High Reliability and Robust Process Improvement

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President and CEO, The Joint Commission

July 26, 2016

3000 patients over 6 years
Operating-Room Fire at Hospital Burns Patient, Prompts Changes

FirstHealth of the Carolinas officials should know by the end of the month whether they have taken adequate corrective steps to prevent operating room fires like the one recently that burned the neck and shoulders of a patient during an emergency surgery at Moore Regional Hospital.

The N.C. Division of Health Service Regulation placed Moore Regional on "immediate jeopardy" status following an

'You're taking out wrong kidney, surgeon was told'

A surgeon accused of killing a patient by taking out the wrong kidney was named the person making a mistake by a medical student watching the operation, a court heard yesterday.

Dr Mahesh Goel dismissed the concerns of student Victoria Fern and pressed on with the surgery, it was said.

Goel and consultant urologist John Roberts are accused of manslaughter over the "appalling" error which left 70-year-old Graham Reeves with one diseased kidney.

The Korean War veteran died five years after the botched operation.

Roberts, 53, and Goel, 39, had shown a level of care before that is expected of competent surgeons, prosecutor Leighton Davies QC said.

"It was a tragic surgical error described by Mr Roberts himself in the aftermath as the worst thing he has ever done in his life," said Mr Davies. "He says it was an appalling error."

Mr Reeves, who was single, was due to have his damaged right kidney removed. But the surgeon removed his left kidney and before the mistake was realised it was put in a jar of acidic sterilising agent.

"The right kidney was diseased for years and non-functioning," Mr Davies told Cardiff Crown Court.

"The operation played a significant part in causing his death. It deserves to be condemned as gross negligence and therefore a crime."
Current State of Quality
- Routine safety processes fail routinely
  - Hand hygiene
  - Medication administration
  - Patient identification
  - Communication in transitions of care
- Uncommon, preventable adverse events
  - Surgery on wrong patient or body part
  - Fires in ORs, retained foreign objects
  - Infant abductions, inpatient suicides

Current State of Improvement
- We have made some progress
  - Project by project: leads to “project fatigue”
  - Satisfied with modest improvement
- Current approach is not good enough
  - Improvement difficult to sustain/spread
  - Getting to zero, staying there is very rare
- High reliability offers a different approach
  - The goal is much more ambitious
  - High reliability is not a project
High Reliability Healthcare

Our team has worked for 7 years with academics and experts from HROs (nuclear, aviation, military, amusement parks)

- We have created a model for healthcare:
  - Leadership committed to goal of zero harm
  - Safety culture embedded throughout
  - RPI (lean, six sigma, change management)

- Everyone’s job is protecting patients
- New resources, tools, and programs

RPI and High Reliability

- How did HROs achieve zero harm?
  - How to get from low to high reliability?
  - No guidance from the academics

- How do we address safety processes that fail 40-60% of the time?

- How to get major improvement quickly?

- Answer?
  
  RPI = lean, six sigma, and change management
Robust Process Improvement

- Systematic approach to problem solving
- The Joint Commission has fully adopted RPI
  - Intense customer focus, increase value
  - Goal is to train everyone
  - RPI is “the way we work”
- The Joint Commission is adopting all components of safety culture
- We measure RPI and safety culture and report on strategic metrics to Board

Quality Progress
Cover Story
June 2016
What is Lean?

- **Philosophy:** continuous improvement of processes through employee empowerment
- Teaches us to view our processes from the customer’s perspective—in value streams
- **Tools:** to increase value by eliminating steps in processes that represent pure waste
- Waste increases cost, produces no value
- All unexamined processes have waste; often as much as 50% of time and effort is waste
Lean Process Improvement

Before

After

Work time: value added

Waiting, rework: non-value added time

Same value, Less time, lower cost

Business Improvement = Eliminate Waste + Improve Outcomes → Lean Six Sigma

Six Sigma Uses “DMAIC” To Improve the Outcomes of Processes

Define

Measure

Analyze

Improve

Control

Who are the customers? What is critical to the quality of the process?

What are the most important causes of the defects?

How can we maintain the improvement?

How do we remove the causes of the defects?

How can we measure exactly how well the process is performing?
Six Sigma Philosophy

- Philosophy underlying six sigma helps us to think about quality differently
- Six sigma measures bad outcomes as “defects per million opportunities”
- 1% rate of bad outcomes = 10,000 defects per million
- Six sigma = 3.4 defects per million
- It gives us tools and a way to think about getting to zero harm: the high reliability goal

How Safe are US Airlines?

1990-2001
- 129 deaths per year
- 9.3 million flights per year
- Rate = 13.9 deaths per million flights

2002-2013
- 14.6 deaths per year
- 10.2 million flights per year
- Rate = 1.43 deaths per million flights

= 90% ↓
Technical Solution is Not Enough

Lean, six sigma provide technical solutions to standardize markedly improved processes.

Why does improvement fail so often?
- Not for lack of a good technical solution.
- Failures occur when organization fails to accept and implement a good solution it had.

RPI addresses this challenge directly.

Change management = a systematic way to implement and sustain good solutions.

Change management is the rocket science of improvement.

The Joint Commission
Facilitating Change™

Key components of managing change

1. **Plan**: engage all stakeholders, identify sponsor, champion and process owner
2. **Inspire**: paint a convincing picture of how beneficial the change will be
3. **Launch**: initiate the change, intensify communication to stakeholders
4. **Support**: sustain the improvement; empower process owner

Change management is not linear

Getting Started

- Identify all the relevant stakeholders
- "ARMI" analysis
  - Approvers
  - Resources
  - Members
  - Interested parties
- Different roles at different phases of change
- Revisit periodically during change process
Resistance to Change

Managing resistance is critical to success
- “Resistance Analysis” is a vital tool
- Who is likely to resist and why?

Sources of resistance
- Technical
- Political
- Cultural

Each requires a different strategy to overcome

Engaging Stakeholders

“Attitude/Influence Matrix”
- Assess attitudes of key stakeholders (support or oppose the change)
- Which individuals can influence the attitude of those who are opposed?

Works to build support, overcome resistance
Requires continuous attention during project as attitudes typically change over time
Opponents, if converted, are best advocates
RPI in Health Care Today
- RPI routinely produces 50%+ improvement
- Only a small percentage of hospitals or systems use RPI in any form or fashion
- RPI is used differently by different hospitals
  - Most use only some of the parts; change management is most often left out
  - Most do not use it to transform
  - Most limit training to small group
- Compelling business case for RPI

The Business Case
- Administrative processes in health care are often just as broken as clinical processes
  - Billing, supply chain, throughput
  - RPI can directly improve margins
- Learning RPI allows organizations to solve their own problems, eliminate consultants
- Quality improvements often don’t save $$
- Generate positive ROI now while learning how to redesign care processes for future
- Mayo program ROI = 5:1

RPI Solves Revenue Cycle Problems

Mount Sinai: RPI uncovered significant problems billing for cardiac stents, pacemakers and implantable defibrillators
- Complex process involving cardiology, IT, finance, faculty practice, nursing
- 63% error rate——reduced to 5.6%
- $5M increase in annual revenue

Mount Sinai: RPI solved longstanding chemoRx billing issues: $1.7M revenue increase

Training and Deployment

We have a large group of experts in lean, six sigma, and change management (RPI)
- Studied experience of major corporations (for example, GE, Lilly, BD, Cardinal)
- Extensive experience with 27 hospitals and systems applying RPI tools

We are training hospitals and systems to:
- Get the most out of RPI tools and methods
- Embed RPI throughout their organizations
Center for Transforming Healthcare

Using RPI together with leading US hospitals and health systems to solve most difficult quality and safety problems

Project topics:

- **2009-10**: hand hygiene, wrong site surgery, hand-off communications, SSIs
- **2011**: safety culture, preventable HF hospitalizations, and falls with injury
- **2012**: sepsis mortality, insulin safety
- **2013-4**: C. difficile prevention, VTE
# Participating Hospitals

- Atlantic Health
- Barnes-Jewish
- Baylor
- Cedars-Sinai
- Cleveland Clinic
- Exempla
- Fairview
- Floyd Medical Center
- Froedtert
- Intermountain
- Johns Hopkins
- Kaiser-Permanente
- Mayo Clinic
- Memorial Hermann
- New York-Presbyterian
- North Shore-LIJ
- Northwestern
- OSF
- Partners HealthCare
- Sharp Healthcare
- Stanford Hospital
- Texas Health Resources
- Trinity Health
- VA Healthcare System-CT
- Virtua
- Wake Forest Baptist
- **Wentworth-Douglass**

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# Health Facilities Management Magazine

![Image: Health Facilities Management Magazine](image)

**2014 ES Department of the Year: Wentworth-Douglass Hospital**

[Image: Wentworth-Douglass Hospital](image)
RPI Improves Housekeeping

- New wing added in 2012: 130,000 SF with new, unfamiliar types of spaces
- Challenge to Environmental Services staff:
  - Add this building to existing 364,000 SF
  - No new staff, same high quality cleaning
- Used RPI to redesign workflow
- Met the challenge
- Saved the hospital about $440,000

Current State of Quality

- Routine safety processes fail routinely
  - Hand hygiene
  - Medication administration
  - Patient identification
  - Communication in transitions of care
- Uncommon, preventable adverse events
  - Surgery on wrong patient or body part
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RPI Delivers Results

- “One-size-fits-all” best practice is inadequate
- Complex processes require more sophisticated problem-solving methods (RPI)
- Three crucial and consistent findings:
  - Many causes of the same problem
  - Each cause requires a different strategy
  - Key causes differ from place to place
  
RPI: producing next generation best practices; solutions customized to your causes

Some Important Causes of Hand Hygiene Failures

1. Faulty data on performance
2. Inconvenient location of sinks or hand gel dispensers
3. Hands full
4. Ineffective education of caregivers
5. Lack of accountability

- Each requires a very different strategy to eliminate
Causes Differ by Hospital

<table>
<thead>
<tr>
<th>Main Causes of Failure to Clean Hands (across all participating hospitals)</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ineffective placement of dispensers or sinks</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>Hand hygiene compliance data are not collected or reported accurately or frequently</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>Lack of accountability and just-in-time coaching</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>Safety culture does not stress hand hygiene at all levels</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>Ineffective or insufficient education</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>Hands fall</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>Wearing gloves interferes with process</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Perception that hand hygiene is not needed if wearing gloves</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>Health care workers forget</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>Distractions</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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</tbody>
</table>

Note that not all of the main causes of failure appear in every hospital. The chart above represents the validation of the root causes across hospitals. This underscores the importance of understanding hospital-specific root causes so that appropriate solutions can be targeted.

RPI Drives Major Improvements

<table>
<thead>
<tr>
<th>Center Projects</th>
<th>Results(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand hygiene</td>
<td>71↑</td>
</tr>
<tr>
<td>Hand-off communication failures</td>
<td>56↓</td>
</tr>
<tr>
<td>Wrong site surgery risks</td>
<td></td>
</tr>
<tr>
<td>• Scheduling</td>
<td>46↓</td>
</tr>
<tr>
<td>• Pre-op</td>
<td>63↓</td>
</tr>
<tr>
<td>• Operating Room</td>
<td>51↓</td>
</tr>
<tr>
<td>Colorectal SSIs</td>
<td>32↓</td>
</tr>
<tr>
<td>Falls with injury</td>
<td>62↓</td>
</tr>
</tbody>
</table>

Targeted Solutions Tool (TST)

- Web-based tools: secure extranet channel
  - Available to all accredited customers now
  - No added cost, voluntary, confidential
- Educational, no jargon, no special training
- Coaches available to guide users to solutions
- Targeting only your causes means you don’t use resources where they aren’t needed
- 2010: hand hygiene; 2012: safe surgery and hand-off communication; 2015: falls
Preventing Falls With Injury

- Falls in hospitals persist
  - Rate=4 per 1000 pt days: 30-50% with injury
  - 30 different causes, varied by hospital
    - Problems with fall risk assessments
    - All staff must be involved
    - Engage and educate patients and families
- 5 Center hospitals used targeted solutions:
  - Reduced falls with injury by 62%
  - Reduced injury rate from 33% to 19%

Implications for Typical Hospitals

200 Beds
- Expect 358 falls/yr
  - 117 injuries
  - $1.6M in costs
- Annual impact
  - 72 fewer injuries
  - $1M in costs avoided

400 Beds
- Expect 659 falls/yr
  - 216 injuries
  - $2.4M in costs
- Annual impact
  - 133 fewer injuries
  - $1.9M in costs avoided
Impact of Hand Hygiene TST

TST improves HH: 55% to 85%, Reduces HAIs by 35%

300 Beds
- Expect 555 HAIs/yr
- Annual impact:
  - 194 fewer HAIs
  - 12 lives saved
  - $3.7M cost avoided

600 Beds
- Expect 1100 HAIs/yr
- Annual impact:
  - 388 fewer HAIs
  - 24 lives saved
  - $7.5M cost avoided
Used TST to achieve >95% hand hygiene compliance

Bloodstream infections fell by 2/3

MRSA Rate Decreases as Hand Hygiene Improves
Memorial Hermann: Getting to Zero

The Joint Commission Journal on Quality and Patient Safety

2012 John M. Eisenberg Patient Safety and Quality Awards
Memorial Hermann: High Reliability from Board to Bedside

Innovation in Patient Safety and Quality at the National Level

M. Michael Shakot, MD, FACS; Douglas Monroe, MD, MBA; Juan Inesria, MBA, FACHE; FIBC; CHPQ; Debbi Garbade, RN, MSN, CPHRM, CHPQ, CPSD; Anne-Dita France, PhD, CPHQ, MBII, FACHE

Article-at-a-Glance

Background: In 2006 the Memorial Hermann Health System (MHES), which includes 12 hospitals, began applying principles embraced by high reliability organizations (HROs). Three factors support the HRO journey: (1) aligned organizational structure with transparent management systems and compressed reporting processes; (2) Robust Process Improvement (PPI) with high-reliability interventions and (3) cultural establishment, sustenance, and evolution.

January 2016

The Joint Commission

Journal on Quality and Patient Safety

Improvement from Front Office to Front Line

Sustaining Improvement in Hand Hygiene and Health Care–Associated Infections


Jt Comm Journal on Qual Pat Safety 2016;42(1):6-17
Michael Shabot, MD
Memorial Hermann System EVP

“We fully attribute to the Center for Transforming Healthcare’s hand hygiene TST the final drop in HAI rates to zero or near-zero system-wide. After implementing the hand hygiene TST, our hospitals began to report zeros as their most common monthly CLABSI and VAP result. Our mothers were right after all! Feel free to quote me. This actually saves lives.”
Joint Commission, High Reliability and RPI

- We must have much more ambitious goals for healthcare improvement: zero harm
- Current methods are inadequate
- Lean, six sigma, and change management (RPI) are delivering impressive results
- ROI of at least 4:1 is readily achievable
- Some hospitals/systems approaching zero
- Joint Commission has tools to help