

How Safe is Your Hospital: Really?

An Advanced Approach to the Measurement and
Monitoring of Safety

Healthcare Trustees of New York State

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Lake Placid

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An Awkward Question

At a neighborhood cocktail party, the conversation turns to safety in health care. Horror stories emerge.

Someone's mother got C. diff and had her colon removed. Someone else's cousin was the victim of a serious medication error. Famous cases—Libby Zion, Sorrel King, Betsy Lehman—emerge. They look at you, and say: “Hey, you're on the Board at the hospital, aren't you?

How safe is your hospital?”

How would you answer this question?



Common Answers to “How Safe Is Your Hospital?”

- “Oh, we’re very safe. My wife had surgery last year and it went great.”
- “Well, we got some sort of safety award from the hospital association.”
- “Staff tell us that our hospital infection and complication rates are within the expected range for a hospital of our size and complexity.”
- “We have not had a serious safety event in 7 months.”

How safe is your hospital....

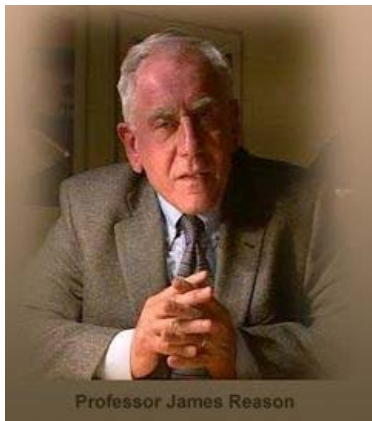
...for WHOM?



SAFETY



The most common way to answer the question “How safe is your organization?” is to describe how much harm has (or has not) occurred in the past. This is a “lagging indicator.”



“Safety is a dynamic non-event.”

James Reason

A lagging indicator does not describe how safe you are **RIGHT NOW**, or how safe you will be **TOMORROW**.

Advanced Leadership and Oversight of Safety



The measurement and monitoring of safety

Drawing together academic evidence and practical experience to produce a framework for safety measurement and monitoring

**Vincent, Burnett, and Carthey:
The Health Foundation, 2013**

To get a more complete answer to the question “How safe are we?” leaders must also ask about four “leading indicators”

1. How **RELIABLY** do we perform our key safety processes?
2. How well do we **SENSE AND RESPOND TO OPERATIONAL SAFETY ISSUES?**
3. How well do we **ANTICIPATE AND PREPARE FOR FUTURE RISKS?**
4. How well do we **LEARN FROM, AND INTEGRATE THE LEARNING** from past safety events?

Reliability: What Are We Talking About?

- Key safety processes are carried out as specified, ***regardless of...time of day, day of week, which team members are present, which doctor is on call, whether the ER is jammed...***

**What safety processes
should we focus on? What
MUST be highly reliable?**

Patient Safety Processes Ready for Adoption: **Strongly Encouraged**

1. Preoperative checklists and anesthesia checklists to prevent operative and postoperative events

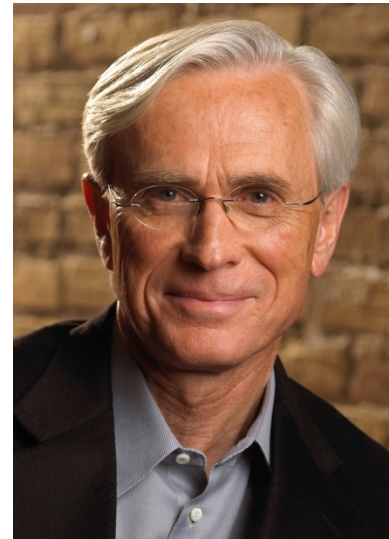
2. Bundles that include checklists to prevent central line–associated bloodstream infections
3. Interventions to reduce urinary catheter use, including catheter reminders, stop orders, or nurse-initiated removal protocols
4. Bundles that include head-of-bed elevation, sedation vacations, oral care with chlorhexidine, and subglottic suctioning endotracheal tubes to prevent ventilator-associated pneumonia
5. Hand hygiene
6. The do-not-use list for hazardous abbreviations
7. Multicomponent interventions to reduce pressure ulcers
8. Barrier precautions to prevent health care–associated infections
9. Use of real-time ultrasonography for central line placement
10. Interventions to improve prophylaxis for venous thromboembolisms

Two Perspectives on Pre-Operative Checklists

- “100% of our surgical cases have a completed pre-op checklist form.”



