Lean & Green Healthcare
- Lean Six Sigma @ Work

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Agenda

- Need for Lean in Healthcare
- Lean at UHS
- Lean & Green
- Questions
American health care "gets it right" 54.9% of the time.

2X Resources ½ Quality

Healthcare Pathway – in prior to 80’s
## Healthcare Pathway - Current

### Patients

<table>
<thead>
<tr>
<th>Health Status</th>
<th>Setting</th>
<th>Socio-economic Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy</td>
<td>Rural</td>
<td>High</td>
</tr>
<tr>
<td>Minor Ailments</td>
<td>Suburban</td>
<td>Medium</td>
</tr>
<tr>
<td>At Risk</td>
<td>Urban</td>
<td>Low</td>
</tr>
<tr>
<td>Acutely Ill</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chronically Ill</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catastrophically Ill</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Care Delivery

<table>
<thead>
<tr>
<th>Catchment Area</th>
<th>Access</th>
<th>Location</th>
<th>Provider</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td>In Person</td>
<td>Home</td>
<td>Traditional Provider</td>
<td>Wellness</td>
</tr>
<tr>
<td>Regional</td>
<td>Telephonic Setting</td>
<td>Outpatient Public/Private Insurers</td>
<td>Risk Assessment</td>
<td></td>
</tr>
<tr>
<td>National</td>
<td>Electronic</td>
<td>Hospital Medicine Midlevel Providers</td>
<td>Prevention</td>
<td></td>
</tr>
<tr>
<td>International</td>
<td>Internet</td>
<td>Emergency Department Alternate Providers</td>
<td>Acute Care</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Call Center</td>
<td>Long Term Care Health Infomediary</td>
<td>Chronic Care</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Internet</td>
<td>Complementary Care</td>
<td></td>
</tr>
</tbody>
</table>
Health Spending as a Share of GDP
United States, 1960 to 2020, selected years

Recent Detail

<table>
<thead>
<tr>
<th>Year</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>16.2%</td>
</tr>
<tr>
<td>2007</td>
<td>16.4%</td>
</tr>
<tr>
<td>2008</td>
<td>16.8%</td>
</tr>
<tr>
<td>2009</td>
<td>17.9%</td>
</tr>
<tr>
<td>2010</td>
<td>17.9%</td>
</tr>
</tbody>
</table>

Notes: Health spending refers to National Health Expenditures. Projections (P) include the impact of the Affordable Care Act. 2010 figure reflects a 4.2% increase in GDP and a 3.9% increase in national health spending. CMS projects national health spending will also have accounted for 17.9% of GDP in 2011 and 2012.

National Health Expenditures as a Percentage of Gross Domestic Product and Breakdown of National Health Expenditures, 2009

Introduction to Lean Six Sigma

Typical Organization

- Value-Adding Activities: 1%
- Non-Value-Adding Activities: 99%

Traditional Improvement

- Value-Adding Activities: 5%
- Non-Value-Adding Activities: 95%

Lean Waste Reduction

- Value-Adding Activities: 70%
- Non-Value-Adding Activities: 30%

Target

- Minor Improvement
- Major Improvement

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Six Sigma

Define

Measure

Analyze

Improve

Control

Mapping
Process, Flow, & Value Stream

Balancing Work
Creating “Pull”

Current Process Identification

Baseline Performance

Visual Data Analysis

Future Process Development

Clean Sweeps

The Last “S” Sustain

5 S’s
Sort
Set-in-Order
Shine
Standardize
Sustain

Six Sigma…Eliminate Variability /Defects
Lean…Eliminate Waste
5 Steps To Lean Thinking

1. Specify Value
   Define value in from the customers perspective and express value in terms of a specific product

2. Map the Value Stream
   Map all of the steps...value added & non-value added...that bring a product of service to the customer

3. Establish Flow
   The continuous movement of products, services and information from end to end through the process

4. Implement Pull
   Nothing is done by the upstream process until the downstream customer signals the need

5. Work to Perfection
   The complete elimination of waste so all activities create value for the customer

Key concepts - identifying value, the value stream and waste
Waste in Healthcare

Wastes
1. Defects
2. Overproduction
3. Inventories
4. Movement
5. Excessive Processing
6. Transportation
7. Waiting

Examples
1. Re-sticks, redraws, med errors, wrong site surgery
2. Blood draws done early to accommodate lab
3. Pts waiting for bed assignments, lab samples batched, dictation waiting for transcription
4. Looking for pts, missing meds, missing charts or equipment
5. Multiple bed moves, retesting
6. Excessive transporting pts for tests
7. Inpts waiting in ED, Pts waiting for discharge, MDs waiting for test results
Major Lean Tools/Concepts

1. Charter
2. Value Stream Mapping (VSM)
3. Data Driven Decision Making
4. Spaghetti Mapping
5. 5S & Visual Controls
6. Kanban
7. Other Concepts
   a. Batch vs. Single Piece Flow
   b. Push vs. Pull System
   c. Balancing, Leveling, Sequencing
   d. Set-Up Reduction
   e. Standard Work
   f. Error Proofing
UHS

~ 5500 employees
- 30 Primary Care Clinics
- Comprehensive Healthcare Services Provider
The Challenge of Changing “Culture”

- Mission
- Strategy
- Understandable Goals
- Transparency
- Visual measurement of Performance
- Methodology
- Leadership

Purpose

Process

People
Performance Improvement
Dept. @ UHS

- Team
  - Under Quality & Patient Safety

- Roles & Responsibilities
  - UHS Lean Six Sigma Program Development & Deployment
  - Employee Training
  - Data Analytics
  - Project Management
  - Have Fun!!!
Deployment Journey

Phase #1
Initiative Planning & Startup
prepared to gain full benefits of Six Sigma

Phase #2
Executive Training & Onboarding
Senior Management prepared to lead and select projects with impact

Phase #3
Employee Training & Onboarding
Lean and Six Sigma Training

Phase #4
Transition Training & Implementation
Train and Deploy Resources

Phase #5
Initiative & Project Management Activities
Attains Self Sufficiency & is Self Sustaining
Performance Improvement (PI)

• Since 2009

- 104 Lean/Six Sigma Experts, 70 Champions
- 32 Six Sigma & 55 Lean Projects

Training/Mentoring

Project Results

Deployment
Reducing OR Change Over Time

CURRENT STATE

Steps: 114  
NVA: 56  
Hand-off: 37
FUTURE STATE

Steps: 76
NVA: 1
Hand-off: 17
Results

Average Turnover by Day

- Baseline
- Improve

Daily Turnover

Rolling Days

- UCL = 33.88
- \( \bar{X} = 26.57 \)
- LCL = 19.25
Lean Eliminates “Wastes”
But Not Always Environmental Wastes

Lean’s “Deadly Wastes”
1. Defects
2. Overproduction
3. Waiting
4. Non-value added (over-) processing
5. Transportation
6. Inventory
7. Motion

Where are the environmental wastes?
Excess material use
Toxic / hazardous material use
Scrap & non-product output
Hazardous wastes
Pollution (emissions/effluents)
Energy and water consumption
UHSH Initiatives

- Recyclable Vs. Reusable
- Energy Efficiency
- Green Products
- Waste Management

ROI $$ negligible
In Summary

- Lean Six Sigma works effectively in Healthcare
- Lean tools applicable to Green
- Lack of motivation for Early Adopters
- Future areas
  - Strong Regulatory/Govt. Support
  - Technology has to be in place
  - Incentives have to align
Questions?