Performance Improvement (PI) and Financial Impact

Providing Sustainable Patient-Centered Care
Agenda

• Challenges in healthcare today
• PI and it’s application in healthcare
• PI and financial analysis
Learning Objectives

• Explain the importance of a PI Model to guide learning
• List key problems that PI can address to drive sustainability in healthcare
• Describe how organizational structure and managerial accounting are impacted by PI
Professional Background

• 7 years in Automotive Manufacturing
  – Ford and Goodyear
  – Production, engineering, financial analysis

• 3 years in Electronics Manufacturing
  – Rockwell Automation
  – PI, engineering management

• 3 years in Healthcare
  – Norton Healthcare
  – PI
Industry Need Analogy: 90’s US Auto

**Strengths**
- Proximity to US Customers
- Truck Market Dominance

**Weaknesses**
- Push Flow
- Brand / Model Proliferation
- High Labor Cost

**Opportunities**
- Leverage Worker Votes
- Struggling EUR Brands for Sale

**Threats**
- Transplant Operations
- NAFTA
- Lax Foreign Reg’s

PI efforts over next 2 decades:
- Lead Time Reduction
- Brand / Model Rationalization
- Workflow Efficiency

US Auto in the 90’s had internal weaknesses that could be addressed to counter external threats.
Industry Need: US Healthcare Today

Favorable

Strengths
- Highly Educated Workforce
- Outpatient Service Growth

Weaknesses
- Controllable Volume Variation
- Unnecessary Practice Variation
- High Labor Cost

Opportunities
- M&A / Partnerships
- EBP Sharing

External

Threats
- Retail Markets
- VBP / ACA
- Higher Deductibles

Potential PI Efforts:
- Scheduling Optimization
- Practice Standardization
- Workflow Efficiency

How do we improve without trade-off?

US Healthcare today is facing similar challenges to sustainability that the US Auto Industry faced in the 90’s
Why PI in Healthcare?

- Healthcare is becoming more competitive
- As competition increases, there is greater pressure for an organization to justify its existence
- Existence is justified by providing sustainable value
- Sustainable value is achieved through PI
- PCAST: President’s Council of Advisors on Science and Technology
  - BETTER HEALTH CARE AND LOWER COSTS: ACCELERATING IMPROVEMENT THROUGH SYSTEMS ENGINEERING
  - www.whitehouse.gov/ostp/pcast
  - Find under Documents & Reports (May 2014 Report)
Fact Sheet Recommendations from PCAST

- **Recommendation 1:** Accelerate the alignment of payment incentives and reported information with better outcomes for individuals and populations.
- **Recommendation 2:** Accelerate efforts to develop the Nation’s health-data infrastructure.
- **Recommendation 3:** Provide national leadership in systems engineering by increasing the supply of data available to benchmark performance, understand a community's health, and examine broader regional or national trends.
- **Recommendation 4:** Increase technical assistance (for a defined period—3-5 years) to health-care professionals and communities in applying systems approaches.
- **Recommendation 5:** Support efforts to engage communities in systematic healthcare improvement.
- **Recommendation 6:** Establish awards, challenges, and prizes to promote the use of systems methods and tools in health care.
- **Recommendation 7:** Build competencies and workforce for redesigning health care.
What is PI?

Performance Improvement (PI) is the practice of enhancing the ability of an organization to learn so that it grows value for its customers with the greatest speed.

CREATE new knowledge
SHARE new knowledge
Why Lean and Six Sigma?

Lean
- Waste Elimination
- Standardized Work
- Flow
- Customer PULL

Six Sigma
- Standardization, Variation
- Defects – Miss Elimination
- Optimization
- Process Control

“We will be the region’s most comprehensive, strongest, and preferred health care organization, setting the standard for quality and caring.”
What is Value?