- “80% of your pre-operative checklists are defective.”



Patient Safety Processes Ready for Adoption: **Encouraged**

1. Multicomponent interventions to reduce falls
2. Use of clinical pharmacists to reduce adverse drug events
3. Documentation of patient preferences for life-sustaining treatment
4. Obtaining informed consent to improve patients' understanding of the potential risks of procedures
5. Team training
6. Medication reconciliation
7. Practices to reduce radiation exposure from fluoroscopy and CT
8. The use of surgical outcome measurements and report cards, such as those from ACS NSQIP
9. Rapid-response systems
10. Use of complementary methods for detecting adverse events or medical errors to monitor for patient safety problems
11. Computerized provider order entry
12. Use of simulation exercises in patient safety efforts

Characteristics of Different Levels of Process Reliability: (Amalberti, Nolan)

Chaos	80-90%	97-99%	10^{-3} , 10^{-4}	10^{-5}
No written specifications; processes are custom-crafted each time	Standard <u>specifications</u> in policies and guidelines, then staff are trained and expected to perform	Specifications become <u>standard work</u> through high reliability methods	Anticipate and contain failures through HRO culture, loss of autonomy	Loss of identity Error proofing
Doctor examines patient, writes orders on blank sheet of paper, gives them to a nurse to execute	Watch 5 people doing the process, see 5 different processes	Watch 5 people doing the process, see <u>one</u> process	Pre-task safety briefings, pre-occupation with failure, deference to expertise, ...	Equivalent actor
Most chronic and acute disease treatment in the U.S.	Handwashing, barrier precautions, care guidelines...	Top hospitals infection control "bundles"	Blood banking	Safety in anesthesia 15

Error Proofing



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No written specifications; processes are custom-crafted each time	Standard <u>specifications</u> in policies and guidelines, then staff are trained and expected to perform	Specifications become <u>standard work</u> through high reliability methods	Anticipate and control through culture, automation	Loss of monitoring
Doctor examines patient, writes orders on blank sheet of paper, gives them to a nurse to execute	Watch 5 people doing the process, see 5 different processes	Watch 5 people doing the process, see <u>one</u> process	Pre-briefing, occurrence of failure, deference to expertise, ...	
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Errors in these processes can be immediately catastrophic.

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Most chronic and acute disease treatment in the U.S.	Hand hygiene, barrier precautions, care guidelines...	Top hospitals infection control "bundles"	Blood banking	Safety in anesthesia

Errors in these processes don't usually lead to an immediate catastrophe.

Why do our processes get “stuck” at low levels of reliability?

- We become accustomed to it, and think it's normal
- We tend to rely on vigilance and hard work
- We focus on outcomes rather than process (no harm, no foul)
- We fail to design and implement standard work
- **We don't understand and use sophisticated designs for reliability**

Improvement Concepts Associated with 98-99% Reliability (1)

Build decision aids and reminders into the system

- Examples:
 - Order entry in electronic record
 - Chronic disease registries and appointment reminders
- Other examples?



Improvement Concepts Associated with 98-99% Reliability (2)

Make the desired action the default

- Examples:
 - All ventilator patients will be placed on the ventilator “bundle” unless the doctor specifically orders staff not to use it
 - Sterile technique will be followed in all surgical procedures
- Other examples?

Improvement Concepts Associated with 98-99% Reliability (3)

Use redundancy

- Examples:
 - Multidisciplinary Rounds
 - Nurses must double check certain medications with another nurse to insure accurate dosing, etc. (e.g., insulin, opiates, anticoagulants, chemotherapy...)
- Other examples?

Improvement Concepts Associated with 98-99% Reliability (4)

Level-load using sophisticated scheduling methods

- Examples:
 - ***“Real Time Demand Capacity”*** flow management in hospitals
 - Advanced access in primary care offices
- Other examples?

Improvement Concepts Associated with 98-99% Reliability (5)

**Harness the process you wish to
make reliable to existing workflows,
habits, and patterns of work**

- Example:
 - Nurse starts pre-op antibiotic when she sees the surgeon starting to scrub
 - Other examples?

Reliability of Processes: Trustees Need to Know That...

