Clinical Microsystems and Lean

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Clinical Microsystem

“… a small group of people who work together on a regular basis – or as needed – to provide care and the individuals who receive that care… It has clinical and business aims, linked processes, a shared information environment and produces services and care which can be measured as performance outcomes.”

The Path Forward

- Step 1: Organize a “Lead Team”
- Step 2: Do the Assessment
  - Use the “5Ps” and review your Metrics That Matter
- Step 3: Make a Diagnosis
  - Review your assessment and select a theme for improvement
- Step 4: Treat Your Microsystem
- Step 5: Follow-up


Lean AND Clinical Microsystems

- What Lean Healthcare is NOT…
  - The answer to ALL of your problems
  - Doing “more with less”
  - A replacement for the 5P’s
  - Just a manufacturing problem solving tool
  - A bunch of “tools” for problem solving
A “Lean” Overview of Lean

- The Toyota Production System (TPS)
- *The Toyota Way* – Jeffrey Liker
  - Outlines 14 principles of the Toyota Way
    1. Philosophy
    2. Process
    3. People and Partners
    4. Problem Solving

What is Lean?

“Lean provides a way to specify value, line up value creating actions in the best sequence, conduct these activities without interruption whenever someone requests them, and perform them more and more effectively.”

-from *Lean Thinking* by James Womack and Daniel Jones (1996)
Lean is a systems redesign methodology that **shortens the time** between start and finish of any given process by **eliminating sources of waste**.

**Lean Concepts**

- **Value**
  - Value is determined by the “end customer” – the patient
- **Identify and eliminate waste**
  - Anything that does not add value from the patient’s perspective
- **Value flows without interruption**
  - Identify ideal patient experience – streamline process and eliminate waste to achieve
- **Allow customer to “pull” value from process**
  - Available when they want it – one piece flow
- **Continuous pursuit of perfection**
  - Reliable and sustainable systems design
Specify Value

<table>
<thead>
<tr>
<th>Patient Perspective</th>
<th>Provider Perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>• No delays in access to care – no scheduled waiting</td>
<td>• No delays in access to patients – full schedule</td>
</tr>
<tr>
<td>• Accurate, consistent, satisfying outcomes</td>
<td>• All charts, labs, and pertinent information readily available</td>
</tr>
<tr>
<td>• Flexible</td>
<td>• Patients are geographically close together (inpatient)</td>
</tr>
<tr>
<td>• No waiting to see provider</td>
<td></td>
</tr>
</tbody>
</table>

Patient Provider

Typically 95% of Health Care Process Time is non-value added!!!

Lean = Eliminating the Waste

The Eight Forms of Waste
• Defects
• Overproduction
• Waiting
• Not Utilizing Employees
• Transportation
• Inventory
• Motion
• Extra Processing

Non-value added

Value added

5%
Defects

- Hospital-acquired illness
- Wrong-site surgeries
- Medication errors
- Foreign objects remaining in patient after surgery
- Problem orders
- Misfiling documents
- Dealing with service complaints
- Mistakes resulting from miscommunication
- Illegible, handwritten information
- Collection of incorrect patient information

Overproduction

- Too many meal trays delivered
- Asking the patient the same questions multiple times
- Large supply of forms
- Extra floor space utilized
- Unnecessary carbon copying
- Batch printing patient labels
Waiting

- Idle machines/people
- Large waiting rooms
- Patients waiting to see physician, nurse, etc.
- Waiting on the phone to schedule patients
- Early admissions for procedures later in the day
- Waiting for internal transport between departments

Not Utilizing Human Potential

- Not using people’s mental, creative, and physical abilities
- Staff not involved in redesigning processes in their workplace
- Workarounds
- Nurses and Doctors spending time locating equipment and supplies
- Staff rework due to system failures
Transportation

- Poor workplace lay-out for patient services
- Carrying files from location to location
- Moving equipment in and out of procedure or operation room
- Patient transportation

Inventory and Inspection

- Office supplies stored in hallways
- Charge slips piled up to be dictated
- Physician orders building up to be entered
- Unnecessary instruments contained in operating kits
- Multiple quality control checks
- Much rework
Motion

