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# Preventing perioperative adverse events: 2016 Review

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# Disclosures

- None

# Preventing Perioperative Adverse Events(P.P.A.E)



# P.P.A.E

## Outline:

1. Overview of reducing Surgical “Never Events”
2. Anesthesiology Closed Claims
3. Checklists
4. Infections
5. Systems engineering for reducing readmission
6. Systems Engineering for Outpt. Surgery
7. Questions

# Overview

- 2015 DSHS Texas data(final raw numbers):  
122 retained foreign objects

66 wrong site surgeries

30 wrong surgery

7 Surgeries performed on wrong patient

2 Deaths in ASA Class I patients

# Overview

- Berger et al. *JAMA Surgery* 2015:  
Wrong-site surgery median 1/100,000

Retained surgical items 1/10,000

Surgical Fires Unknown

# Overview

- Risk factors for wrong site operations:
  1. Several surgeons involved in same operation
  2. Multiple procedures for one operation
  3. Time pressure
  4. Emergency
  5. Abnormal patient anatomy
  6. Morbid obesity



# Overview

- American Academy of Orthopedic Surgery task force: **Most common wrong site**
  - Arthroscopy( knee, foot, ankle)
  - Hip fracture
  - Slipped capital femoral epiphysis
- Survey of hand surgeons:
  - 21% admitted to operating on wrong site at least once

Source: Michaels et al. *Achieving the National Quality Forum's "Never Events" Prevention of wrong site, wrong procedure, and Wrong patient operations*. Ann Surg 2007; 245: 526-532.

# Overview

- Universal Protocol\*:
  - Released in 2004
  - JCAHO public protocol
  - Tripartite:
    1. Conduct a pre-procedure verification
    2. Mark the procedure site
    3. Perform a time-out

\*[www.jointcommission.org/standards\\_information/up.aspx](http://www.jointcommission.org/standards_information/up.aspx)

# Overview

## Interventions to Reduce Wrong-site Surgery:

- 5 Studies support Universal Protocol
- 4 studies support education approach
- 4 studies support team training

Source: Berger et al. *Challenges in Reducing Surgical “Never Events”* JAMA Surg, 2015; 150(8): 796-805

# Overview

## Interventions to prevent Retained Surgical Items:

- 5 studies address data-matrix-coded sponge-counting systems

## Interventions to Prevent Surgical Fires

- Insufficient

Source: Berger et al. *Challenges in Reducing Surgical “Never Events”* JAMA Surg; 2015; 150(8): 796-805

# Overview

“NEVER!” events → 100% preventable?

Clearly preventable by communication  
( though not all events)

**No proven strategy to improve  
communication yet**

Source: Berger et al. *Challenges in Reducing Surgical “Never Events”* JAMA Surg, 2015;  
150(8): 796-805

# Overview

- Targets for Intervention:
  1. Develop Systematic National Data Collection
  2. Increase communication/standardization/ Situational Awareness
  3. Implement systems to reduce human error

Source: Berger et al. *Challenges in Reducing Surgical "Never Events"* JAMA Surg. 2015; 150(8): 796-805

# Overview

- “Culture of blame” still leads to underreporting of these events
- Example of success: Pennsylvania Safety Authority-PA-PSRS
  - secure, anonymous and confidential reporting
  - Analysis of data for trends
  - Recommends changes in healthcare practice throughout the state
  - Provides a baseline from which to improve

Source: Berger et al. *Challenges in Reducing Surgical “Never Events”*  
JAMA Surg. 2015; 150(8): 796-805



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# Overview

- Communication Improvement:  
Study in 2012:  
4 types of failures
  - Audience( Key ppl excluded)
  - Content( Insufficient Info)
  - Occasion( futile discussion  
due to timing)
  - Purpose( failure to resolve a  
discussed issue)

Source: Hu et al. *Deconstructing Intraoperative Communication Failures*. J Surg Res 2012; 177(1): 37-42

# Overview

- Communication optimization:
  1. Better timing i.e During incision time  
( Anes, Surg, RN usually present and focused)
  2. Reduce frivolous tasks/distractions/variations
  3. Counterintuitively, reducing “individualism” in OR might automate things and reduce errors

Source: Berger et al. *Challenges in Reducing Surgical “Never Events”* JAMA Surg, 2015; 150(8): 796-805

# Overview

## Joint Commission on Accreditation of Healthcare Organizations (JCAHO) Recommendations

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The operative site is marked

A "time-out" briefing is conducted in the operating room (OR) prior to starting the procedure

Active identification of the patient is implicit in the protocol during the preoperative verification process and time-out procedure

Source: Michaels et al. *Achieving the National Quality Forum's "Never Events" Prevention of wrong site, wrong procedure, and Wrong patient operations*. Ann Surg 2007; 245: 526-532

# Overview

## Veterans Health Administration (VHA) Recommendations

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The operative site is marked

A “time-out” briefing is conducted in the operating room (OR) prior to starting the procedure

The patient is actively identified using required techniques, specifically directing the operative team to compare the consent form and patient identification band, as well as asking the patient to verbally state their name, social security number, and the specific location on their body where the procedure will take place