- Health care processes function across a wide range of levels of reliability.
- The methods used to improve process reliability depend to a great extent on the starting level of reliability, and whether a defect in the process is potentially catastrophic.
 - Basic process is reliable, defect is catastrophic—use HRO methods
 - Basic process is chaotic or low reliability—use “Level II” reliability methods to improve reliability to 99% or better

Where can you go to learn more?

- IHI White Paper
 - http://www.ihi.org/education/IHIOpenSchool/Courses/Documents/CourseraDocuments/08_ReliabilityWhitePaper2004revJune06.pdf
- Weick and Sutcliffe
 - Managing the Unexpected: High Performance in an Age of Complexity

Sensitivity to Operations

- Timely Sensing and Responding to
 - Ebbs and flows in volume and severity
 - Staffing problems
 - “Organizational entropy”
 - Unexpected events
 - Equipment failure
 - Natural disaster
 - Epidemic
 - Supply shortages
 - ...etc.



Trustees should know whether these practices are in place, and how well they are being performed.

- Unit “Supervisor” without direct patient care responsibility
- Executive and Leader Safety Rounding
 - Patient Interviews
 - Informal Conversations with Staff
- Service Hand-Offs and Safety Briefings
- House-wide Daily Safety Briefings

House-wide Daily Safety Briefings: A Superb Leadership Practice to Build “Sensitivity to Operations”

- 15-minute daily meeting of key operational leaders, led by Chief Executive
- Agenda:
 - Quick report on house-wide safety status: “It’s been 31 days since our last Serious Safety Event and 5 days since our last employee lost work day event.”
 - Brief scripted report on any safety issues from each manager, including security, facilities, bio-med...
 - Brief follow-up on any previously identified urgent safety issues
- *Note: Generally works best around 8:30 or 9 a.m., allows managers to have their own “pre-huddles” with their teams.*
- ***Don’t skip Saturday and Sunday!***
- ***Don’t ignore nights!***

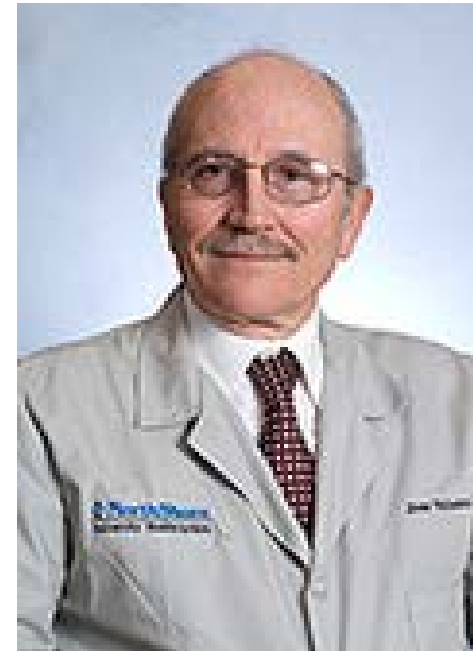
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Two Different Perspectives on Anticipation and Preparedness



What could possibly go wrong?



Jose Velasco, MD
“Let’s talk about the 3 worst things that could happen during this Whipple procedure.”





Aircraft Crews...