Value Added Activity
An activity that changes the state of the patient or information to meet customer needs and add value (something a customer would be willing to buy / perceive value in having)

Non-Value Added Activity
Those activities that take time or resources, but do not directly meet customer requirements or add value
## Examples of Waste

<table>
<thead>
<tr>
<th>Type of Waste</th>
<th>Definition</th>
<th>Healthcare Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Defects</strong></td>
<td>Time spent creating, detecting, and resolving errors</td>
<td>Wrong dose administered to a patient</td>
</tr>
<tr>
<td><strong>Overproduction</strong></td>
<td>Doing more than the patient needs or doing it sooner than needed</td>
<td>Unnecessary diagnostic procedures</td>
</tr>
<tr>
<td><strong>Waiting</strong></td>
<td>Waiting for the next activity to occur</td>
<td>Insufficient bed volume / turnover post surgery</td>
</tr>
<tr>
<td><strong>Not Using Talent</strong></td>
<td>Waste incurred due to ignoring employees, their ideas, and their potential / development</td>
<td>Nurses caught in daily workarounds and not engaged in improvement</td>
</tr>
<tr>
<td><strong>Transportation</strong></td>
<td>Unnecessary movement of the patient, specimens, or materials</td>
<td>Cath lab being far from the ED</td>
</tr>
<tr>
<td><strong>Inventory</strong></td>
<td>Excessive amounts of supplies</td>
<td>Drugs on hand beyond their shelf life</td>
</tr>
<tr>
<td><strong>Motion</strong></td>
<td>Unnecessary movement by employees</td>
<td>Lab techs walking miles per shift in a poor layout</td>
</tr>
<tr>
<td><strong>Extra Processing</strong></td>
<td>Excessive activity in a process step</td>
<td>Unused form data</td>
</tr>
</tbody>
</table>
## Sources of Waste

<table>
<thead>
<tr>
<th>Source</th>
<th>Definition</th>
<th>Healthcare Examples</th>
<th>Graphical Depiction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process Design</td>
<td>Waste that is inherent in the processes we do today.</td>
<td>- Long distances between the ED and CT Scan (motion)</td>
<td><img src="ED_to_CT_Scan_100ft.png" alt="Diagram" /></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Error opportunities resulting in extra inspection (defects / extra processing)</td>
<td></td>
</tr>
<tr>
<td>Unevenness</td>
<td>Waste that is generated by variation of patient volume or supply delivery</td>
<td>- Poor coordination with EMS resources causing waiting in ED (waiting)</td>
<td><img src="Unevenness.png" alt="Diagram" /></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Infrequent ordering of supplies resulting in high inventories (inventory)</td>
<td></td>
</tr>
<tr>
<td>Overburdening</td>
<td>Waste that results from insufficient capacity</td>
<td>- Poor planning with changing community needs resulting in diversion of patients to other facilities or rushing service (transportation / defects)</td>
<td><img src="Overburdening.png" alt="Diagram" /></td>
</tr>
</tbody>
</table>
NHC DMAIC Improvement Process

PROCESS STEPS
FOLLOW EVIDENCED-BASED PROCESS

PROCESS MEASUREMENT
ASSESSING PROCESS PERFORMANCE

PROCESS IMPROVEMENT MODEL
- Define
- Measure
- Improve
- Analyze
- Control
DMAIC Process Overview

**Phase**

**Define**
- Problem Defined
- Key process metric(s) identified (id by customers)

**Measure**
- Understand Current Process
- List of inputs that might be causing the problem
- Accurate baseline data (KPOMs)

**Analyze**
- Process waste identified
- Prioritized list of critical barriers and root cause(s)

**Improve**
- New process identified
- Actions needed to deploy new process + pilot

**Control**
- Hard-wired process w/ hand-off to business owner
- Celebration!
**Project Overview**

- **Project Description**: In 2011, 24 ED Stroke Patients were treated with rt-PA out of a total Stroke Patient population of 558 patients (4.5%). Of the 24 patients, only 4 (16%) had a door-to-needle time of 60 min or less. Timely use of rt-PA benefits the patient in the following ways:
  - Drug Effectiveness: 33% probability of a higher-score recovery outcome vs. no treatment
  - Increased Benefit: Increased probability of favorable outcome at 3 months post-event as OTT (Last known well to rt-PA administration) decreased showing statistical significance (p=0.005<<0.05)

- **Project Scope**: All stroke patients eligible for rt-PA.
  - Start: Patient arrival at ED / End: Administration of rt-PA

- **Project Goal**: Achieve median DTN time of 60 min or less.
What we wanted to know: How does the process flow?

**Current State VSM**

- Process observations were made for each process step at each hospital
- Process was timed (stopwatch, checklists, timestamps)
- Current State VSM was assembled based on findings

What we found: Most of the process time is spent waiting after the patient is done in Radiology and there are opportunities to improve.
What we wanted to know: What is the impact of our efforts?