The consent form is “administered and executed properly,” which empowers the staff to halt the procedure if the following elements are not included in the consent form: patient signature, title of the procedure (including site/laterality), and brief descriptions of the procedure and rationale for the procedure. Two members of the OR team review pertinent radiologic images prior to commencing the surgical procedure (where applicable)

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Source: Michaels et al. *Achieving the National Quality Forum’s “Never Events” Prevention of wrong site, wrong procedure, and Wrong patient operations*. *Ann Surg* 2007; 245: 526-532

# Overview

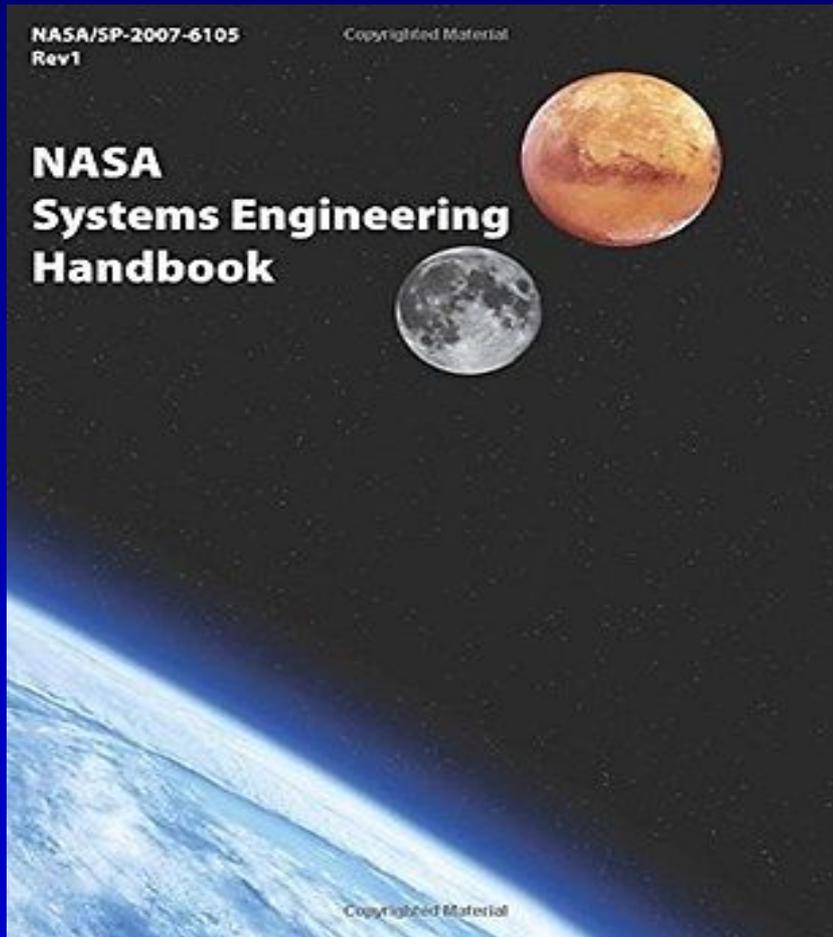
- Long-term solutions:

**Systems engineering is a methodical, disciplined approach for the design, realization, technical management, operations, and retirement of a system.**

**A “system” is a construct or collection of different elements that together produce results not obtainable by the elements alone.**

Source: NASA Systems Engineering Handbook 2007 NASA/SP-2007-6105

# Overview



[ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20080008301.pdf](https://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20080008301.pdf)

# Overview

Systems engineering logic:

Reduce error by redesigning the system

Standardisation is good, but there has to be resilience and adaptability to recover from unsafe and new situations

Source: Berger et al. *Challenges in Reducing Surgical “Never Events”* JAMA Surg. 2015; 150(8): 796-805

# Overview

- Johns Hopkins Perioperative Instruction sheet:

**I. Introduction of names and roles**

**II. Review critical information**

- Do we have the correct patient?
- Is the correct side or site marked?
- Has the procedure been agreed upon?
- Have antibiotics been given?

**III. Surface and Mitigate Hazards**

Source: Michaels et al. *Achieving the National Quality Forum's "Never Events" Prevention of wrong site, wrong procedure, and Wrong patient operations.* Ann Surg 2007; 245: 526-532

# Overview

- Johns Hopkins Instruction Sheet(continued):

**SURGERY** -- Discuss plans for the surgical procedure:

- ⇒ Describe critical steps
- ⇒ Provide team with pertinent information, including problems that may be encountered
- ⇒ Ask team: If something were to go wrong with this procedure, what would it be, and how could we prevent the problem?
- ⇒ Risks during procedure such as bleeding, fluid loss
- ⇒ Surgeon suggests "If anyone has a concern during the case, please let me know."