- Leaving patient rooms to
  - get supplies or record
  - document care provided
- Large reach/walk distance
- Documenting in more than one place
- Nurse checking electronic medication record to see if order entry is completed
- Using separate IS systems for one process

Extra Processing

- Multiple signature requirements
- Extra copies of forms
- Multiple information systems entries
- Printing hard copy of report when digital is sufficient
- Multiple steps to get pre-approval for urgent treatments
- Overstocking inventory
CASE: Batching Sterile Compounds

- Medium-sized hospital prepares 24 hour batches of IV medications
- Deemed a “better use of our night staff” to compound in advance of when meds actually needed
- Average daily volume is 600 doses
- Average daily return rate is near 35%

Batch System

- ~600 IVs to compound daily
- 2 FTE RPh – 2H
- Team writes new orders
- Compound/Dispense new meds
- 24 hour batch at 0200
- Techs deliver before 1200
- Bring back all waste
Necessary Changes

- Standardize the work – policies, procedures, and workspaces that ensure standard outcomes
- Move from a batch delivery to a one-piece flow delivery of medications
- Implement visual controls in unit med rooms and pharmacy to smooth transition

One-Piece Flow

- Standard timing on the hour, doses print 3H prior to patient need
- RPh checks
- Doses delivered hourly to units
- Only one dose available for administration

Returns dropped from 35% to less than 3%

Paperwork Simulation

- Sit in teams of 4
- Choose roles – Person A, B, C, and D
- When the time starts, turn over the cards
- Person A
  - Must complete ALL three cards before passing on to Person B
- Person B
  - Must complete ALL three cards before passing on...
- 4 minute time limit
## Paperwork Simulation – Round 2

- Same roles – Person A, B, C, and D
  - When the time starts, turn over the cards
  - Do NOT have to complete all cards before passing them on
  - 4 minute time limit

## 5S Workplace Organization

- **Five “S”**
  - Sort
  - Simplify (Set in Order)
  - Standardize
  - Sweep (Shine)
  - Sustain (Self Control)
- **NOT**
  - Scrounge
  - Steal
  - Stash
  - Scramble
  - Search
Before 5S

Sort

- Touch everything
- Separate necessary from unnecessary
- Remove clutter
- Free up floor space
- Eliminate obsolete items
- Do not keep “just in case”
**Sort**

Remove and Red Tag Items not used or excess supplies

**Simplify**

- Organize items by frequency of use
- Assign items to locations
- Mark “home” locations for movable objects
  - Outline if possible
- White boards for tracking shared items
- Set inventory limits & refill triggers
Simplify and Standardize Flow

Color Coding and Two-Bin

- Two small bins instead of one large
- Empty bin triggers resupply

Shine

- Establish visual controls to differentiate normal from abnormal conditions
- Establish “shine” schedules and accountability
- Monitor adherence
Simplify and Shine

- Establish written documentation for all processes and procedures
- Use pictures to document desired state
- Monitor adherence to standards

Standardize
Pittsburg VA – Equipment Room

Benefits
Clean equipment = pathogen vector
Saves frustration, searching
Freed up $20K-worth of unused equipment for use elsewhere

Sustain
- Create communication board
- Use communication board
- Conduct periodic audits
- Conduct failure mode analysis and take corrective action when problems found during audits
Medication Cart – Post 5S Mock-up

Laminated Instructions
Place for Water Jug
Place for IV Bags
Common Supplies

Baseline / Outcomes
Data

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Post-RPIW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance traveled to pass meds to one patient</td>
<td>181</td>
<td>33</td>
</tr>
<tr>
<td>Number of attempts before med pass complete for one patient</td>
<td>3.3</td>
<td>1.0</td>
</tr>
<tr>
<td>Totals log-ins per patient med pass</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>Total time to pass meds to one patient</td>
<td>18</td>
<td>3</td>
</tr>
</tbody>
</table>

Time saved for other patient care activities = 15 min x 100 ADC x 3 shifts x 365 = **27,375 hours per year**
More Examples

Next…

- A3 Problem Solving Methodology
Thank you!

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