

**Successful Implementation Strategy for the Prevention of Surgical Site Infections**  
**Prof. Sean Berenholtz, Johns Hopkins University**  
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 **JOHNS HOPKINS**  
MEDICINE

**Successful Implementation Strategy for  
the Prevention of Surgical Site Infections**

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Armstrong Institute for Patient Safety and Quality

Hosted by Prof. Joseph Solomkin  
University of Cincinnati College of Medicine

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**World Health Organization**  
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[www.who.int/gpsc/en](http://www.who.int/gpsc/en)

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**Roadmap**

- Review an implementation model used in successful large-scale programs associated with reductions in healthcare-associated infections, mortality, and costs
- Review how this model was adapted to achieve reductions in colorectal surgical site infections and improved patient satisfaction.

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## Preventable Harm in Surgery



More than  
250,000  
avoidable deaths  
after surgery

- 50% of all hospital adverse events linked to surgery
- At least HALF of those adverse surgical events are **avoidable**
- 25% in-patient surgeries followed by complications each year

<http://www.who.int/patientsafety/challenge/safe.surgery/en/>

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## Increasing rates of infection-related and post-procedural adverse events among patients who required surgery

The NEW ENGLAND JOURNAL of MEDICINE

SPECIAL ARTICLE

### National Trends in Patient Safety for Four Common Conditions, 2005–2011

Yun Wang, Ph.D., Noel Eldridge, M.S., Mark L. Metersky, M.D.,  
Nancy R. Verzier, M.S.N., Thomas P. Meehan, M.D., M.P.H.,  
Michelle M. Pandolfi, M.S.W., M.B.A., JoAnne M. Foody, M.D.,  
Shih-Yieh Ho, Ph.D., M.P.H., Deron Galusha, M.S., Rebecca E. Kliman, M.P.H.,  
Nancy Sonnenfeld, Ph.D., Harlan M. Krumholz, M.D., and James Battles, Ph.D.

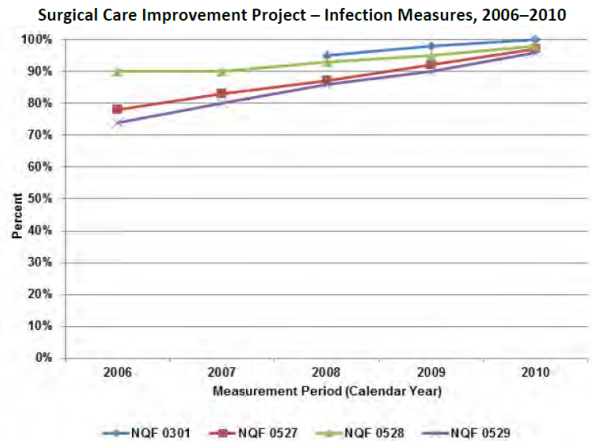
N Engl J Med; 370;4:341-351. (January 23, 2014)

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## Surgical Care Improvement Project (SCIP)

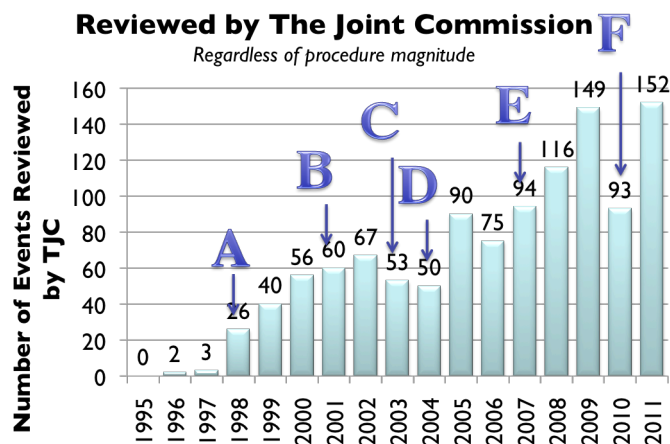


However, improvements in SCIP measures did not translate into improvements in patient outcomes.

CMS National Impact Assessment of Medicare Quality Measures. March 2012; 42.