Source: Michaels, et al. *Achieving the National Quality Forum's "Never Events" Prevention of wrong site, wrong procedure, and Wrong patient operations.* Ann Surg 2007; 245: 526-532

# Overview

- Johns Hopkins Instruction sheet (continued):

**ANESTHESIOLOGY** – Discuss all relevant issues:

- ☐ Patient comorbid disease that will increase risk
- ☐ Aspects of surgery that increase risk, such as need for IV access
- ☐ Availability of blood products
- ☐ Interventions to prevent complication such as myocardial infarction, surgical site infection

Source: Michaels et al. *Achieving the National Quality Forum's "Never Events" Prevention of wrong site, wrong procedure, and Wrong patient operations*. *Ann Surg* 2007; 245: 526-532

# Overview

- Johns Hopkins Instruction Sheet(continued)

**NURSING** – Discuss all relevant issues:

- ☐ Are all necessary instruments available?
- ☐ Will any special equipment be considered?
- ☐ Plan for breaks (Relieving nurse to introduce themselves when switching)

Source: Michaels, et al. *Achieving the National Quality Forum's "Never Events" Prevention of wrong site, wrong procedure, and Wrong patient operations.* Ann Surg 2007; 245: 526-532

# Overview

- **Compliance Monitoring( key step):**

Are there significant barriers to doing a good OR briefing?  
Y/N/Other:

Are OR briefings important for patient safety?  
Y/N/Other:

Did an OR briefing occur in your last case?  
Y/N/Other:

Were all team members introduced (eg, names and roles)?  
Y/N/Other:

Was there discussion of potential patient care issues prior to skin incision?  
Y/N/Other:

Was there a general operative plan shared with everyone prior to skin incision?  
Y/N/Other:

Was a white board used to identify names and roles of present team members?  
Y/N/Other:

Is the surgical time-out important from your perspective?  
Y/N/Other:

Source: Michaels et al. *Achieving the National Quality Forum's "Never Events" Prevention of wrong site, wrong procedure, and Wrong patient operations*. Ann Surg 2007; 245: 526-532

# Anesthesiology Closed Claims

- Death in ASA 1-2 patients:

Year 2000 and onward:

147 deaths in ASA 1-2  
patients 2/2 intraoperative  
events

Descending order:

Respiratory, CV,  
Medication, Regional  
block, surgery specific,  
Equipment,  
Miscellaneous \*

\* Source: ASA Closed Claims Project Query 2016 (all information confidential)



# Anesthesiology Closed Claims

- Examples of unsafe practices:
  - #1. Pt. received MAC Anesthesia w/o ETCO<sub>2</sub>, stethoscope for face lift
  - Anoxic brain injury after CPR
  - Team sued for inadequate preoperative diagnosis of OSA

\*

*Source: ASA Closed Claims Project Query 2016 (all information confidential)*

# Anesthesiology Closed Claims

- Examples of unsafe practices:
  - #2 Failure to adhere to difficult airway algorithm( multiple attempts to intubate without use of LMA/Laryngospasm on emergence- use of Rocuronium instead of succinylcholine( quicker onset of action)

\* Source: ASA Closed Claims Project Query 2016( all information confidential)

# Anesthesiology Closed Claims

- Examples of unsafe practices:
  - #3 Severe intraop PE in RRP procedure. No Heparin given or SCD use. Though NOT a definite cause-effect.

\* Source: ASA Closed Claims Project Query 2016( all information confidential)

# Anesthesiology Closed Claims

- Examples of unsafe practices:
  - #4 Anesthesiologist unfamiliar with plastic surgery office gives propofol and rocuronium for breast reduction Pt. Develops severe bronchospasm, ventilation lost
  - Pt. received CPR, EMS called to transport pt. To local hospital.
  - Unclear link to office setting safety

# Anesthesiology Closed Claims

- Themes:

Human Error

Still medication and equipment issues leading to death, though rare

What system changes help reduce human error?

# Checklists

- Gawande, “The Checklist manifesto”(2011)
  - Brought checklists into focus
  - Had tons of evidence to support checklist use
  - Led to the universal checklist( WHO)



# Checklists

- Journal of American College of Surgery 2016- Checklist improved “perception” of safety via survey data\*
- 13 hospitals in SC(1744 surveys)
- Only 54.1% said checklist was used effectively
- 73.6% said checklists prevented problems

\*Molina et al. *Implementation of the Surgical Safety Checklist in South Carolina Hospitals is Associated with Improvement in Perceived Perioperative Safety*: J Am Coll Surg 1-12-2016



# Checklists

- What are the barriers?
  - No modification for local needs
  - Ineffective leadership who don't cultivate buy-in
  - passive resistance
  - duplication of existing measures
- How do you measure success?
  - “I would feel safe being treated here as a patient” – 41.7% pre vs. 49% post

*\*Molina et al. Implementation of the Surgical Safety Checklist in South Carolina Hospitals is Associated with Improvement in Perceived Perioperative Safety: J Am Coll Surg 1-12 2016*

# Checklists

- Measuring success:
  - Team discussions are common (+15%)
  - Physicians are open to suggestions(+9%)
  - Potential errors or mistakes are pointed out without raised voices or condescending remarks(+7%)

*\*Molina et al. Implementation of the Surgical Safety Checklist in South Carolina Hospitals is Associated with Improvement in Perceived Perioperative Safety: J Am Coll Surg 1-12-2016*

# Checklists

- Survey data showed doctors and PAs/NPs had the biggest perception of improvement
- Nurses/ technicians did not see a higher perceived improvement except in communication
- Improvement in average overall teamwork was 5.4% (  $p < 0.001$  )
- Discrepancy between surgeons/anesthesiologists /nurses- “The Entire Surgical team stops at 3 points”

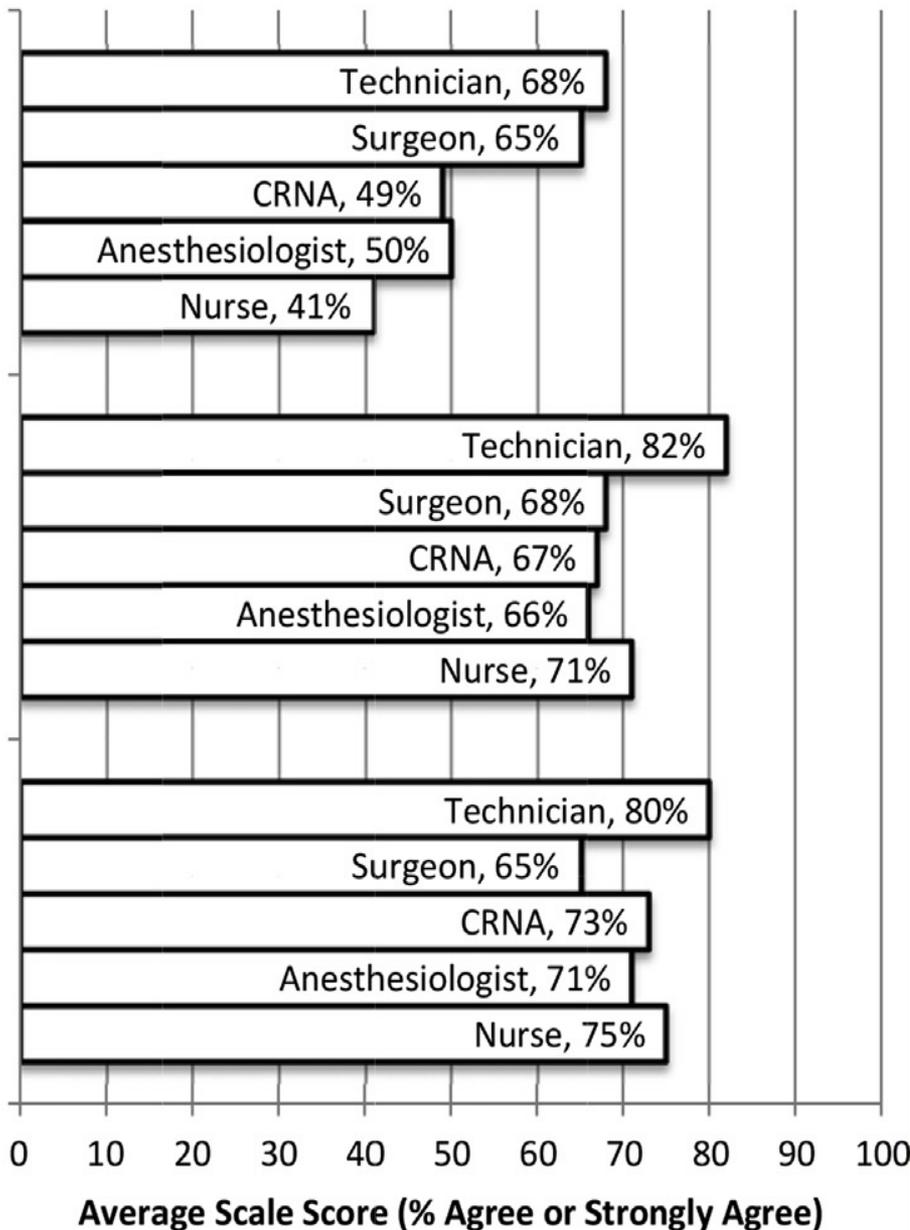
\*Molina et al. *Implementation of the Surgical Safety Checklist in South Carolina Hospitals is Associated with Improvement in Perceived Perioperative Safety*: J Am Coll Surg 1-12-2016



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### Implementation Effectiveness

The entire surgical team always stops at all 3 critical points during the procedure to read the checklist (before induction of anesthesia, before skin incision, and before the patient leaves the room)



### Impact of Checklist Use

In the ORs where I work, using the checklist helps my cases run more smoothly

### Impact of Checklist Use

In the ORs where I work, problems or complications have been averted by the checklist

# Checklists

- O'Leary et al. March 2016\*:  
retrospective cohort study  
14458 pre and 14314 post checklist  
procedures in kids(28 days -18 yo)  
4.08% complications pre and 4.12%  
post checklist  
Statewide checklist use was  
government mandated

\* O'Leary et. Al. *Effect of surgical safety checklists on pediatric surgical complications in Ontario.* CMAJ 1-8; 3/14/16

# Checklists

- Records were extracted from large public databases ( possible in a uniform healthcare system)
- Children >8 yo were participants in the preoperative portion of the safety check.
- Cardiac and Transplant surgery were excluded(traditionally the highest-risk surgeries in kids)
- All-cause mortality was primary endpoint

\* O'Leary et. Al. *Effect of surgical safety checklists on pediatric surgical complications in Ontario.* CMAJ 1-8; 3/14/16

# Checklists

- Length of stay, bringbacks and ER visits within 30 days were also measured
- Small difference in length of stay
- No difference in ER visits
- No difference in bringbacks.

\* O'Leary et. Al. *Effect of surgical safety checklists on pediatric surgical complications in Ontario.* CMAJ 1-8; 3/14/16

# Checklists

- Limitations:
  - No measurement of the quality of checklist utilization
  - Low-risk for mortality population
  - A lot of research focuses on major adverse events which are a low incidence in ambulatory surgery

\* O'Leary et. Al. *Effect of surgical safety checklists on pediatric surgical complications in Ontario.* CMAJ 1-8; 3/14/16

# Checklists

- Conclusions:

- Good data DOES exist:

- Haugen et al. *Ann Surg* 2015;  
261:821-8

- Norwegian adults undergoing surgery, found 8.4% reduction in complications and 0.6% reduction in mortality after WHO checklist implementation

- RCT design and Developed country

# Checklists

- Conclusions(continued):

Ceiling effect exists:

Checklists cannot reduce the rate of complications in a population with an already low incidence of complications

Prospective studies are subject to a Hawthorne effect

\* O'Leary et. Al. *Effect of surgical safety checklists on pediatric surgical complications in Ontario.* CMAJ 1-8; 3/14/16

# Checklists

Conclusions ( continued) :

- Compliance remains a concern:

Tends to decrease over time(PLOS One 2/29/16)

Most providers when asked state they would want it used if they were a pt.

Random audits

Perception  $\neq$  reality

# Infections

- Wick et al. 2012 describe a program to reduce infections in colorectal surgery:

Mean Surgical site infection (SSI) went from 27.3% to 18.2% (33.3% decrease)

SSIs and readmission are used as metric in surgical care by CMS and others.

Wick et al. *Implementation of a Surgical Comprehensive Unit-Based Safety program to reduce surgical site infections*. J Am Coll Surg. 2012; 215:193-200

# Infections

- Hospitals with near perfect compliance with Surgical Care Improvement Project(SCIP) still have higher than expected SSI rates.
- Comprehensive Unit-based Safety (CUSP) Program shows good results in Michigan and Rhode Island
- Authors attempts to design program for colorectal surgery

Wick et al. *Implementation of a Surgical Comprehensive Unit-Based Safety program to reduce surgical site infections*. J Am Coll Surg. 2012; 215:193-200

# Infections

- CUSP Team created: Surgery, anesthesia, nursing, hospital infection control- combined talents
- Leadership team included surgery. Nursing, and anesthesia “provider champions” ; team coach; hospital executive committed to reducing barriers
- Monthly meetings to address safety concerns

Wick et al. *Implementation of a Surgical Comprehensive Unit-Based Safety program to reduce surgical site infections.* J Am Coll Surg, 2012; 215:193-200

# Infections

- CUSP team attended lecture on science of safety
- Safe design principles taught=  
Standardize work, Develop checks, learn from mistakes
- Team was surveyed for SSI prevention concerns/strategies
  - ➔ Three main concerns: Skin preparation, normothermia and sterile technique

Wick et al. *Implementation of a Surgical Comprehensive Unit-Based Safety program to reduce surgical site infections*. J Am Coll Surg 2012; 215:193-200.

# Infections

**Table 1.** Comprehensive Unit-Based Safety Program for Surgery Applied to Surgical Site Infection Prevention

<b>Component</b>	<b>Method</b>
1. Science of safety education	Introductory talk to explain the approach to addressing safety at a local level
2. Staff safety assessment	Two question survey to team members asking: How will and SSI develop in the next patient? What can we do to prevent an SSI?
3. Senior executive partnership	Senior executive attends CUSP meetings, making resources available to address safety concerns and assist with system-wide barriers
4. Learning from defects	Teams are trained to use a structured tool to learn from defects
5. Implement teamwork and communication tools	Review unit-level safety data (eg, SSI) monthly and develop local quality improvement initiatives to improve teamwork, communication and address identified hazards

# Infections

**Table 2.** Local Staff Safety Concerns and Areas for Improvement: Results of the 2-Question Survey Administered to Frontline Staff to Identify

<b>Safety issue identified (% response)</b>	<b>Opportunities to improve</b>
Infection control (68)	Skin preparation; hypothermia; contamination of bowel contents into the wound, antibiotic timing, selection and re-dosing; length of case
Coordination of care (12)	Increase use of preoperative evaluation center, improve surgical posting accuracy (case name and duration), computer assistance for antibiotic selection and re-dosing
Communication and teamwork (12)	Improve communication throughout perioperative period, empower team members to speak up, improve compliance with briefings/debriefings, implement teamwork tools



# Infections

Equipment/supplies (2)	Accurate temperature probes, point of care glucose monitoring, under body warmers, and sanitizing wipes near anesthesia machine
Policies/protocols (2)	Standardize care/protocols/policies, <sup>5</sup> monitor sterile technique policies
Education/training (2)	Ongoing education (with supportive data), development of an SSI prevention checklist

# Infections

- CUSP focused on 6 interventions:
  1. Standardization of Skin Preparation
  2. Administration of preoperative chlorhexidine showers
  3. Selective elimination of bowel prep
  4. Warming of patients in preanesthesia area
  5. Adoption of sterile techniques for bowel and skin
  6. Addressing lapses in prophylactic abx.

Wick et al. *Implementation of a Surgical Comprehensive Unit-Based Safety program to reduce surgical site infections*. J Am Coll Surg 2012; 215:193-200

# Infections

## Standardized Skin Preparations:

- OR Nurses drove effort

All pts. switched to chlorhexidine, even ostomy

Preoperative chlorhexidine wash cloths given to pts. to use night before surgery( from local experience) ( 95% compliance)

Wick et al. *Implementation of a Surgical Comprehensive Unit-Based Safety program to reduce surgical site infections*. J Am Coll Surg 2012; 215:193-200

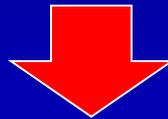
# Infections

- Elimination of bowel preparation:
  - Bowel preps have possibly increasing SSI risk
  - All pts. were switched to oral antibiotic mechanical bowel preparation
- Warming patients:
  - Pts. noted to be hypothermic preop
  - Bair huggers now placed as soon as pt. places gown on → 12% improvement in T
  - >36° at end of case

# Infections

- Sterile technique in OR:

Scrub techs noted that dirty instruments for bowel were being used for skin closure



Instruments now passed off sterile field after anastomosis is complete, cautery and suction are changed, team changes gloves prior to skin

Wick et al. *Implementation of a Surgical Comprehensive Unit-Based Safety program to reduce surgical site infections*. J Am Coll Surg 2012; 215:193-200

# Infections

- Gaps in antibiotics:
  - A. Recommended dose of gentamicin is 5mg /kg , providers were underdosing due to nephrotoxic concerns;
  - B. Gentamicin was understocked in OR supply cabinets
  - C. Education sessions given, supplies increased, dose calculator placed in anesthesia record

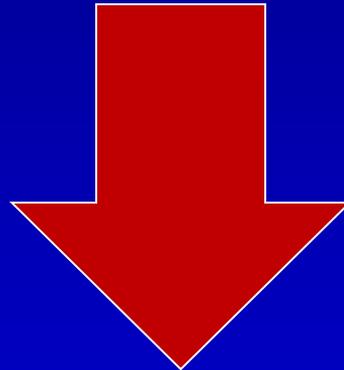
Wick et al. *Implementation of a Surgical Comprehensive Unit-Based Safety program to reduce surgical site infections*. J Am Coll Surg 2012; 215:193-200

# Infections

- Checklist was created for the entire bundle, compliance monitored by CUSP coach.
- 278 pts. in pre sample, 324 pts. in post-sample
- Improvements seen in superficial SSI (-3.6%) and deep infections (-5%)
- SCIP compliance was similar throughout study

# Infections

Multidisciplinary, best-practice based(national and local), feedback receiving efforts



Improvements and reductions in adverse events(e.g SSIs)

# Infections

- SCIP compliance is a surrogate for better teamwork in the OR, leading to better outcomes
- Culture impacts outcomes
- Top-down strategies often fail
- Existing evidence and local wisdom → leads to solutions implemented by front-line staff with leadership support

Wick et al. *Implementation of a Surgical Comprehensive Unit-Based Safety program to reduce surgical site infections*. J Am Coll Surg 2012; 215:193-200

# Infections

- Authors acknowledge that the study was not randomized so statistically it is not definitive, although still likely
- No ability to tease out the contribution of each aspect of the bundle
- SSI rate was still high, so further work needs to be done
- Still, the authors did design a good approach that got results( my opinion)

Wick et al. *Implementation of a Surgical Comprehensive Unit-Based Safety program to reduce surgical site infections*. J Am Coll Surg 2012; 215:193-200

# Infections

- Conclusions: (paraphrasing )

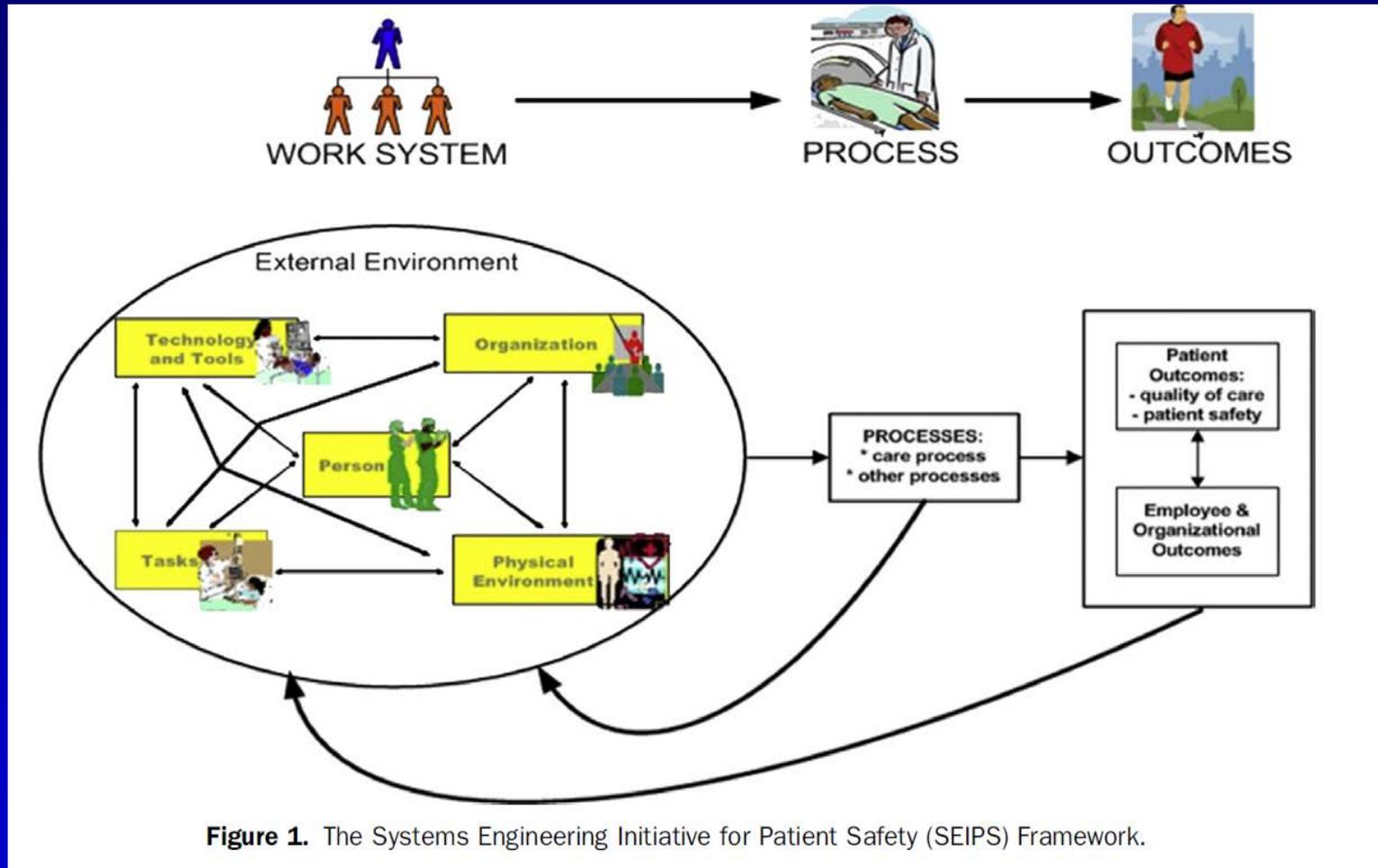
Successful event reduction efforts require accurate outcomes measurement, support of hospital leadership and engaged front-line personnel in the context of a strong safety culture

*Wick et al. Implementation of a Surgical Comprehensive Unit-Based Safety program to reduce surgical site infections. J Am Coll Surg 2012; 215:193-200*

# Readmission

- Metric tracked by CMS!
- Acher et al. 2015 apply the Systems Engineering Initiative for Patient Safety(SEIPS) to address readmission

# Readmission



**Figure 1.** The Systems Engineering Initiative for Patient Safety (SEIPS) Framework.

# Readmission

- Postoperative complications drive readmission
- Readmission may actually be a sign of higher quality care, because patients experiencing complications are seen
- Authors sought to apply systems-engineering approach to transitions of care from patient and provider perspective to analyze effect on readmission

Acher et al. *Using Human Factors and Systems Engineering to Evaluate Readmission After Complex Surgery* J Am Coll Surg 2015; 221:810-820

# Readmission

- 5 elements of work system:
  - People
  - Tasks
  - Technology and Tools
  - Organization
  - Environment
- Qualitative data collected from readmitted patients and focus group with inpatient providers
- Quantitative data obtained from medical records

Acher et al. *Using Human Factors and Systems engineering to evaluate readmission after complex surgery* J Am Coll Surg 2015; 221:810-820

# Readmission

- Pancreas, liver, colon rectum or esophagus surgeries
- Interviews conducted within 48h of readmission
- Focus group of 2 surgical residents, 2 nurses, case manager and inpatient pharmacist: Answered “Why do these readmissions happen?”

Acher et al. *Using Human Factors and Systems engineering to evaluate readmission after complex surgery* J Am Coll Surg 2015; 221:810-820

# Readmission

- Raw interviews were analyzed for themes
- Processed by Human factors engineer and health outcomes
- Themes were categorized prioritizing the patient perspective
- 69% of pts. did not believe readmission was preventable
- All described issues of a surgical complication

# Readmission

- Surgical complications leading to readmission were:
  - Abdominal Pain (50%)
  - Nausea and Vomiting (39%)
  - Diarrhea (11%)
  - Fever (17%)
  - Fatigue (17%)
  - Dehydration/AMS (6%)
  - Shortness of Breath (6%)
  - Bleeding from drain (6%)

*Acher et al. Using Human Factors and Systems engineering to evaluate readmission after complex surgery J Am Coll Surg 2015; 221:810-820*

# Readmission

- One-third of the patients lived alone and only half had arrangements for a caregiver after surgery

Acher et al. *Using Human Factors and Systems engineering to evaluate readmission after complex surgery* J Am Coll Surg 2015; 221:810-820

# Readmission

- Pt and caregiver expectations, pt education and preparation for discharge, educational materials, care team structure, health record design and inadequate insurance, all fit into the five elements of SEIPS model
- For example: Pt health literacy and postop cognitive status , impaired sensorium ( i.e pain meds); reported by interviews
- Pts reported hurried or incomplete discharge education and instructions(information overload)

# Readmission

- Educational paperwork contained very little useful information, difficult to navigate
- Poor team member level communication- i.e discussing test results before finalized, team members contradicting each other, variability in nursing practice
- Last minute planning by care team contributed to patients' feeling unprepared
- Late day discharges are affected by lack of personnel after hours

# Readmission

- Local hospitals perceived as inadequate, leading to readmission at the large academic center where surgery performed
- EHR information noted to be general and not patient centered or specific
- No home health benefits and insufficient insurance also a factor

# Readmission

- Examples:

Theme addressed	Proposed interventions
Patient and caregiver expectations and understanding Discharge preparation	<ol style="list-style-type: none"><li>1. Initiate multiple discharge planning conversations 2 to 3 days before discharge with a specific focus from each team:<ul style="list-style-type: none"><li>Pharmacy: medication reconciliation</li><li>Social work: home health needs or need for skilled nursing facility</li><li>Physicians: expectation for normal recovery and when to seek medical attention</li></ul></li><li>Nurses: discharge process and teaching</li><li>2. Include caregivers in all pre-discharge conversations<ul style="list-style-type: none"><li>Repeat meetings with care teams, patient, and caregiver during the pre-discharge process</li></ul></li><li>3. Provide patient with a specific time and date of discharge, pre-arranged follow-up appointments, and a specific point of contact for future questions or issues.</li></ol>
Home health service and equipment	<ol style="list-style-type: none"><li>1. Establish enhanced availability of low cost hotel near academic medical center for patients who may need more frequent postoperative care but do not qualify for inpatient status.</li><li>2. Provide hospital-based home health services for those who do not qualify or are uninsured.</li></ol>

# Readmission

- Understanding pt's educational preferences ( audio/video/written)
- Discussion does not imply comprehension.
- Only 1/3 of patients truly understand enough to make informed decision about their care, and forget relevant information
- Postoperative cognitive dysfunction
- Post-hospital syndrome( stress, sleep deprivation, pain, deconditioning)

# Readmissions

- Authors admit patients might not be fully aware of everything that contributed to readmission
- Caregivers were not interviewed
- Using protocol-based transitional care nurses to enhance post-discharge care(one example)

Acher et al. *Using Human Factors and Systems engineering to evaluate readmission after complex surgery* J Am Coll Surg 2015; 221:810-820

# Outpatient Surgery

- SEIPS study 2005:

Pt. safety issues in outpt. surgery-

1. Ensure providers are fully informed of pt. clinical status
2. Surgery is appropriate
3. Adequate pre-op preparation
4. Pts. well-educated for postop self-care.

Source: Carayon et al. *Implementing a systems engineering intervention for improving safety in outpatient surgeries in advances in patient safety*. From AHRQ PMID 21249998

# Outpatient Surgery

## Interventions:

1. Institutional policy that all pt. info provided by noon of day before surgery
2. Updating center policy and procedure manuals then distributing to referring physician offices
3. Integrating EMR into surgery center
4. Creating Anesthesia preop clinic record

Source: Carayon et al. *Implementing a systems engineering intervention for improving safety in outpatient surgeries in advances in patient safety*. From AHRQ PMID 21249998

# Outpatient Surgery

- Data collection:

- Initial staff questionnaire

- Patient shadowing to evaluate patient care process

- Physical layout, quality and safety data

- Participatory design

- Post-intervention impact assessment

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- Survey content( and primary answer):
  1. What do you think are main quality of care and patient safety issues in your outpatient surgery center?- (pt. communication)
  2. Please list instances where your performance was challenged or below par due to problems in the outpatient surgery center “system” (work space)
  3. Please think of instances in the past year when you were able to perform your job very well (work space)

Source: Carayon et al. *Implementing a systems engineering intervention for improving safety in outpatient surgeries in advances in patient safety*. From AHRQ PMID 21249998

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- Examples of patient shadow:
  - “Space is small and MD and RN need same spaces on occasions”
  - “ Anesthesiologist does not have a designated space for medication preparation”
  - “Information not transferred and missing on preop consent from surgeons office. Anesthesia picks this up.”

Source: Carayon et al. *Implementing a systems engineering intervention for improving safety in outpatient surgeries in advances in patient safety*. From AHRQ PMID 21249998



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- Madison Patient Safety Collaborative:
  - Through research and bringing leaders of different outpatient surgery centers, a sustainable model for patient safety collaboration was created
  - Surgery centers requesting continued interaction with the Systems Engineering research
  - Collaboration made the impetus to change stronger

Source: Carayon et al. *Implementing a systems engineering intervention for improving safety in outpatient surgeries in advances in patient safety*. From AHRQ PMID 21249998

# SEIPS

- If you need more information about the SEIPS model here is URL:
- [Cqpi.wisc.edu/seips-main.htm](http://Cqpi.wisc.edu/seips-main.htm)

# Limitations

- Have not given a concrete solution
- Each institution is a bit different and barriers of implementation will be heterogeneous
- Patient safety “research” can never truly be top-quality evidence ( Prospective Randomized double blind with controls)
- Vast amounts of data : how do you find concrete answers to clinical issues?

# Conclusions

- Many different approaches exist to solving clinical problems
- Systems Engineering
- Local Review
- National Guidelines
- **Evidence seems to show that local organization and self-review, along with the promotion of teamwork and feedback, lead to better systems of care to reduce adverse events in the perioperative setting**

# Questions