



# “The Checklist Conundrum” -Lucian Leape

- 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”
    - Hawn MT, et al. Ann Surg. 2011 Sep;254(3):494-9; discussion 9-501
  - WHO surgical safety checklist
    - Urbach DR, et. Al. N Engl J Med 2014;370:1029-38.

***Culture and context influence effectiveness of implementation***



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# From NASA to NASCAR to Intensive Care Units



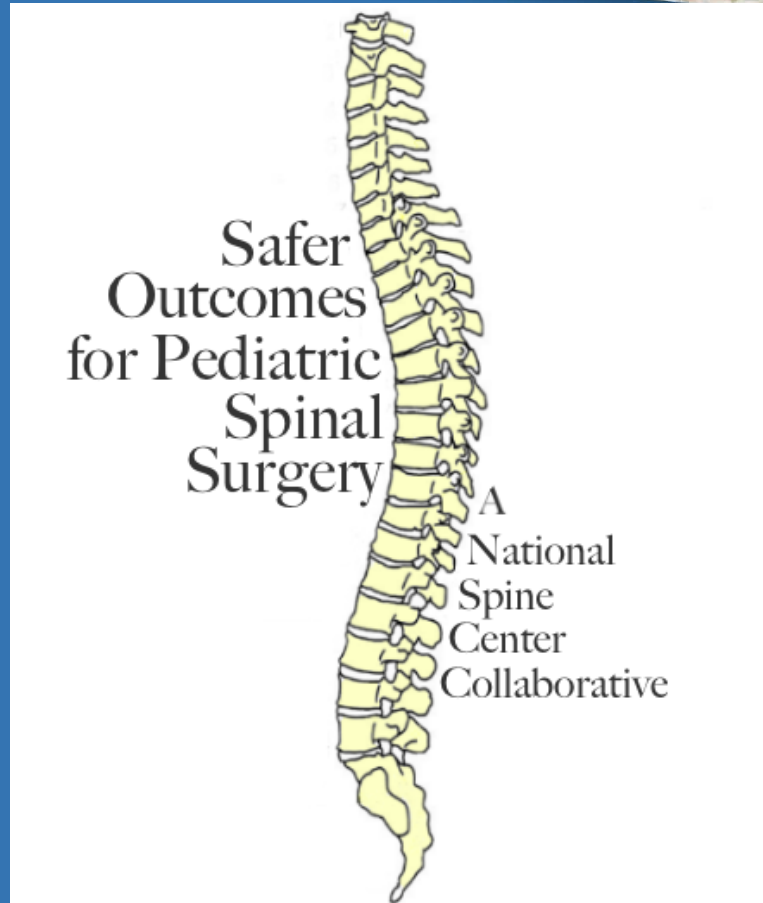
**“The main barriers are the lack of collaboration and a culture that is resistant to change. There is also a lack of systems integration”**

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



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# Organizational Factors Associated with Effective SSI Prevention



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# How is Care Organized at Hospitals with the Best Patient Outcomes?

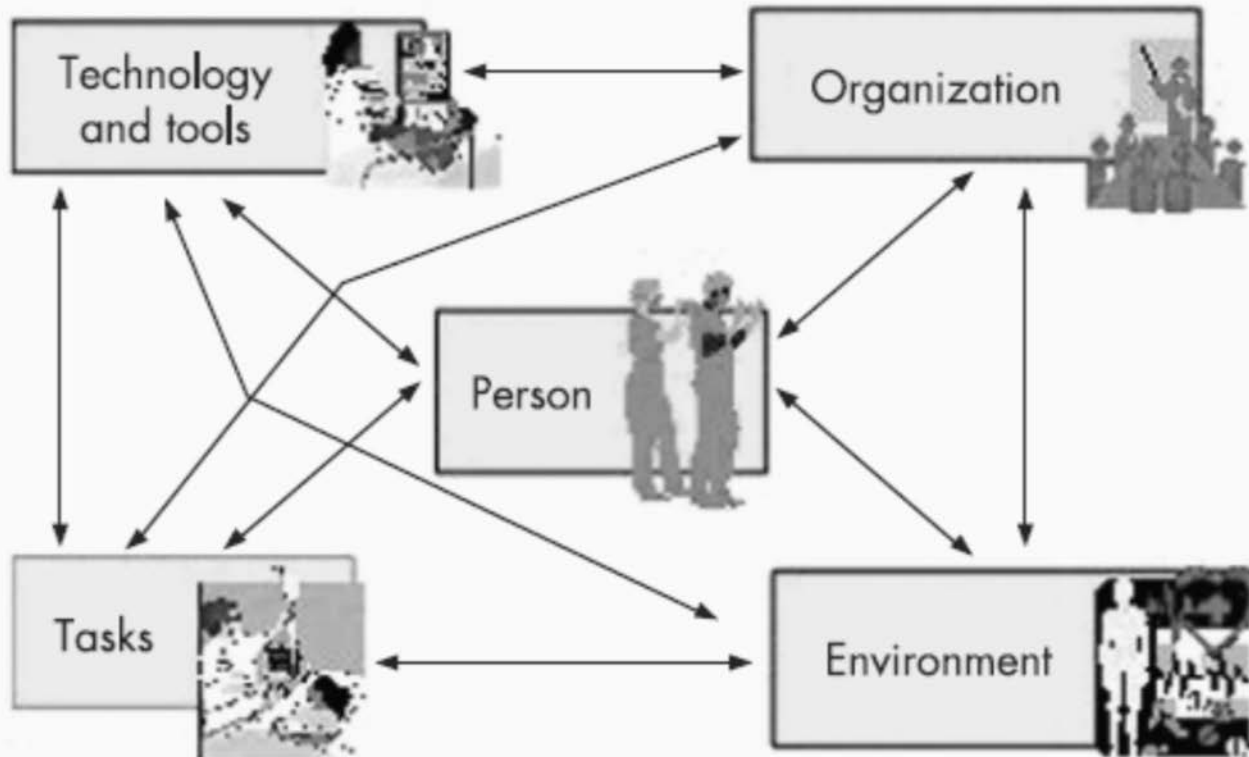


- Grouped hospitals by performance in SSI prevention
- Interviewed 150 total staff & families
- Reviewed protocols
- OR & unit observations
- TeamSTEPPS surveys

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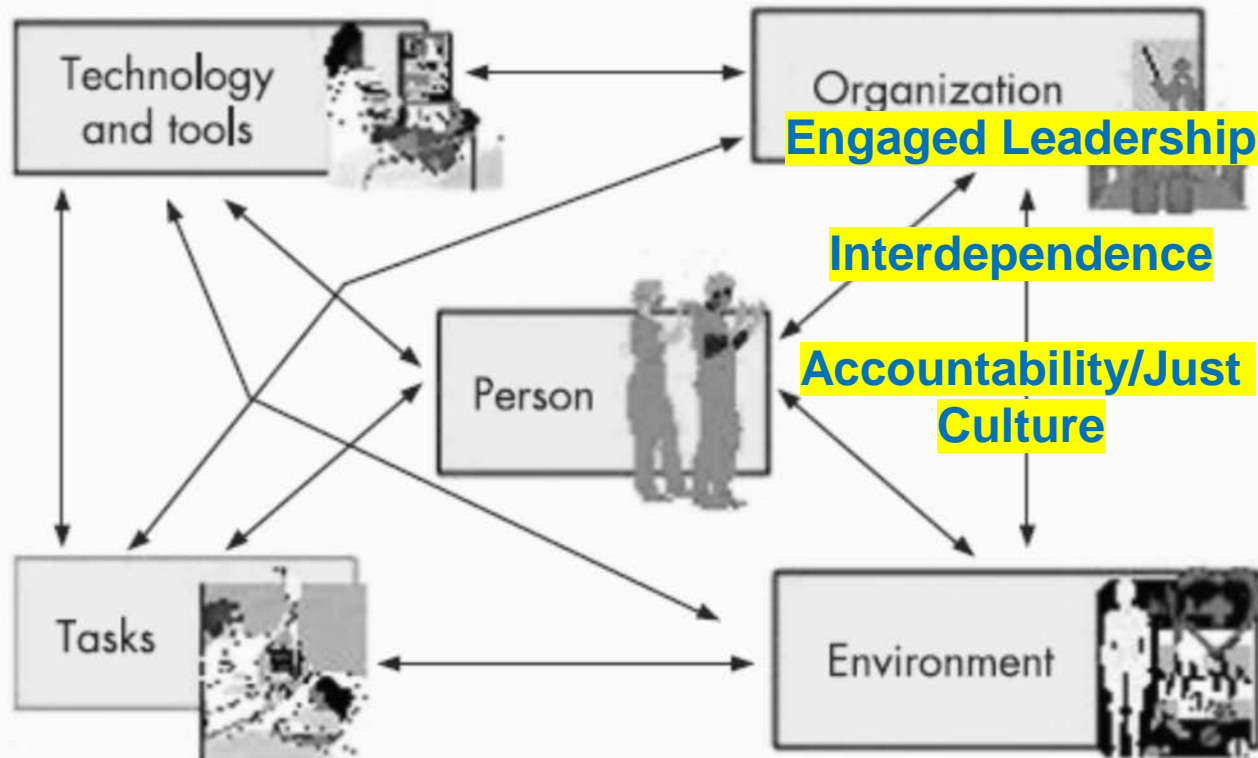


# Systems Engineering for Patient Safety Model (SEIPS)





# Organizational Culture



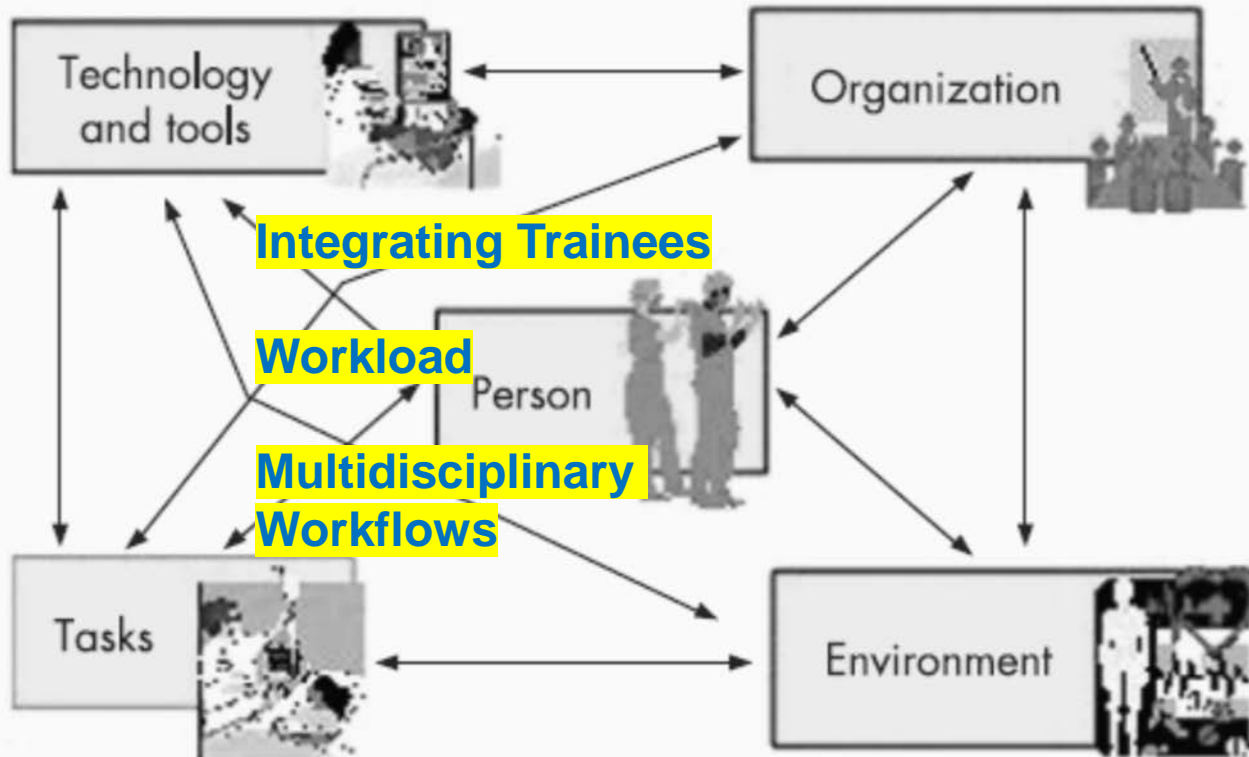


# Accountability

- **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



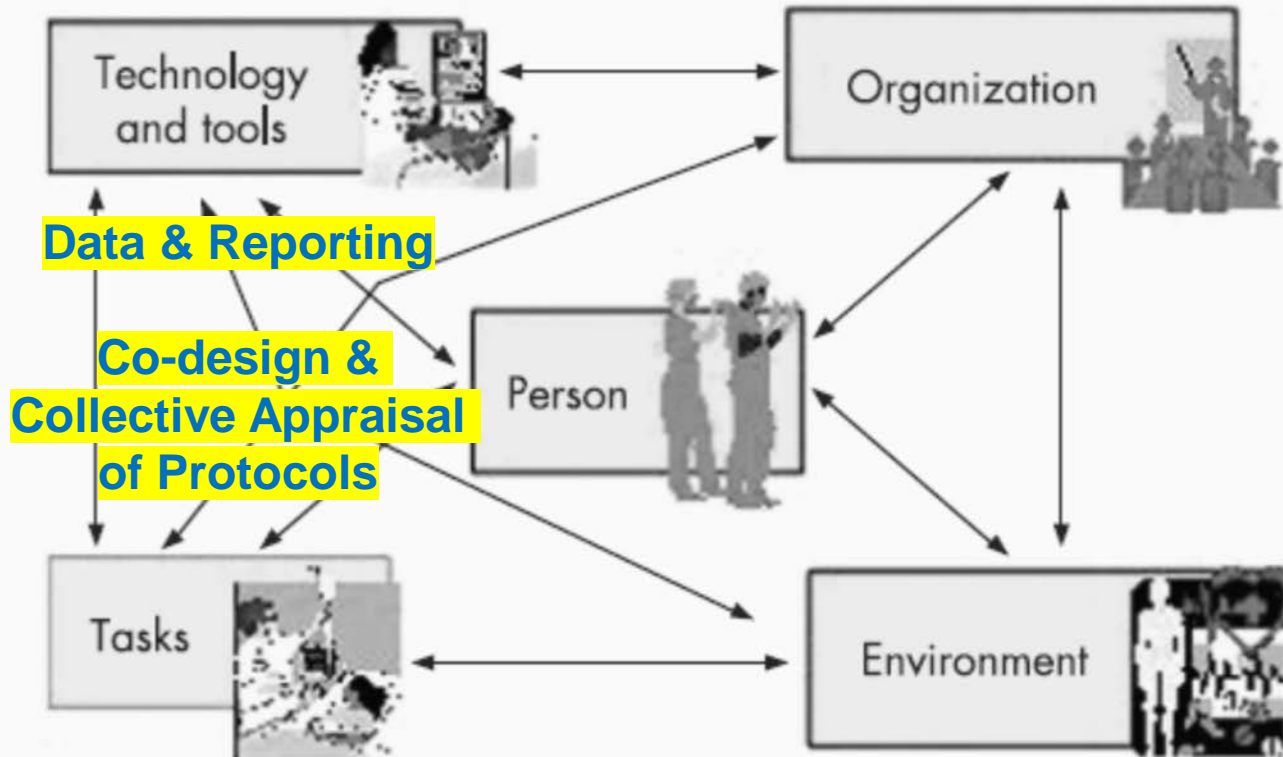




# Integrating Trainees

- **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*)





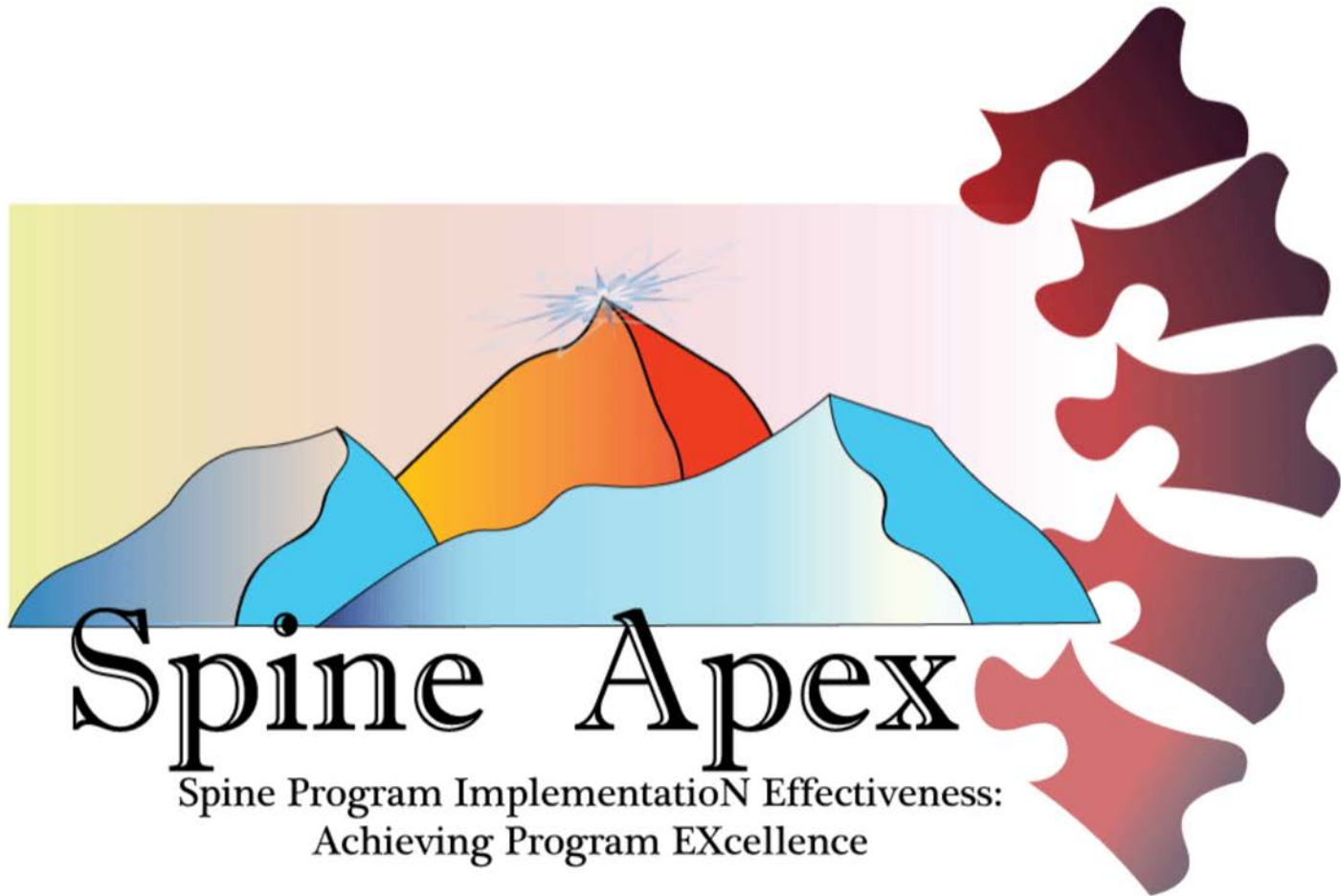
# How Protocols are Developed

- **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"



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# Implementing Comprehensive Unit-Based Safety Programs (CUSPs)





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# 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





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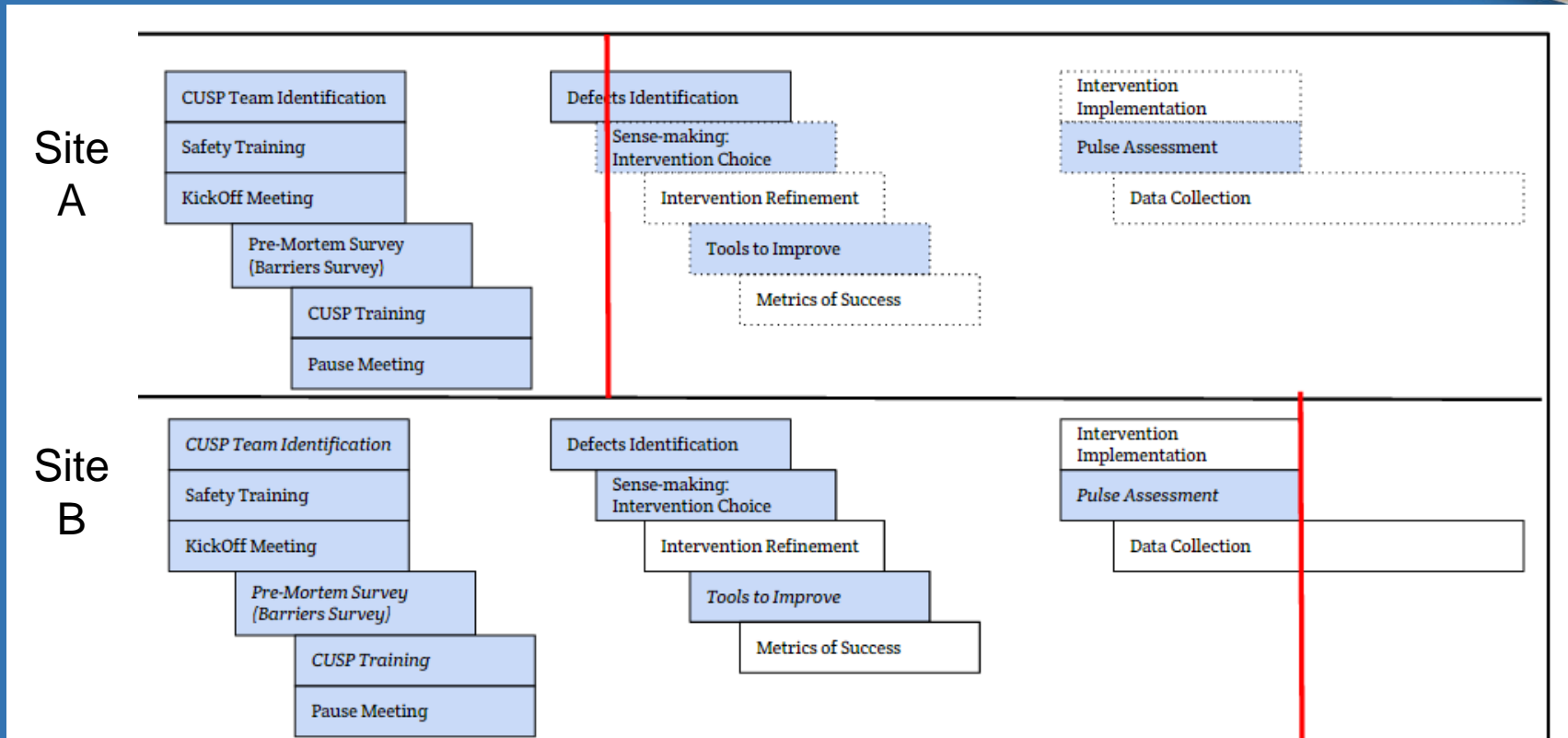
# The CUSP/SUSP Model

- 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
  - Wick, et al. J Am Coll Surg 2012: 33% reduction in SSI for colorectal surgery in 12 months with no change in SCIP measures
    - Reduce delays & disruptions
    - Improved teamwork & communication
    - Lower mortality



# CUSP Study Design

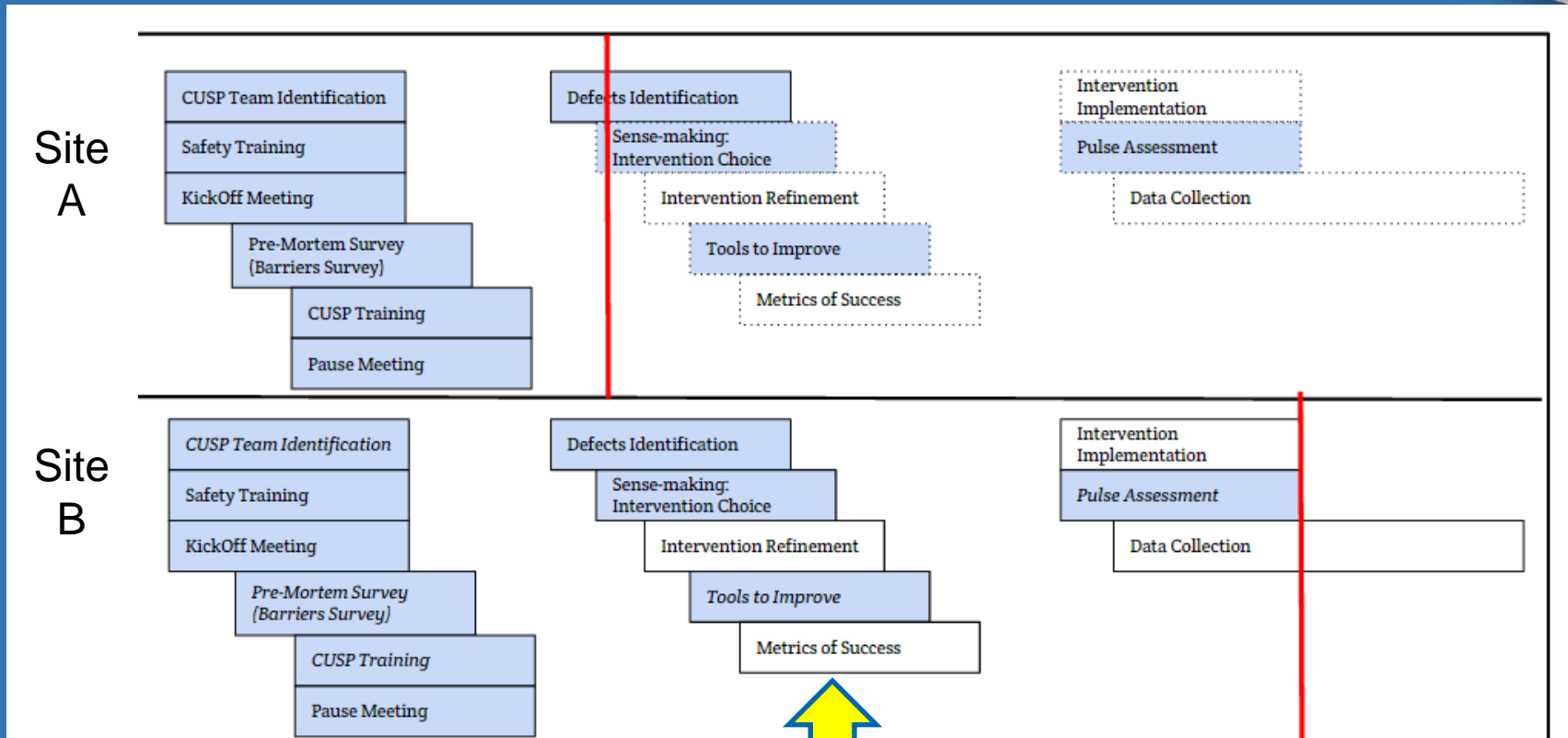
Establish Team → Tools/methods → Measure/Sustain





# CUSP Study Design

Establish Team → Tools/methods → Measure/Sustain



Kotter's principles/ LEAN

# CUSP & Organizational Change Models

## Kotter's Steps of Change

Step 1: Create a sense of urgency

Step 2: Create a guiding coalition

Step 3: Develop a shared vision

Step 4: Communicate the vision

Step 5: Empower others to act

Step 6: Go for short-term wins

Step 7: Consolidate gains to produce more change

Step 8: Anchor new approaches in Culture



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# 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



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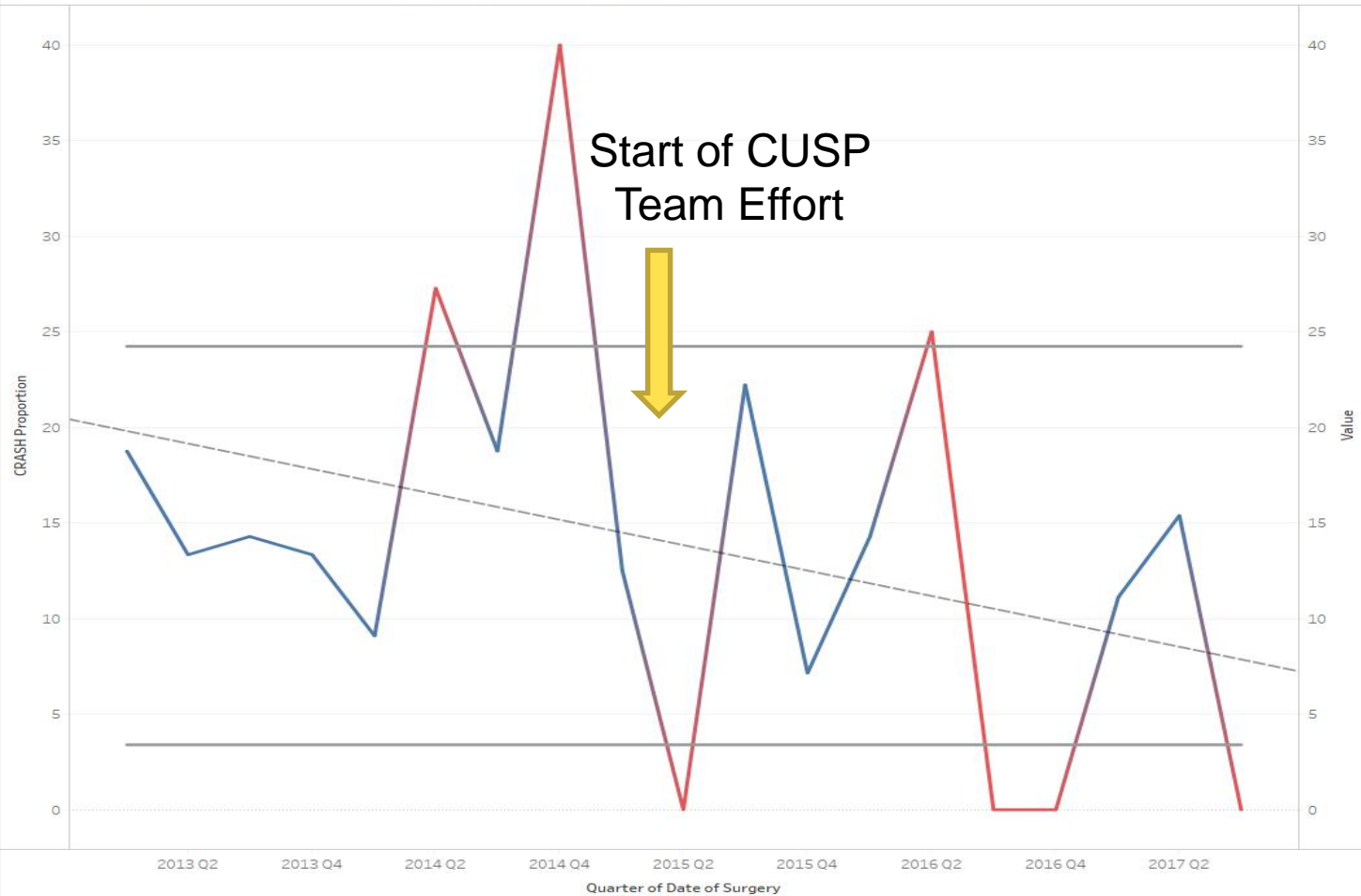
# *CUSP team approach*

- 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

Percent CRASH per Surgical Volume by Quarter  
Control Chart CRASH Proportion / Total PICU Discharge Surgical Volume



The trends of CRASH Proportion, CRASH Proportion, Lower Bound and Upper Bound for Date of Surgery Quarter. Details are shown for CRASH Proportion, Lower Bound and Upper Bound. For pane CRASH Proportion: Color shows details about Outliers. The data is filtered on Eligibility and Date of Surgery. The Eligibility filter keeps maybe and yes. The Date of Surgery filter excludes 10/18/2017 12:56:00 PM and 10/23/2017 8:36:00 AM.

Outliers  
■ False  
■ True



# CUSP Defect Identification: Central Line Removal

CVC duration in high-risk PSF patients		2015q3-2016q2 n=26
Adverse Outcomes / HACs	VTE	2 (7%)
	CLABSI	0
Outcome Measures	CVC duration (median)	3.1
	Proportion of LOS (median)	67%
Process Measures	CVC removed in PICU	31%
Balancing Measures	Needed TPN	4 (15%)
	New CVC placed after CVC removal	0 (0%)
	New PIV placed after CVC removal	6 (23%)



# Reducing Central Line Days

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# 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



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# Central Line Skills Lab

**Internal Jugular Vein Entry**  
 Collar Bone  
 Subclavian Vein Entry  
 Exit Site out of skin  
 Catheter Tail  
 Cap

**Non-Tunneled Central Venous Access Device**

**Internal Jugular Catheter**

**Subclavian Central Venous Catheter**

**Equipment:**

- 200 mL saline
- 100 mL sterile 0.9% NaCl (normal saline)
- 100 mL 0.5% povidone-iodine solution
- 100 mL 70% alcohol
- 100 mL 2% lidocaine
- 100 mL 1% lidocaine
- 100 mL 1% lidocaine
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**Need a Line? Non-Tunneled CVC & PICC Removal**

**Protocol Review: Non-Tunneled CVCs and PICC Removal**

1. Verify there is an order to remove the central venous catheter.
2. Position patient in a supine and comfortable position.
3. Wash hands and put on clean gloves.
4. Remove the dressing using adhesive remover if necessary. If available, remove dressing using the device as well, using caution. If adhesive is securing the site, where a catheter removal kit is present, use the catheter as intended to remove during evaluation.
5. Internal jugular and subclavian lines are removed on ultrasound or fluoroscopy, except for PICC. If the patient is unable, remove central venous catheter by venous access. Instruct the patient to hold their breath as the catheter is removed to prevent during evaluation.
6. Grasp the line at the insertion site, and slowly pull it and then it can be pulled to the site. Remove it and grasp it once more at the insertion site. Do not pull against resistance. Do not pull against at insertion site until the catheter is fully removed.
7. If resistance is met, wait for a repeat bedside ultrasound removal. This may take up to 15 minutes. For PICC removal, apply a 1" x 1" sterile adhesive (removal device) around the upper arm if necessary. If necessary, use a removal device to remove the catheter. If resistance is met, wait for a repeat bedside ultrasound. If resistance is met, wait for a repeat bedside ultrasound. If resistance is met, wait for a repeat bedside ultrasound. If resistance is met, wait for a repeat bedside ultrasound.
8. Grasp the line at the insertion site, and slowly pull it and then it can be pulled to the site. Remove it and grasp it once more at the insertion site. Do not pull against resistance. Do not pull against at insertion site until the catheter is fully removed.
9. Check removal, measure the catheter from the tip to the 10" mark. If there are no markings, measure from the tip to the insertion portion of the hub.
10. If there is a discrepancy between marked length and measured length, notify Provider on QIP.

**Technical Complications**

**Clotting**

**Broken Tip**

**Potential Complications**

**Phlebotomy/Infections** - The most difficult to prevent. Use aseptic technique on all catheter connections on the site of CVC.

**Needle As Shunt or Pulmonary Embolism** - The most difficult to prevent. Use aseptic technique on all catheter connections on the site of CVC.

**Thrombosis** - The most difficult to prevent. Use aseptic technique on all catheter connections on the site of CVC.

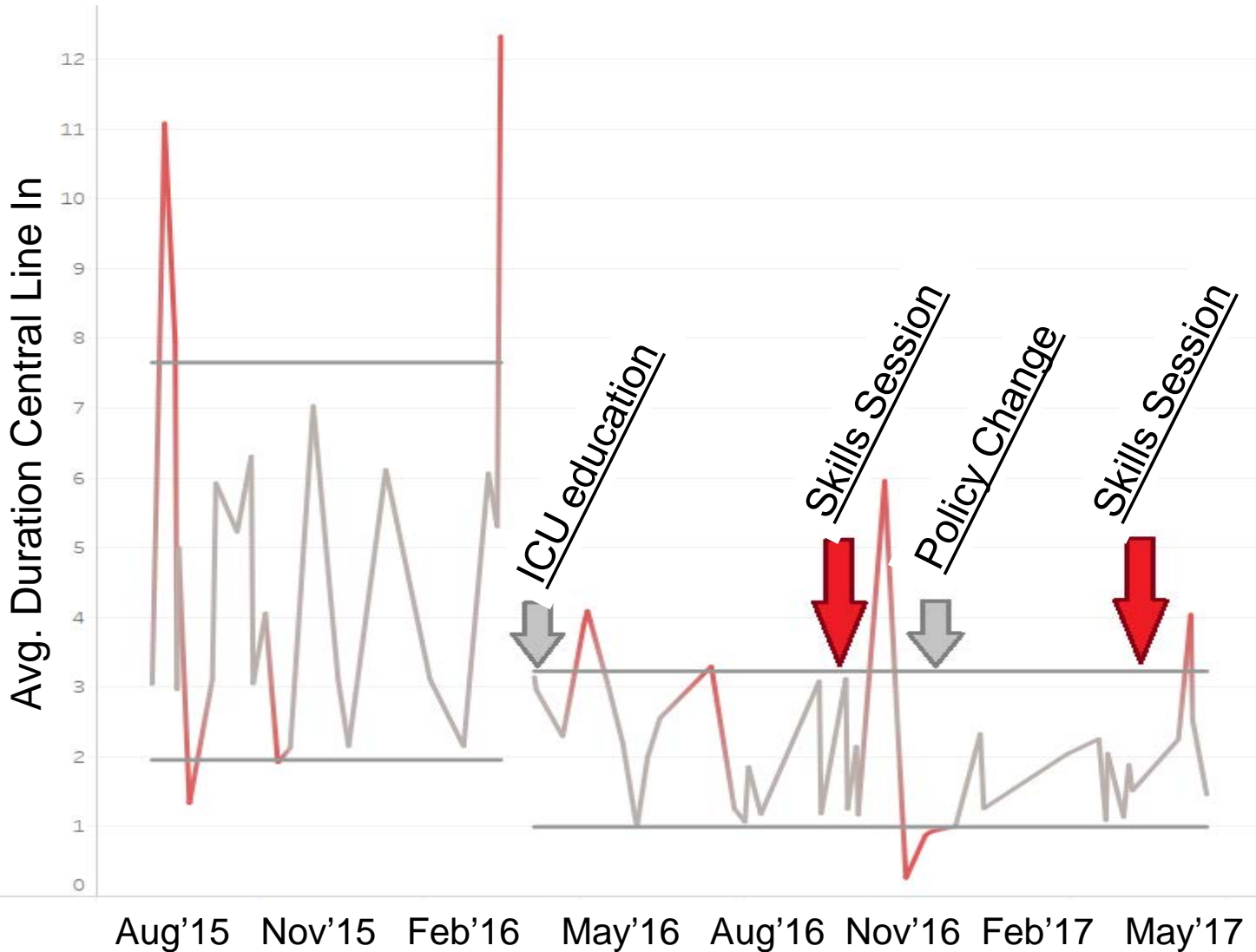
**Infection** - The most difficult to prevent. Use aseptic technique on all catheter connections on the site of CVC.

**Dislodgement** - The most difficult to prevent. Use aseptic technique on all catheter connections on the site of CVC.




**Disruption** - The most difficult to prevent. Use aseptic technique on all catheter connections on the site of CVC.



## Post-operative Central Line Days in High Risk Spine Fusions



# Reducing Central Line Days

CVC duration in high-risk PSF patients		2015q3-2016q2 n=26	2016q3-q4 n=22
Adverse Outcomes / HACs	VTE	2 (7%)	0
	CLABSI	0	0
Outcome Measures	CVC duration (median)	3.1 	2.1
	Proportion of LOS (median)	67% 	37.5%
Process Measures	CVC removed in PICU	31%	66%
Balancing Measures	Needed TPN	4 (15%) 	0 (0%)
	New CVC placed after CVC removal	0 (0%)	0 (0%)
	New PIV placed after CVC removal	6 (23%)	7 (32%)



# 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?*