What we found: Focusing on just the Top 3 improvement priorities alone will address over 70 min of the 110 min expected DTN Time.

Impact of Top 3 Priorities

#1 Tx Decision
#2 Lab Label
#3 rt-PA Box

Admin rt-PA

Wait on Lab & CT Results
- Wait on Either:
  - 56.9 min (95%)
  - 12.4 min (Median)
  - 19.3 min (Average)
- N = 44 (includes 3 no waits)

Wait on Lab Result:
- 56.9 min (95%)
- 32.4 min (Median)
- 35.8 min (Average)
- N = 8

INR: 20 min (Average)

CMP: 25.8 min (Average)

Wait on CT Results:
- 35.5 min (95%)
- 10.5 min (Median)
- 17.1 min (Average)
- N = 33

Wait on Tx Decision (includes CTA Wait):
- 60.7 min (95%)
- 46.7 min (Median)
- 51.2 min (Average)
- N = 9 (Total rt-PA Pts in Study)

CTA TAT:
- 82.0 min (95%)
- 61.0 min (Median)
- 61.7 min (Average)
- N = 6

Pure Wait on Tx Decision (All tests in):
- 41.7 min (95%)
- 17.7 min (Median)
- 16.7 min (Average)
- N = 8 (one had MRI)

Post CT Wait for CTA Order:
- 87.8 min (95%)
- 19.4 min (Median)
- 36.6 min (Average)
- N = 6

Over 40 improvement options found!
What we wanted to know: How is delay in the Tx Decision addressed?

#1: Tx Decision Roadmap

- Worked with Stroke Neurologists to develop a shared view of risk (Contraindication to Tx)
- Mapped with input from EBP research and Stroke Neurologists (red is contraindication)
- Minimizes delay between receiving required results and issuing an order
- Included in related physician onboarding documentation

What we found: This is the EBP and NHC Neurologist accepted Tx Criteria. Following this and the broader process for Acute Stroke will reduce delays in Tx.
What we wanted to know: How will we control DTN Time?

DTN Time Comparison

What we found: We have an on-going measurement system, processes in place, and a system team committed to continuously improving.

All solutions implemented with negligible cost!
PI Impact to Culture

Good Hero
Reactive
Fire fighter
Broken Processes
Fragmented efforts

Great Leader
Proactive
Permanent fire preventer
Efficient, integrated processes
Aligned efforts
The PI Journey

- **Infancy**: Many historic problems to solve
- **Transition**: Fewer historic problems to solve
- **Maturity**: New problems embraced as opportunities and solved quickly
- **Continual Improvement**: Innovative solutions & setting EBPs

Change & Results

Time
PI Opportunities in Healthcare

1. Redesign Practice Care Settings – Increase Prevention
2. Optimize Scheduling of Procedures – Stabilize Demand
3. Increase Accuracy of Productivity – Optimize Staffing
4. Iterative Redesign of Work – Continually Improve

Opportunities mostly focus on addressing operational concerns rather than clinical concerns

A significant amount of the nation’s cost-of-care concerns can be addressed by incorporating these strategic objectives
The science in healthcare has traditionally been on the clinical side, but there is opportunity to have operational excellence.

Operational vs. Clinical

Core Clinical: Activities that involve Dx, Tx, or Prevention

Shared Territory: Where clinical factors have operational implications or where operational limitations influence clinical decisions

Supporting Operational: Activities that are not part of Dx, Tx, or Prevention

Many activities are considered operational:
- Scheduling
- Staffing
- Allocation of Equipment
- Capital Planning
Redesigning practice care settings, starting with primary care, drives preventive care efforts while testing concepts.
Workflow Redesign

- Redefined work roles to balance work load and move interruption away from the MA
- MA now able to be in a cyclical workflow with provider for higher throughput

Eliminating unnecessary work, rebalancing assignments, and redesigning the Provider – MA flows have improved capacity
Optimize Scheduling of Procedures

Reducing daily scheduling variation allows for increased utilization and efficiency.

