Mistake-Proofing to Reduce Medical Errors

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Lean Enterprise Institute
Lean In Healthcare Workshops

February 2, 2010 in Miami
Mistake-Proofing Healthcare:
Designing Processes to Reduce Medical Errors
with instructor John Grout

February 2-3, 2010 in Miami
Key Concepts of Lean in Healthcare
with instructor Mark Graban

February 4, 2010 in Miami
Value-Stream Mapping for Healthcare
with instructor Tom Shuker
About the Speaker

John Grout

- researched mistake-proofing extensively for the past 17 years
- worked with numerous hospitals, healthcare systems, and medical firms including governmental agencies in the U.S. and U.K.
- received the Shingo Prize for his paper, "The Human Side of Mistake-Proofing," with co-author Douglas Stewart
- dean of the Campbell School of Business at Berry College, Rome, Georgia, and the David C. Garrett Jr. Professor of Business Administration
Outline

• **Error Design Vocabulary**
• Examples: Exploring & Improving Design Options
• A Mistake-Proofing Methodology
• Links Back to Lean & Waste
• Conclusion
To err is human

• Have you ever traveled to work and not remembered it?
• Have you ever gone home when you meant to stop at a store?
• Have you ever found yourself in the garage with no recollection of what you went out there to get?

Q1: Why does that happen?
Q2: How would you stop these if a life depended on it?
A new attitude toward preventing errors:

“Think of an object’s user as attempting to do a task, getting there by imperfect approximations. Don’t think of the user as making errors; think of the actions as approximations of what is desired.”*

Dealing with “approximations”: How to prevent errors

“The remedy is in changing systems of work. The remedy is in design.” Donald Berwick hopes “that normal, human errors can be made irrelevant to outcome, continually found, and skillfully mitigated.”
A lack of design vocabulary?

Distribution of health care FMEA recommended actions

<table>
<thead>
<tr>
<th>Recommended action</th>
<th>Total</th>
<th>Non-design response</th>
<th>No response</th>
<th>Design response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>390</td>
<td>264</td>
<td>84</td>
<td>42</td>
</tr>
<tr>
<td>Percentage</td>
<td>100%</td>
<td>67.69%</td>
<td>21.54%</td>
<td>10.77%</td>
</tr>
</tbody>
</table>
Adding “poka-yoke” to your vocabulary

Poka-yoke is Japanese slang for Mistake-proofing. The term was coined by Shigeo Shingo.

Mistake-proofing is the use of process design features to facilitate correct actions, prevent simple errors, or mitigate the negative impact of errors.

Mistake Proofing to Reduce Medical Errors presented by the Lean Enterprise Institute
Get a new toothbrush  Use a metric wrench  Your syrup is hot  Your beer is cold

MRI is this way  Take the elevator to X-ray

Go this way  Alcatraz’s kitchen: The convicts are armed

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Example: Reliably doing boring things
A Case study

• “In 2002, Virginia Mason doctors had to deal with 30 cases [of VAP] at a cost of $5000 to $40,000 each, said Michael Westley, medical director of critical care and respiratory therapy… By ‘reliably doing boring things,’ such as frequent hand-washing by doctors and nurses and keeping the patient’s head elevated, the hospital cut the number to five cases last year” (emphasis added).
Head of Bed Tilt – VAP Bundle

The little gauge on the side of the bed is fine when you’re 24 inches away.

Everyone who walks past the room and looks in should be able to see an error from the doorway.

There is no reason to assume your first idea will be your best. Pella generated 7 designs before selecting 1.

Additional improvements are possible…

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Possible Improvements: mistake-proofing the mistake-proofing device

Orange horizontal bar allows HOB tilt to be visually assessed at a distance with ease.

Slightly lighter orange lines should be horizontal when head of bed not tilted (allows easy installation & calibration).

> 30 DEGREE TILT WHEN VENTILATOR IN USE

If your loved one is on a ventilator, you can reduce his or her risk of Ventilator Associated Pneumonia (VAP) by making sure the head of the bed is tilted so that this text is level.

Text provides job aid to show when to use and how many degrees of tilt are ideal.

Text enlists family members and other visitors to ensure compliance and reduce tampering.

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Variations of connectors
Designing Sharps
Eliminating Scalds
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A basic mistake-proofing methodology

- Map the process
- Remove Non-value-added steps
- Failure mode & effects analysis
- Root Cause analysis or fault tree analysis
- Multiple Fault trees: Benign Failure design

When possible solutions ≥ k, proceed to selection and implementation
Using failure analysis to design benign failures

Creating benign failures means moving causes from tree #1 to tree #2

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Waste broadly defined:

1. Spreading MRSA
2. Not having what you need
3. Not saying “hi” when you could

Waste: waiting

Synergy Health
St. Joseph's Hospital

If you have been waiting longer than 15 minutes, please ask for assistance at the Registration Desk.
Waste: defective work

- Fixation with failure (esp. small failures)
- Presume sample mixing will occur

Before:

After:
Waste: motion

- 5s “Motion is the shadow of waste.”
- “Kanban” visual ordering
Waste: variation

CT scan pre-recorded instructions

Fridge Temp

Dental X-ray target

Broselow tape: varying age and size

Medical History

Question 14C1

From 1980 through 1990, did you spend a total time of 6 months or more associated with a military base in Belgium, The Netherlands, or Germany?

Military Stay?

Back Yes ??? No Next

Obtaining blood donor information
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Are you allowed to act?

- If the worst case is the status quo?  
  - Yes

- Aren’t clinical trials required?  
  - Not always

- How do I know?  
  - You need at least the same level of evidence to improve a practice that was utilized in establishing it.
Still Seeking Examples

- Manufacturing benefits from a set of 4 books/catalogs with approximately 500 published examples
Still Seeking Examples

• Now medicine has a book of 150 examples
• I believe more examples exist (and I want them)
• Using a Wiki* to avoid duplication and ease submission
  http://mmpp.wikispaces.com

*Like Wikipedia, where anyone can add examples or edit existing ones
To Do list…

• Download and look through the book from AHRQ (http://www.ahrq.gov/qual/mistakeproof/mistakeproofing.pdf) or call 800-358-9295 ask for publication #07-0020

• Identify 5 mistake-proofing devices already in use in health care (especially unique or novel ones.)

• Send 5 photos and an explanation of each to jgrout@berry.edu or post them directly at mmpp.wikispaces.com

• (Username: LEIguest Password: leiguest)
Additional Information

- www.mistakeproofing.com
- mmpp.wikispaces.com
- pokayoke.wikispaces.com
Thank You
Healthcare Value Leaders Network

… our mission is to **expand and accelerate** the use of lean in more healthcare organizations, for the **benefit of all** - patients, physicians, and hospital employees, and our communities.

Visit the website to learn more!

www.HealthcareValueLeaders.org
Questions & Answers