Anticipate Disasters

Prepare a Checklist Just in Case

Rehearse

Alcoa Crews Use a Pre-Task Safety Briefing

Alcoa GPP-US EHS Pre-Job Brief			
Date:	Prejob Leader:	Department:	
Location:	Ambulance Stop:	Who is your help chain?:	
What are you getting ready to do?:			
Does a written procedure exist for the task? <input type="checkbox"/> Yes <input type="checkbox"/> No		Have You reviewed it? <input type="checkbox"/> Yes <input type="checkbox"/> No	
What Performance Mode is each crew member in? (check all the apply)			
<input type="checkbox"/> Knowledge-Based - You don't know what you don't know (lack of knowledge about the task). Example: Troubleshooting. ERROR RATE = 1.0 - 1.10		<input type="checkbox"/> Rule-Based - There is a rule and you know the rule exists (includes written procedures or an unwritten rule). ERROR RATE = 1.100	
<input type="checkbox"/> Skill-Based Using habit, routine, not thinking, low or no conscious thought (done successfully over 50-100 times). Task has less than 7-15 discrete steps. ERROR RATE = 1:1,000			
Error Traps: (check all that apply)			
<input type="checkbox"/> Time Pressure, Stress, High Work load - tight time schedule, doing more than one task at a time, anxiety, impatience			
<input type="checkbox"/> First time/Infrequent task - not done the task in > 6 months, unfamiliar with the details, little or no experience			
<input type="checkbox"/> Distractions - feeling pulled in too many directions, getting pulled off another job, not completing original job			
<input type="checkbox"/> Vague/poor work guidance - guidance conflicts with past experience, instructions out of date, minor errors in instructions			
<input type="checkbox"/> End of Shift or Work Cycle <input type="checkbox"/> Poor Verbal Communication <input type="checkbox"/> First Day Back > 4 days <input type="checkbox"/> Over-Confidence			
EHS Hazard Assessment. (check all that apply)			
<input type="checkbox"/> Trouble Shooting	<input type="checkbox"/> Adjacent work area hazards	<input type="checkbox"/> Electrical /High or Low Voltage	
<input type="checkbox"/> Vertical Drop Zone <input type="checkbox"/> Trunk/Crane Traffic	<input type="checkbox"/> Working In Remote Area	<input type="checkbox"/> Hand/Finger Placement Hazard	
<input type="checkbox"/> Slips/Trips - walking working surfaces	<input type="checkbox"/> Different level fall/leveled work	<input type="checkbox"/> Other Pinch Points <input type="checkbox"/> High temperature	
<input type="checkbox"/> Line of Fire or struck by <input type="checkbox"/> Body Placement	<input type="checkbox"/> Inevitable loads <input type="checkbox"/> Prybar/Crowbar	<input type="checkbox"/> Hot work <input type="checkbox"/> Power Outage <input type="checkbox"/> Roof Work	
<input type="checkbox"/> Close Clearance, Congestion	<input type="checkbox"/> Exposure to caustic/acid/fluids	<input type="checkbox"/> Stored Energy (i.e. hydraulic, caustic)	
<input type="checkbox"/> Excessive reaching, bending, twisting	<input type="checkbox"/> Digging/Excavation <input type="checkbox"/> Confined Space	<input type="checkbox"/> Exposure to asbestos, lead, noise, dust, PCB	
<input type="checkbox"/> Repetitive Motion/Vibration of tools	<input type="checkbox"/> Lifting, Pushing, Pulling	<input type="checkbox"/> Machine Guard removed/by-passed	
<input type="checkbox"/> Aluminum/zinc hot/dross/SPL/ZZ spillage	<input type="checkbox"/> Pump/train/trailer/discharge liquids	<input type="checkbox"/> Waste bag generated <input type="checkbox"/> Containers/labels	
<input type="checkbox"/> Can spilled material enter storm drains?	<input type="checkbox"/> Will weather impact the task	<input type="checkbox"/> Lighter dust or visible emissions	
<input type="checkbox"/> Impact/shut down any part of a pollution control system (i.e. dust collector, scrubber, treatment plant, cooling tower, sil station, etc.)		<input type="checkbox"/> Shut down/startup a major (MACT) process (i.e. Potline, Bake Oven, Furnace, etc.)	
<input type="checkbox"/> Increase Anode effects/fluoride/other emissions			
Other Explain:			
Will any Specialized PPE/Tools, Inspections, Checklists, Permits, Barricading, Notifications, Observers be needed? (List below.)			
<input type="checkbox"/> Pre-Cleanup:	<input type="checkbox"/> Specialized PPE:	<input type="checkbox"/> Specialized Tools:	
<input type="checkbox"/> Pre-Inspection:	<input type="checkbox"/> Barricading/Observer:	<input type="checkbox"/> Permits/Notifications:	
Other:			
Critical Steps to complete the task:			
Action that is unacceptable AND if performed incorrectly could result in significant harm to personnel, quality environmental or equipment.	What Could Go Wrong?	CounterMeasures	Stop Criteria
Describe the worst thing that could happen & how it could occur? (serious injury, fatality, significant equipment damage, Non-Compliance)			
Additional situations/conditions you would choose to STOP THIS TASK? (Be specific)			
Additional HPI Tools: <input type="checkbox"/> STAR (point/touch, verbalize) <input type="checkbox"/> Step By Step <input type="checkbox"/> Stop and Seek Help <input type="checkbox"/> 3-Way Communication			
Can we do the job safely and environmentally compliant? <input type="checkbox"/> YES <input type="checkbox"/> NO - STOP - Do not proceed with Task!			
Who Participated in this Prejob:			
Post Job Debrief: (Section filled out after the job has been completed)			
HRTD Observations: Supervisor was present during Pre-Job Briefing & Execution of HRTD? <input type="checkbox"/> YES <input type="checkbox"/> NO Complete reverse side			
Does the Written procedure need updated? <input type="checkbox"/> Yes <input type="checkbox"/> No	RN / IFE / EEE need to be written? <input type="checkbox"/> Yes <input type="checkbox"/> No	Did everything go as planned? <input type="checkbox"/> Yes <input type="checkbox"/> No If no, hold a post job review	