>10% Productivity gain possible by reducing CV from 0.36 to 0.07
Increase Accuracy of Productivity

• Productivity standards are based on benchmarks
  – *Internally modified to better reflect current process*
  – *Do not identify true process potential (theoretical capacity)*
• Benchmarks are based on peer group performance
  – *Disguises waste from unevenness, hides potential*

<table>
<thead>
<tr>
<th></th>
<th>Hospital</th>
<th>Nursing</th>
<th>Surgery</th>
<th>Pulmonary Services</th>
<th>Imaging</th>
<th>Cardiology</th>
<th>Hospital Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.67)</td>
<td></td>
</tr>
<tr>
<td>#5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Variable Paid FTE Opportunity
(Based on Consultant Productive Standard Recommendation)

Opportunity to apply improvement in practices too

More accurate measurement of performance allows for gaps to be better understood and addressed
Iterative Redesign of Work

• Operational procedures include plans for reaction to abnormal events
  – Stop the process to analyze and fix
  – Set new standards (inspect for what you expect)
• Take every opportunity to encourage finding problems and solving them
  – Can’t fix what you can’t see
  – Everybody should have a specific role to play
• Structure reports & accounting for identifying system level problems with drilldown

Current processes are continually challenged in a structured manner through procedures for increased efficacy
Data can be arranged for higher power analysis that identify where further studies / engagement is most beneficial.
Managerial Accounting

• Traditional allocation spreads indirect costs to business units via assumed cost driver
  – Cost driver may not be highly correlated
  – Costs do not necessarily go away if unit is closed
• Segmented income statements only assigned traceable (direct) fixed costs to business units
  – Traceable costs disappear if unit is closed
  – Common costs are lumped into a cost pool
  – Structure allows drilldown to see performance gaps

Segment reporting provides more insight than traditional allocation of costs.
The Medical Group has a low segment margin that is due to relatively high variable patient care expense in Primary Care.
Segment Reporting Example: Step 2

<table>
<thead>
<tr>
<th></th>
<th>Total Service</th>
<th>Office A</th>
<th>Office B</th>
<th>Office C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unrestricted revenue</td>
<td>$9,000,000</td>
<td>$2,000,000</td>
<td>$4,000,000</td>
<td>$3,000,000</td>
</tr>
<tr>
<td>Variable expenses:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variable patient care expenses</td>
<td>$7,500,000</td>
<td>$1,600,000</td>
<td>$3,450,000</td>
<td>$2,450,000</td>
</tr>
<tr>
<td>Other variable expenses</td>
<td>$1,500,000</td>
<td>$300,000</td>
<td>$700,000</td>
<td>$500,000</td>
</tr>
<tr>
<td>Total variable expenses</td>
<td>$9,000,000</td>
<td>$1,900,000</td>
<td>$4,150,000</td>
<td>$2,950,000</td>
</tr>
<tr>
<td>Contribution margin</td>
<td>$0</td>
<td>$100,000</td>
<td>($150,000)</td>
<td>$50,000</td>
</tr>
<tr>
<td>Traceable fixed expenses</td>
<td>$200,000</td>
<td>$50,000</td>
<td>$100,000</td>
<td>$50,000</td>
</tr>
<tr>
<td>Service line segment margin</td>
<td>($200,000)</td>
<td>$50,000</td>
<td>($250,000)</td>
<td>$0</td>
</tr>
<tr>
<td>Common fixed expenses not</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>traceable to individual lines</td>
<td>$100,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net operating income</td>
<td>($300,000)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Some factors to investigate further for Office B:
- Revenue integrity (e.g. proper coding of visits and supporting documentation)
- Compensation structure (e.g. NP to MD ratio)
- Practice efficiency (e.g. visits per provider per day and use of tests / supplies)

Addressing the challenges for Primary Care Office B would significantly impact the company’s net operating income.
Segment Reporting Impact

• Only have common costs where necessary
  – Examples: CEO compensation, corporate office lease

• Make common costs traceable where possible
  – Example: Accounting staff of 20 broken out to cover business units
  – Supporting departments can still have central leadership to ensure standardization

• For more see managerial accounting text

Segment reporting can drive the business to be structured with better clarity.
Summary

• Challenges to healthcare sustainability (SWOT)
• PI to minimize waste & grow value
• Transforming into a proactive culture is a journey
• Great opportunities to improve operations
• Need to align reporting and structure
Getting Started

• Find a PI Mentor
• Identify a project need
  – Culturally manageable
  – Strategically important
• Get a Senior Leader Champion
• Pick a PI Methodology (e.g. DMAIC) and follow it
Q & A

Questions?