Smaller study success in reducing SSI risk not scalable despite high adherence to processes

- Joint Commission multi-institutional surgical care improvement project (SCIP) “accountability measures”

- WHO surgical safety checklist

*Culture and context influence effectiveness of implementation*
"The main barriers are the lack of collaboration and a culture that is resistant to change. There is also a lack of systems integration."

- Dr. Peter Pronovost, discussing Comprehensive Unit-Based Safety Programs and HAIs in an interview with the Wall Street Journal

http://online.wsj.com/news/articles/SB10001424052748704364004576131963185893084
Organizational Factors Associated with Effective SSI Prevention

Safer Outcomes for Pediatric Spinal Surgery

A National Spine Center Collaborative

Agency for Healthcare Research and Quality PCOR Trust Fund K99/R00
How is Care Organized at Hospitals with the Best Patient Outcomes?

- Grouped hospitals by performance in SSI prevention
- Interviewed 150 total staff & families
- Reviewed protocols
- OR & unit observations
- TeamSTEPPS surveys

Agency for Healthcare Research and Quality PCOR Trust Fund K99/R00
Systems Engineering for Patient Safety Model (SEIPS)

Organizational Culture

Engaged Leadership
Interdependence
Accountability/Just Culture

Accountability

- **High**: *OR charge nurse* - “...sometimes if there is a staff member where they feel the surgeon is not up to par they will bring that concern to me and then I'll speak to the team member [surgeon or nurse]...to educate them on the expectation of certain procedures.”

- **Low**: *floor nurse* - “Usually all our spinals [spine surgery patients] have what we call standardized orders... [Yet] we’ll have a doctor that...we know their orders are gonna be a little different...We get so used to one routine, and then another patient comes, and it’s a different doctor, and they want it to be different.”
Interdisciplinary Team Function

- Integrating Trainees
- Workload
- Multidisciplinary Workflows

Integrating Trainees

- **High**: Floor NP - “There’s a lot of time spent with making sure when they come to [name] Hospital they understand the protocol, they understand the process, they understand the pathway.”

- **Low**: Spine nurse - “I think the hard part of working in an academic institution is the Residents and the Fellows. They come in and they think ‘I'm not going to do it that way, ‘cause that's not what I think is right.’ They don't want to follow it, or they don't even know the protocols ‘cause we don’t have a very good way of always sharing that with them.”
Standardization & Reconfiguration (beyond protocols)

- Data & Reporting
- Co-design & Collective Appraisal of Protocols

How Protocols are Developed

• **High:** *Floor Provider:* “...the development of that pathway...there was pharmacy involved, infection control involved, infectious disease involved. Everybody that touches this patient has had input in that whole process...”

• **Low:** *Orthopedic surgeon:* “...[about] time-outs in the operating room: the nursing staff and AORN* established what these time-outs should include and we have gone way overboard ...The surgeons really fought back”
Implementing Comprehensive Unit-Based Safety Programs (CUSPs)

Spine Apex
Spine Program Implementation Effectiveness: Achieving Program EXcellence
The CUSP Model

• Created through a collaborative effort of the Agency for Healthcare Quality and Safety (AHRQ)

• Dovetails with models for corporate organizational change models

• Based on the concept that culture is local and improvement work needs to be owned at the unit-level

• Toolkit modules designed to promote culture change in parallel with unit improvements
Apply CUSP

- Learn about CUSP
- Assemble the Team
- Engage the Senior Executive
- Understand the Science of Safety
- Identify Defects through Sensemaking
- Implement Teamwork & Communication
The CUSP/SUSP Model

• Has evidence for effectiveness in many hospital settings:

  ▪ Pronovost, et al, Am J Med Qual 2015: 70% reduction in CLABSIs in 121 ICUs sustained over 10 years

    • Reduce delays & disruptions
    • Improved teamwork & communication
    • Lower mortality
CUSP Study Design

Establish Team → Tools/methods → Measure/Sustain

Site A
- CUSP Team Identification
- Safety Training
- KickOff Meeting
- Pre-Mortem Survey (Barriers Survey)
- CUSP Training
- Pause Meeting

Site B
- CUSP Team Identification
- Safety Training
- KickOff Meeting
- Pre-Mortem Survey (Barriers Survey)
- CUSP Training
- Pause Meeting

Defects Identification
- Sense-making: Intervention Choice
- Intervention Refinement
- Tools to Improve
- Metrics of Success

Intervention Implementation
- Pulse Assessment
- Data Collection

Data Collection
- Intervention Implementation
- Pulse Assessment
CUSP Study Design

Establish Team ➔ Tools/methods ➔ Measure/Sustain

Kotter’s principles/ LEAN
# Kotter’s Steps of Change

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Create a sense of urgency</td>
</tr>
<tr>
<td>2</td>
<td>Create a guiding coalition</td>
</tr>
<tr>
<td>3</td>
<td>Develop a shared vision</td>
</tr>
<tr>
<td>4</td>
<td>Communicate the vision</td>
</tr>
<tr>
<td>5</td>
<td>Empower others to act</td>
</tr>
<tr>
<td>6</td>
<td>Go for short-term wins</td>
</tr>
<tr>
<td>7</td>
<td>Consolidate gains to produce more change</td>
</tr>
<tr>
<td>8</td>
<td>Anchor new approaches in Culture</td>
</tr>
</tbody>
</table>
Study Outcomes

- Implementation effectiveness
  - Fidelity/adaptation
  - Acceptability
  - Core elements?

- Site project success (internal metrics)

- Improvement in relative SSI performance (PHIS data)

- Improvement in organizational barriers (qualitative data)
CUSP Defect Identification: ICU “CRASH” Care

- Hemodynamic instability within 12 hours of OR transfer
  - C – Collapse
  - R – Resuscitation
  - A – And
  - S – Sudden
  - H – Heightening
  - ….of Care

- Nearly 40% of High Risk spine fusions with rapid escalation of vasopressors and/or aggressive fluid administration
CUSP Defect Identification: ICU “CRASH” Care

- Hemodynamic instability within 12 hours of OR transfer
  - C – Collapse
  - R – Resuscitation
  - A – And
  - S – Sudden
  - H – Heightening
  - ....of Care

- Nearly 40% of High Risk spine fusions with rapid escalation of vasopressors and/or aggressive fluid administration
CUSP team approach

- Improving surgeon<->anesthesia MAP goal communication
- Reviewing MAP management variation data with anesthesia
- Focus on ensuring stability prior to transfer
- OR->ICU hand-off communication
> 50% Reduction in CRASH Care

Start of CUSP Team Effort
# CUSP Defect Identification: Central Line Removal

<table>
<thead>
<tr>
<th>CVC duration in high-risk PSF patients</th>
<th>2015q3-2016q2 n=26</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Adverse Outcomes / HACs</strong></td>
<td></td>
</tr>
<tr>
<td>VTE</td>
<td>2 (7%)</td>
</tr>
<tr>
<td>CLABSI</td>
<td>0</td>
</tr>
<tr>
<td><strong>Outcome Measures</strong></td>
<td></td>
</tr>
<tr>
<td>CVC duration (median)</td>
<td>3.1</td>
</tr>
<tr>
<td>Proportion of LOS (median)</td>
<td>67%</td>
</tr>
<tr>
<td><strong>Process Measures</strong></td>
<td></td>
</tr>
<tr>
<td>CVC removed in PICU</td>
<td>31%</td>
</tr>
<tr>
<td><strong>Balancing Measures</strong></td>
<td></td>
</tr>
<tr>
<td>Needed TPN</td>
<td>4 (15%)</td>
</tr>
<tr>
<td>New CVC placed after CVC removal</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>New PIV placed after CVC removal</td>
<td>6 (23%)</td>
</tr>
</tbody>
</table>
## Reducing Central Line Days

**N=26**

<table>
<thead>
<tr>
<th><strong>Outcome Measures</strong></th>
<th><strong>2015q3-2016q2</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>CVC duration (median)</td>
<td>3.1</td>
</tr>
<tr>
<td>Proportion of LOS (median)</td>
<td>67%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Process Measures</strong></th>
<th><strong>2015q3-2016q2</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>CVC removed in PICU</td>
<td>31%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Balancing Measures</strong></th>
<th><strong>2015q3-2016q2</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Needed TPN</td>
<td>4 (15%)</td>
</tr>
<tr>
<td>New CVC placed after CVC removal</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>New PIV placed after CVC removal</td>
<td>6 (23%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Adverse Outcomes / HACs</strong></th>
<th><strong>2015q3-2016q2</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>VTE</td>
<td>2 (7%)</td>
</tr>
<tr>
<td>CLABSI</td>
<td>0</td>
</tr>
</tbody>
</table>
CUSP team approach

• Process mapping & surveys
  ▪ Confusion about policy
  ▪ Confusion about risk vs. benefits

• Multi-disciplinary Targets
  ▪ Education of ICU on removal criteria prior to floor transfer
  ▪ Clarification of removal policy
  ▪ Co-design of nursing skills lab session
  ▪ Invited family to assist with central line education
Central Line Skills Lab
Post-operative Central Line Days in High Risk Spine Fusions

Avg. Duration Central Line In

ICU education
Skills Session
Policy Change
Skills Session

Aug’15  Nov’15  Feb’16  May’16  Aug’16  Nov’16  Feb’17  May’17
# Reducing Central Line Days

<table>
<thead>
<tr>
<th>CVC duration in high-risk PSF patients</th>
<th>2015q3-2016q2 n=26</th>
<th>2016q3-q4 n=22</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Adverse Outcomes / HACs</strong></td>
<td>VTE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 (7%)</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>CLABSI</td>
<td>0</td>
</tr>
<tr>
<td><strong>Outcome Measures</strong></td>
<td>CVC duration (median)</td>
<td>3.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.1</td>
</tr>
<tr>
<td></td>
<td>Proportion of LOS</td>
<td>67%</td>
</tr>
<tr>
<td></td>
<td>(median)</td>
<td>37.5%</td>
</tr>
<tr>
<td><strong>Process Measures</strong></td>
<td>CVC removed in PICU</td>
<td>31%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>66%</td>
</tr>
<tr>
<td><strong>Balancing Measures</strong></td>
<td>Needed TPN</td>
<td>4 (15%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 (0%)</td>
</tr>
<tr>
<td></td>
<td>New CVC placed after CVC removal</td>
<td>0 (0%)</td>
</tr>
<tr>
<td></td>
<td>New PIV placed after CVC removal</td>
<td>6 (23%)</td>
</tr>
</tbody>
</table>
CUSP Core Lessons (so far)

- Developing leadership skills on multiple levels
- Fighting change fatigue requires continuous data review and collective appraisal – *investment in these activities is critical*
- Safety culture training key to team recognition of defects
- Shift collective focus toward recognizing change targets instead of workarounds
- Encourage constant inquiry – *Is this working as intended? Having the intended effect?*