- What are we getting ready to do?
- Does a written procedure for this task exist?
- Have we reviewed it?
- What performance mode is each crew member in? (Knowledge, Rules, Skills)
- What error traps are present today?
- What safety hazards can we anticipate with this task?
- What could go wrong?
- What's the WORST thing that could happen?
- How would we know it was about to happen?
- What countermeasures are we going to take to make sure it doesn't happen?
- What are our STOP criteria?
- Is everyone ready to go?



Pediatric Critical Events Checklists

Call for help!

Overhead	1605
Blood Bank	45850
PICU	45952
Fire	*9999
GOAT	64161
Charge RN	64160
PACU	45712

Revised March 8, 2013

Air Embolism	2
Anaphylaxis	3
Bradycardia	4
Cardiac Arrest	5-7
Difficult Airway	8
Fire: Airway and OR	9-10
Hyperkalemia	11
Hypertension	12
Hypotension	13
Hypoxia	14-15
Local Anesthetic Toxicity	16
Loss of Evoked Potentials	17
Malignant Hyperthermia	18
Myocardial Ischemia	19
Tachycardia	20
Transfusion & Reactions	21-22
Trauma	23-24

Fire: Airway

Fire in tracheal tube, circuit, canister

9

- Call for help.**
- Stop** all gas flow (O_2 , N_2O)
- Disconnect** breathing circuit.
- Pour saline into airway.
- Remove** ETT.
- Remove sponges and other flammable materials from airway.
- Re-intubate and re-establish ventilation.
- If intubation difficult, don't hesitate to obtain surgical airway.
- Consider bronchoscopy to assess for thermal injury, look for tracheal tube fragments, and remove residual material.
- Impound all equipment and supplies for later inspection.



Picture from ECRI: www.ecri.org

Question for Trustees on Anticipation and Preparedness

- When you approve a capital plan that includes lots of new medical technology, do you ask for a SAFETY PLAN that is at least as rigorous as the BUSINESS PLAN?
- When your strategic plan includes recruiting a new superstar doctor who performs services that have never been done in your hospital before, how do you assure that these services are safe?

How well does your hospital learn from things that went wrong? How well do you apply what you learn?



McLeod Surgery

Brief-Debrief System

- Every surgical case has a serious debrief, recorded on paper
 - Dr. Mike Rose (and his assistant!) drive 100% compliance
 - 88,000 cases over 5 years
- Things that went wrong are categorized and severity-rated, by the team
 - 11 categories (e.g., anesthesia, nursing, equipment, pre-op, surgeon...)
 - 5 levels (level 1 = no harm, 5 = death)
 - 6,800 “things that went wrong” (7.5%)

McLeod Surgery

Brief-Debrief System (2)

- Action is taken on all defects, within hours on category 4 and 5 events
 - Team in OR recommends actions
 - Senior leaders immediately notified
 - Actions spread to all relevant parts of system
 - e.g., obese orthopedic patient falls from table due to accidental “beanbag” deflation

McLeod Surgery Brief-Debrief System (3)

- Results
 - Surgical mortality rate decreased 40%
 - Surgical complications (Premier) decreased 30%
 - Labor hours per case 19.6 to 9.0
 - Dramatic increase in staff morale

mrose@mcleodhealth.org

Vice President Surgical Services

Summary: To answer the question “How safe are we?” trustees must know more than how many safety events have occurred in the past. They must understand the answers to these “leading indicator” questions:

- How well are we performing our key safety processes? (**Reliability**)
- How safe are we right now? (**Sensitivity to Operations**)
- How safe are we going to be in the future? (**Anticipation and Preparedness**)
- How well are we responding to past events? (**Integration and Learning**)

Vincent, