experts to map the process
Step 5: Map the current process
Step 6: Validate the mapped process (walkthrough)
Step 7: Critique the current process
Step 8: Identify the metrics to represent the problems

NSLIJ: Inpatient Sepsis Care

Problem: Timely Abx administration are not consistent for patients with sepsis, severe sepsis, and septic shock, resulting in increased morbidity and mortality
Measure: Average time from sepsis recognition to administration of antibiotics
Act: They break the process into the following steps:

Take vitals → Inform RN → Sepsis Screening → MD Notification → MD Order

Send to Pharmacy → Pharmacy Process → Receive Abx from Pharmacy → Admin Abx

The team decided to collect data for the steps that the team believes are problematic

★ Data are needed for further investigation

Source: Shaghayegh Norouzzadeh, NSLIJ
NSLIJ: Inpatient Sepsis Care

Solution: Abx now available in the Pyxis

Take VS > Inform RN > Sepsis Screening > MD Notification > MD Order > Admin Abx

Retrospective Data (Jan-Oct)

Concurrent Data (Early September)

KQMI Data: Average Abx Administration Time

Source: Shaghayagh Norouzzadeh, NSLIJ
Exercise

- Create a high-level VSM for the ‘problem’ process you identified.
- Use the map to identify high-priority changes that could help improve the process

PDSA Planning

Richard Scoville, PhD
The Model for Improvement

AIM: What are we trying to accomplish?

MEASURES: How will we know if a change is an improvement?

CHANGE: What changes can we make that will result in improvement?

Act

Plan

Study

Do

The PDSA Cycle

- The scientific method
- Use for testing process changes
- Invented by Walter Shewhart in the 1920s at Bell Labs
- Test early, test often, test small
- Use data (quantitative and qualitative) to gauge effectiveness of changes

The Shewhart Cycle

1. Plan a change, or set an improvement
2. Carry it out
3. Study the results
4. What did we learn?

- Act: Adopt the change, or abandon it, or run through the cycle again, possibly under different environmental conditions.
The PDSA Cycle

Your ‘reality check’ tool for testing changes.

- **Act**: What’s happening now? What will happen if we try something different?
- **Plan**: What’s next? Try something else? Explore this further? Implement?
- **Study**: Did it work?
- **Do**: Let’s try it!

**Act**
- Ready to implement?
- Try something else?
- Next cycle

**Plan**
- Objective
- Questions & predictions
- Plan to carry out: Who? When? How? Where?

**Study**
- Complete data analysis
- Compare to predictions
- Summarize

**Do**
- Carry out plan
- Document problems
- Begin data analysis

“What will happen if we try something different?”

“Let’s try it!”
Failed Test? …Why? …Now What?

- Be sure to distinguish the reason:
  - Change was not executed
  - Change was executed, but not effective

- If the prediction was wrong – not a failure!
  - Change was executed but did not result in improvement
  - Local improvement did not impact the secondary driver or outcome
  - In either case, we’ve improved our understanding of the system!

Not Just Once!

LATHER RINSE REPEAT
Building Confidence for Change

System changes that will result in improvement

Learning from data

Change pkg ideas, suggestions, intuition

Change Idea: Standing Orders for A1C Tests

99% Reliability

Cycle 6: Educate all staff, stock forms

Cycle 5: Standardize and document protocol

Cycle 4: Workflow: order slips attached to template, completed by Kathy w/patient

Cycle 3, Day 3: No-shows waste time! Lydia initiates order slip at intake desk – 3 patients

Cycle 2, Day 2: After huddle, Kathy completes order slips for patients who need A1Cs

Cycle 1, Day 1: In daily planned care huddle, identify patients overdue for A1C tests

Make A1C testing default for pts who need it.

Thanks to Kathy Reins, MD
Pace is Crucial

- Rapid cycles = more changes & failures = faster learning
- Project ‘heartbeat’ maintains urgency
- Will dissipates while we procrastinate!

"Fail often in order to succeed sooner" - IDEO

Increasing the Pace

- **Smaller Scale Tests**: One patient, one staff, try it once to get started, talk it through before trying
- **Test Multiple Drivers**: Assign individual responsibility for testing changes
- **Plan Multiple Change Ideas**: Plan a series of PDSA tests in advance
- **Use Volunteers**: Don’t waste time persuading!
Measurement and Data Collection During PDSA Cycles

- Every PDSA requires its own data (not the collaborative measures)
- Use qualitative data for sure, quantitative if practical
- Collect data NOW – don’t wait till later
- One patient/event at a time!
- Use pencil and paper
- Use sampling as part of the plan to collect the data
- MOST IMPORTANT: Record what went "WRONG!"

PDSA Planning*

- Plan a PDSA cycle to test the change you identified from your Process Map

PDSA Cycle Planning Form

1. Plan
   - Briefly describe the change you plan to test.
   - What data will you need to test your prediction(s)? How will you collect it?

2. Do
   - Was the plan carried out?
   - What problems or unexpected events did you encounter?
   - Feedback and observations from the participants.

3. Study
   - What do the data show?
   - Was your prediction confirmed? If not, what did you learn?

4. Act
   - Will you adopt, adapt, abandon this change?
   - What is your plan for the next cycle?


**PDSA Planning**

- Use the Feedback Checklist to critique your plan.

---

**Integrated Structured Approach for Improvements**

Shaghayegh (Sherry) Norouzzadeh, Ph.D.
North Shore Long Island Jewish Health System
Outline

- Selection Criteria for Improvement Strategies
- Open pool of Tools vs. Methodology-bound Tools
- Structured Integration
- Integrated Methodological Approach
- North Shore-LIJ Case Study

Selection Criteria for Improvement Strategies

<table>
<thead>
<tr>
<th>Decision Making Factors</th>
<th>Continues Improvement Methodology</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FTD</td>
</tr>
<tr>
<td>Complexity</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>✓</td>
</tr>
<tr>
<td>Low</td>
<td>✓</td>
</tr>
<tr>
<td>Scope</td>
<td></td>
</tr>
<tr>
<td>Big</td>
<td>✓</td>
</tr>
<tr>
<td>Small</td>
<td>✓</td>
</tr>
<tr>
<td>Resources</td>
<td></td>
</tr>
<tr>
<td>Multideciplanery Team</td>
<td>✓</td>
</tr>
<tr>
<td>Inflexible Team</td>
<td>✓</td>
</tr>
<tr>
<td>Data</td>
<td>✓</td>
</tr>
<tr>
<td>Budget (Employee Time)</td>
<td>✓</td>
</tr>
<tr>
<td>IT Systems</td>
<td>✓</td>
</tr>
<tr>
<td>Type of Issue</td>
<td></td>
</tr>
<tr>
<td>Waste Reduction</td>
<td>✓</td>
</tr>
<tr>
<td>Reducing Variation</td>
<td>✓</td>
</tr>
<tr>
<td>Chronic Issues</td>
<td>✓</td>
</tr>
<tr>
<td>New Issues</td>
<td>✓</td>
</tr>
<tr>
<td>Increase Capacity</td>
<td>✓</td>
</tr>
<tr>
<td>Reduce Cycle Time</td>
<td>✓</td>
</tr>
<tr>
<td>Increase Flexibility</td>
<td>✓</td>
</tr>
</tbody>
</table>

1 Fast Track Decision Making
2 Method for Improvements at Institute for Healthcare Improvements

Timeline

- <7 Days
- <15 Days
- <30 Days
- 4-6 Months

Decision Support Matrix

- Must Be
- Optional
Are Tools Interchangeable?

- **FTD**
  - Brainstorming
  - Categorizing
  - Prioritizing
  - Action Plans

- **Six Sigma**
  - Charter
  - SIPOC
  - Process Map
  - Brainstorming
  - Categorizing
  - Prioritizing
  - Action Plans

- **Lean**
  - A3
  - Value Stream Map
  - Brainstorming
  - Categorizing
  - Prioritizing
  - Action Plans

- **M4I@IHI**
  - Charter
  - SIPOC
  - Process Map
  - Brainstorming
  - Categorizing
  - Prioritizing
  - Action Plans

- **Open Pool of Tools vs. Methodology-bound Tools**

  - Vast list of options
  - Benefitting the strengths of all methodologies
  - Customizing your problem solving approach around the constraints of your organization
  - Increasing the flexibility of methodology
  - Improving the quality of improvement methodologies
  - Improving the quality of results
  - Maximizing the time utilization
Structured Integration

Step 1
• Understanding Problem Background

Step 2
• Determining Goals and Objectives

Step 3
• Attaining Basic Knowledge of the System

Step 4
• Identifying the Issues

Step 5
• Choosing a Problem Solving Model

Step 6
• Validating and Verifying the Improvements

Step 6
• Monitoring the Improvements and Maintaining Sustainability of the System

Integrated Methodological Approach

Step 1 - Two 2hrs sessions to structure the problem and organize the solutions

Step 2 - 1hr Biweekly meetings to designee/study/and redesign PDSA Cycles

Algorithm
1- Map the Current Process
2- Identify Wastes and Opportunities for Improvement
3- Brainstorm the Causes of Problems/ Issues in the Process
4- Categorize, Prioritize, and Rank the Problems
5- Identify Simple Metrics (i.e., 3-4) to Measure the Baseline (i.e., 3-5 Patients)
6- Choose the Next Problem on the List and Brain Storms the Solutions (If Nothing is on the List, Stop)
7- Categorize, Prioritize, and Rank the Solutions
8- Design PDSA Cycle / Test/ and Revise It

Suggested Tool/s
Swim Lane
Lean T.I.M.W.O.O.D
Brainstorm
Affinity Diagram and Priority/Payoff Matrix
What, When, Who (WWW)
Brain Storm
Affinity Diagram and Priority/Payoff Matrix
IHI PDSA Cycles
Example: Reducing Sepsis Mortality Rate by Implementing Sepsis 3hr Bundle

The proposed Integrated Methodological Approach (IMA) has been applied in:

- 3 Tertiary Hospitals
- 2 Small Size Community Hospitals
- 1 Mid Size Hospital

Project Description: Severe sepsis and septic shock account for a large fraction of in hospital mortality for adult patients. The purpose of this process improvement event is to identify and understand current workflow processes and identify the challenges for implementing the Sepsis 3 Hour Bundle.
Swim Lane Process Map

Mapping the Current Process for Sepsis on the Floor

Identifying Waste

Issues:
- PCA taking Vitals
- PCA Informing RN
- RN Informing MD
- ABX Administer
- Accessing Lab Result
- Med Delivery
- Lactate Repeat
- ...

L1 - Norouzzadeh, Scoville & Zak: Building an Integrated Approach to Lean, Six Sigma and the Model for Improvement
Brainstorm

- Pharmacy needs to be notified that there is code sepsis on unit
- Unit doesn’t have bullets to send specimens to lab
- The need to hand create labels
- Lactate Ordered Routine
- Getting Abx to floor
- Getting RN
- Critical Call
- No Grey top tubes on floor
- What is process receiving order?

What are our customers saying?

Cause - Effect

- Supply
  - No Grey top tubes on floor
  - Blood culture bottles out of stock
  - No grey top tubes stocked on med-surg units
  - Pharmacy needs to be notified that there is code sepsis on unit
  - Delay in med. delivery
  - What is process receiving order?

- MD Order Issues
  - The need to hand create labels
  - Unit doesn’t have bullet to send specimens to lab
  - Find way to expedite the 2nd lactate blood test order
  - Write appropriate MD order
  - MD doesn’t respond to page
  - PCA doesn’t communicate abnormal VS in timely manor

- Alert System
  - Beepers might not be working

- PT Specific
  - Poor IV Access for Fluids
  - Lab Result Acceleration Process Needed
  - CSA doesn’t pick up orders in timely manor

Challenges to Implement the 3 Hrs Bundle on the Floor
Affinitive & Prioritize Causes

Easy to Implement

High Impact

1. PCA doesn’t communicate abnormal VS in timely manor
2. LIP doesn’t answer Text
3. MD doesn’t respond to page
4. Willingness/availability of LIP
5. Blood culture bottles out of stock
6. .....

Phase One Opportunities for Improvements
Day 2

1st Change Cycle

### Objective
What are We Trying to Accomplish?
Reducing Time and Improving Communication Between PCA and RN for Abnormal Vital Signs

### ACT
What Changes Can We Make that Result in Improvement?

<table>
<thead>
<tr>
<th>Plan</th>
<th>What</th>
<th>Who</th>
<th>When</th>
<th>Where</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCA Education on Abnormal VS</td>
<td>GC/JC 5/31/13</td>
<td>2C/2D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elaborative Posters on VS Tool</td>
<td>GC/JC 6/6/13</td>
<td>2C/2D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test the Changes</td>
<td>GC/JC 6/10/13</td>
<td>2C/2D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Get Feedback After One Week</td>
<td>GC/JC 6/20/13</td>
<td>2C/2D</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Study
How will we Know a Change is an Improvement?
Metric: Time VS taken to Time RN informed
Advantages of the Integrated Structured Approach for Improvements

1- Swim Lane allow us to learn about our current process
   a. Determine the Scope (Start and End Point)
   b. Identify Waste (Bottlenecks)
   c. Determine Handoffs
   d. Identify Resources

2- Brainstorm
   a. Collect a lot of ideas in a short amount of time
   b. Everybody in the team can participate
   c. There is no judging/ right or wrong answer

3- Categorizing and Prioritizing
   a. Allow us to start with the problems/ solutions which has the highest impact on our process and are easy to fix

4- Collecting Metrics
   a. Help us to figure the root cause of the problem
   b. Allow us to learn if the decided solution is effective

5- PDSA Cycles
   a. Keep the focus on one problem and solution
   b. Helps to scale the testing/ implementation