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## Despite Years Of Technical Intervention, Rates Rose



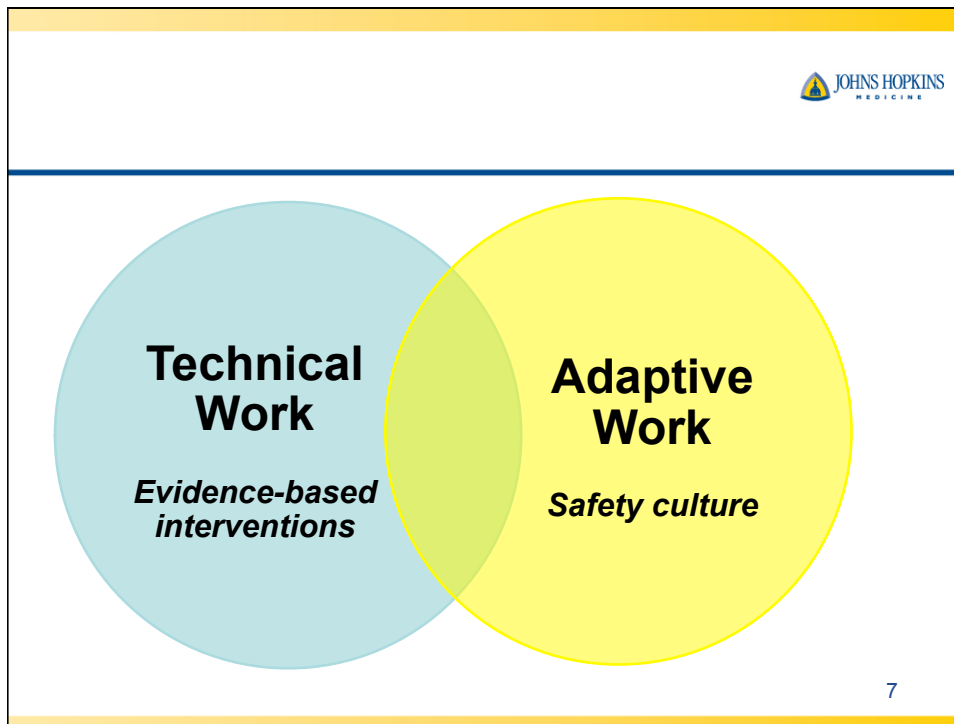
- A. Sentinel Event Alert: Wrong-sided surgery Aug 98
- B. Sentinel Event Alert: Follow-up review of wrong-sided surgery Dec 01
- C. Wrong Site Surgery Summit I Jan 03
- D. Universal Protocol 2004
- E. Wrong Site Surgery Summit II Feb 07
- F. Revised Wrong Site Surgery Definition Jun 10

“Checklists” do not translate into improved results.

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The table compares Technical Work and Adaptive Work. The Johns Hopkins Medicine logo is in the top right corner. The number '8' is in the bottom right corner.

TECHNICAL WORK	ADAPTIVE WORK
Work that we know we should do, like appropriate antibiotic dosing and skin preparation	The intangible components of work, like ensuring team members speak up with concerns and hold each other accountable
Work that lends itself to standardization (e.g., <b>checklists and protocols</b> )	Work that shapes the <b>attitudes, beliefs, and values</b> of clinicians, so they consistently perform tasks the way they know they should
Evidence-based interventions	Safety culture, including teamwork

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## Why does Safety Culture Matter?

*Safety culture is related to outcomes*

- Patient outcomes
  - Patient care experience
  - Infection rates, sepsis
  - Post op hemorrhage
  - Respiratory failure or puncture / laceration
  - Treatment errors
- Clinician outcomes
  - Incident reporting
  - Burnout and turnover

Huang et al., 2010; Mardon et al., 2010; MacDavitt et al., 2007; Singer et al., 2009; Sorra et al., 2012; Weaver et al., 2011.

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## Why does Safety Culture Matter?

- Safety culture influences the effectiveness of other safety and quality interventions
  - Can enhance or inhibit effects of other interventions
- Safety culture can change through intervention
  - Best evidence so far for culture interventions that use multiple components (ie: CUSP)

Haynes et al., 2011; Morello et al., 2012; Van Nord et al., 2010; Weaver et al., 2011.

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## **COMPREHENSIVE UNIT-BASED SAFETY PROGRAM (CUSP)**

A practical approach to tap into the wisdom of frontline staff and improve teamwork and safety culture

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### **CUSP Pre-work**

- Start in one unit and then spread
- Imperative for frontline staff to be involved
- Build strong partnerships:
  - Infection prevention staff
  - Hospital quality and safety leaders
  - Nurse educators
  - Physician leaders

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## **CUSP Objectives**

### **Comprehensive Unit-based Safety Program**

1. Educate staff on science of safety
2. Identify defects
3. Partner with a senior executive
4. Learn from defects
5. Improve teamwork and communication

Jt Comm J Qual Patient Saf 2010;36:252-60  
Resources: <http://www.ahrq.gov/cusptoolkit/>

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## **Generalizable**

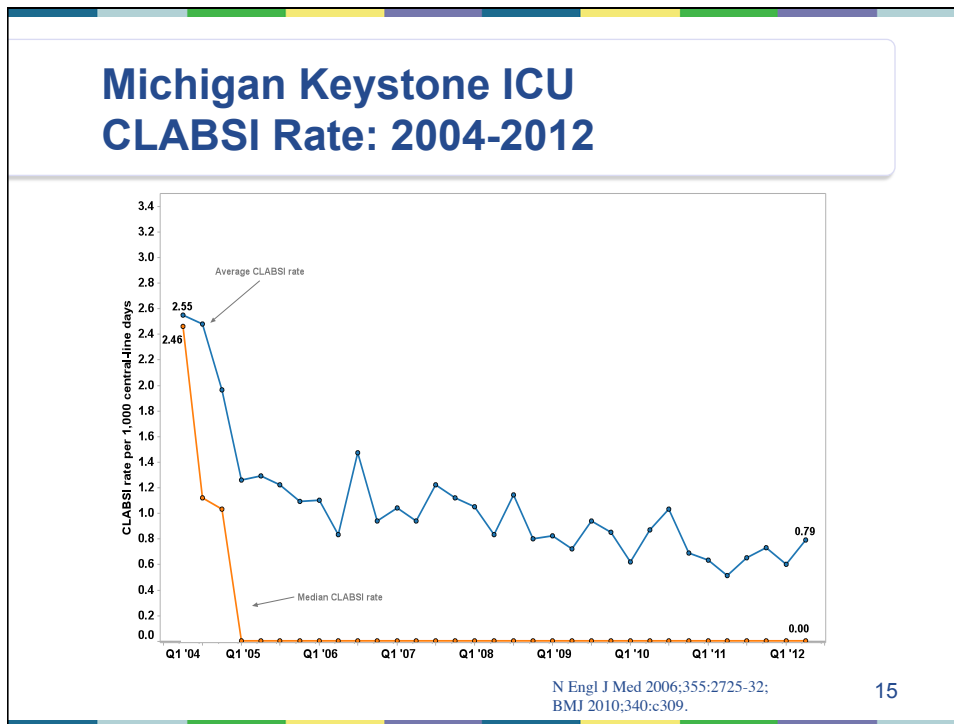
- Central line-associated blood stream infections (CLABSI)
  - N Engl J Med 2006;355:2725-32;
  - Infect Control Hosp Epid. 2014 Jan;35(1):56-62.
- Ventilator Associated Pneumonia (VAP)
  - Infect Control Hosp Epid. 2011;32(4):305-314.
- Venous Thromboembolism (VTE)
  - Arch Surg. 2012;147(10):901-907.

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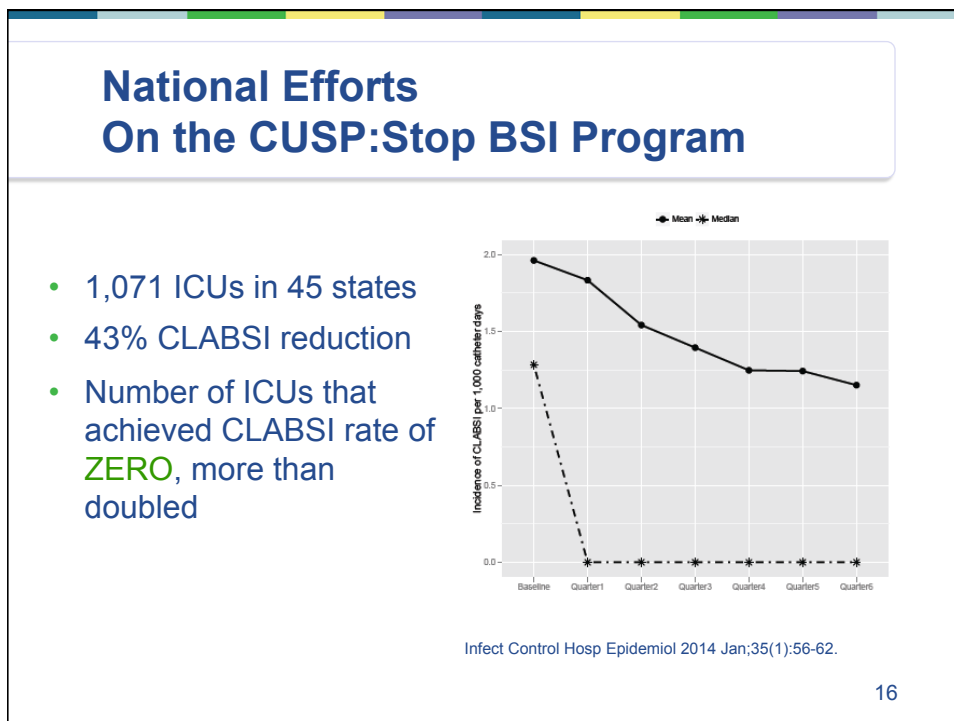
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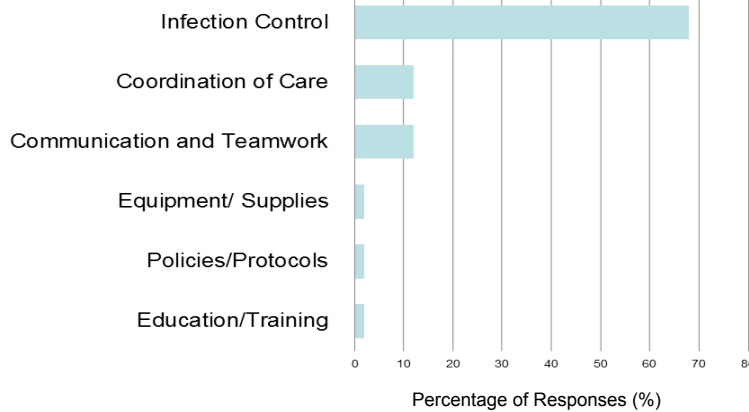
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**How will the next patient develop a SSI?**

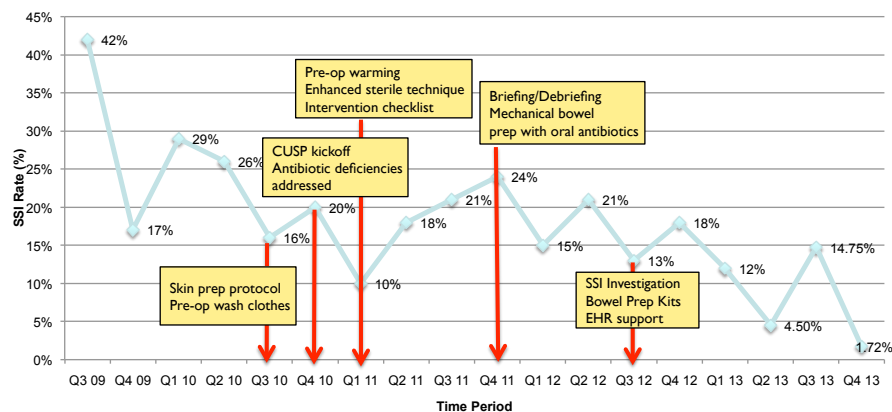
95 Responses from 36 Staff Members



Wick, et al. J Am Coll Surg. 2012;215(2):193-200.

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**Improvement Model Works In The OR**  
*Colorectal NSQIP SSI Rate at Hopkins*



Wick, et al. J Am Coll Surg. 2012;215(2):193-200.

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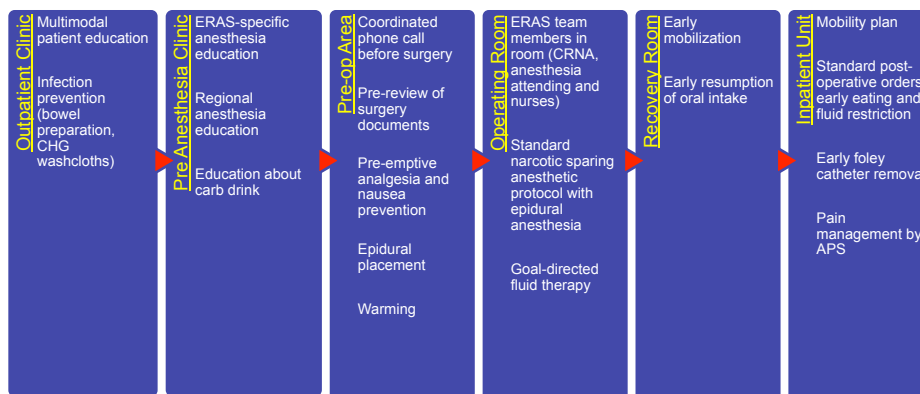
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**Care of colorectal surgery patients is highly variable...**

- Pre-operative education
- Anesthetic plan
- Pain management
- Fluid resuscitation
- Resumption of oral intake
- Mobility efforts

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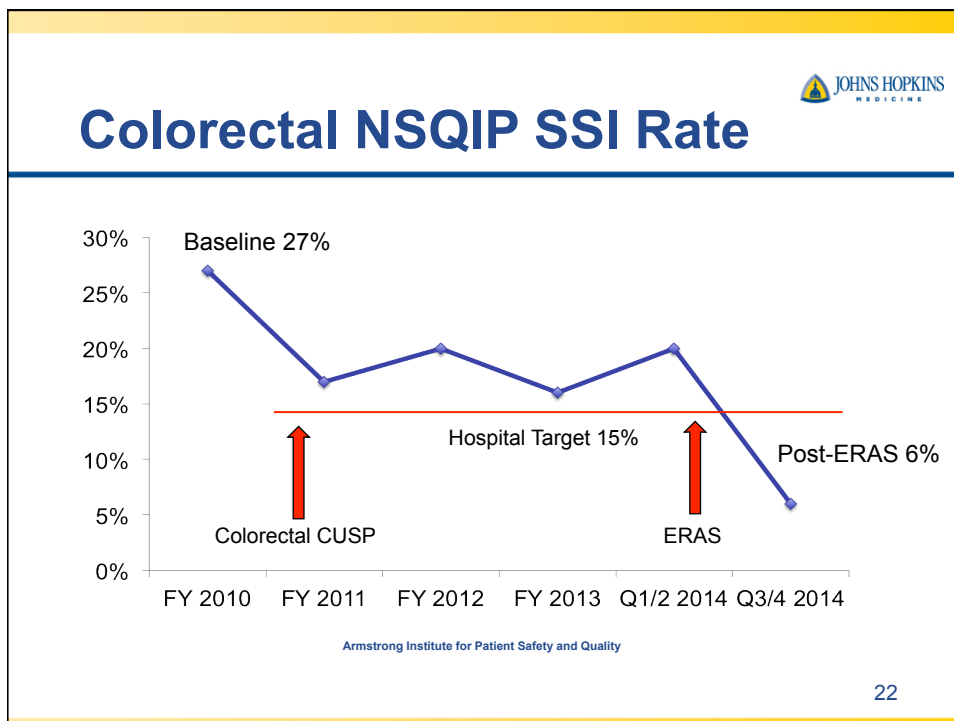
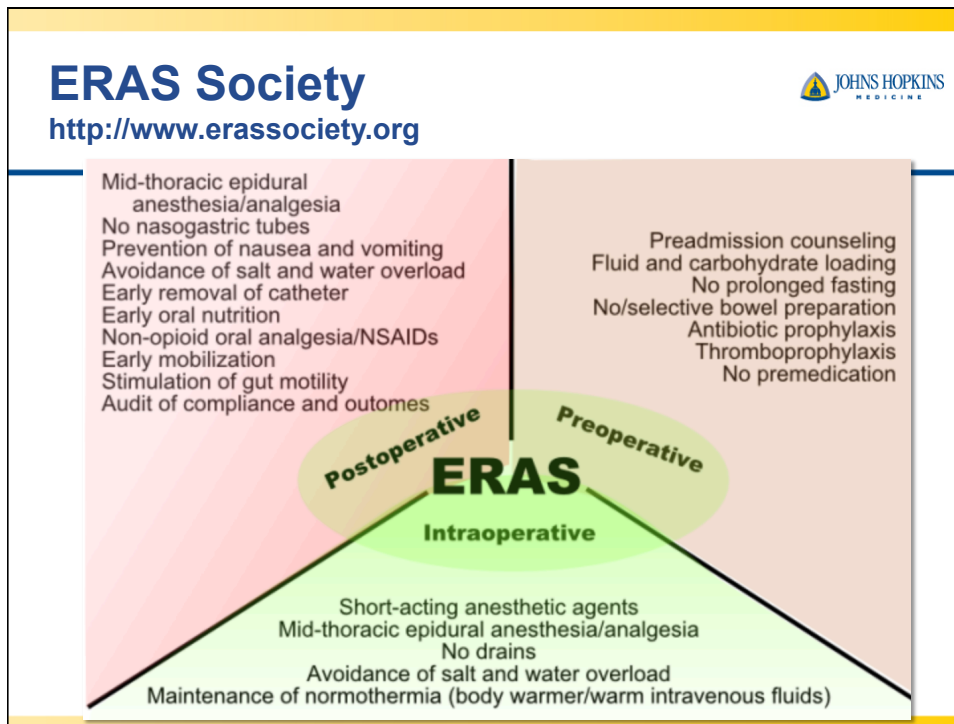
**Enhanced Recovery After Surgery (ERAS)**  
**Colorectal Surgery at Johns Hopkins**



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**Reduction in LOS and Cost Savings**  
**Colorectal Surgery at Johns Hopkins**




	Baseline	ERAS	Difference <small>*P &lt;0.05</small>
No. Patients	310	330	--
Mean Length of Stay	7.2 days	5.3 days	1.9 days (26.4%)*
Variable Direct Cost	\$10,933	\$9,036	\$1,897 (17.3%)*

J Am Coll Surg 2015;221:669-77

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**Reduction in complications and improvements in patient satisfaction**



	Baseline	ERAS	Difference <small>*P &lt;0.05</small>
UTI Rate	4.1%	1.6%	- 2.5%
VTE Rate	3.5%	1.6%	- 1.9%
Patient Satisfaction (HCAPS)	39%	97%	+ 58%*

J Am Coll Surg 2015;221:669-77

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## **CUSP FOR SAFE SURGERY: SURGICAL UNIT-BASED SAFETY PROGRAM (SUSP)**

An AHRQ funded national project to achieve significant reductions in surgical site infections and improvements in safety culture.

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### **SUSP Project Overview**

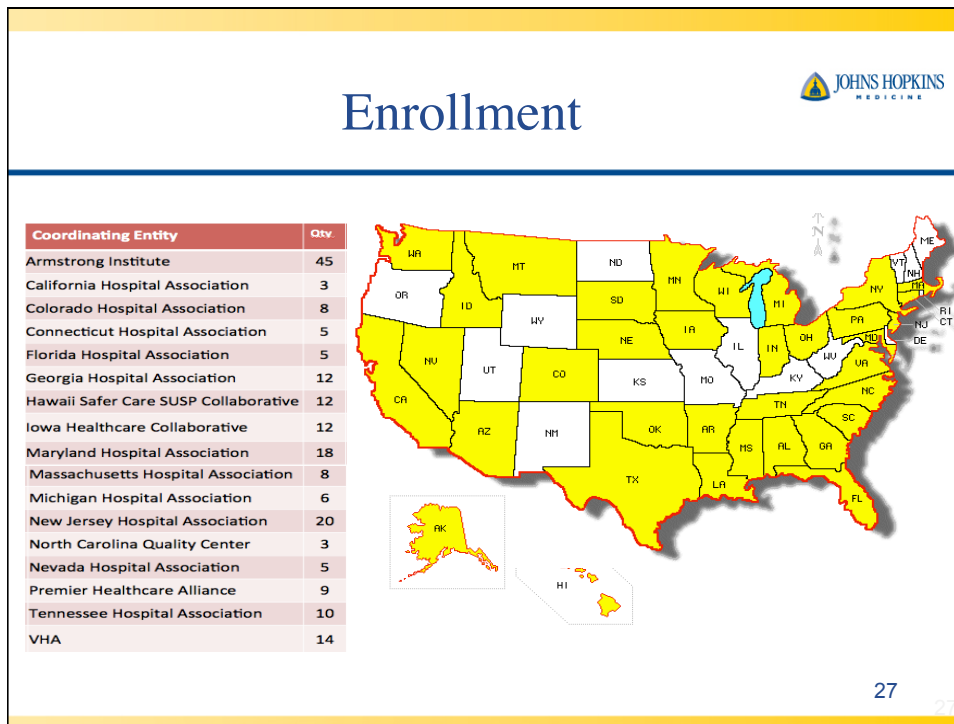
- AHRQ funding project
  - 5 year project, ended August 2015
  - Individual hospitals participated for 2 years
- Leveraging leaders in field
  - Armstrong Institute for Patient Safety and Quality, ACS NSQIP, AHRQ, University of Pennsylvania, WHO
- Adapts successful CUSP/TRIP model for surgery

Armstrong Institute for Patient Safety and Quality

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## SUSP Is Tailored To Your Local Environment

- No single SSI prevention bundle
  - Frontline staff identifies local defects
  - Develop a SSI prevention bundle to address local defects
- Measure local safety culture using Hospital Survey of Patient Safety (HSOPS)
  - Implement CUSP to tap into wisdom of frontline staff and improve culture

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**Eliminate Surgical Site Infections**

- 1 Tap into the wisdom of frontline staff.**  
Engage frontline nurses and clinicians with the two-question survey. How will the next patient get an SSI? How can we prevent that SSI?
- 2 Shift SSI rate ownership to unit leaders.**  
Transfer accountability to improve SSI rates from infection prevention (IP) to unit physician and nurse leaders.
- 3 Collaborate with your infection preventionist.**  
Teach up (IP) with unit-level providers to learn, monitor, investigate, and reduce infections.
- 4 Partner with a senior executive.**  
Meet with a senior executive monthly. This partnership will help your team align improvement efforts with organizational priorities, navigate challenges to changing organizational practice, and foster accountability. Senior leadership must commit to eliminating surgical site infections.
- 5 Audit SSI prevention practices.**  
Review and audit SSI prevention practices to identify local opportunities for improvement.
- 6 Investigate all SSIs as defects.**  
Identify local opportunities to learn from defects. Then develop a plan to improve system of care delivery and prevent future infections.
- 7 Build a local bundle.**  
No single SSI prevention bundle can eliminate SSIs. Identify the defects in your surgical area using steps 1, 5, and 6 to build a local bundle. Your bundle will address the defects that contribute to your SSI. Bundles can change over time.
- 8 Standardize SSI prevention measures.**  
Standardizing care is a fundamental principle for reducing preventable harm, including preventing SSIs. Only evidence-based practices or theory should drive procedure variation between patients or clinical units. Evidence-based deviations are mindful and appropriate, rather than stemming from outdated tradition and power hierarchies.
- 9 Display current SSI rates and trends.**  
All surgical staff should know the current rates and trends, so display prominently. Discuss local rates with your entire clinical unit to foster ownership and provide continuous feedback. Set your goal at ZERO surgical site infections.
- 10 Train new staff in SSI prevention.**  
Incorporate SSI prevention training into nurse, resident, and physician orientation programs.

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**Back to Basics**

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**Lessons Learned**

- Informed by science
  - Technical and adaptive teamwork
  - Focus on systems; Not individuals
- Led by clinicians and supported by management
  - Tap into the wisdom of frontline staff
  - Interdisciplinary Clinical Community
- Culture trumps strategy; can be improved
  - CUSP is a practical and effective strategy

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**March 16, 2016**

**THE GLOBAL MYCOBACTERIUM CHIMAERA  
OUTBREAK IN CARDIAC SURGERY**



**Dr. Hugo Sax**  
University of Zurich Hospitals

**Objectives:**

- How this patient safety threat was discovered in Zurich, Switzerland, and what is known so far
- The story of the global outbreak response
- How infected patients are diagnosed and treated
- How the risk can be contained in the OR

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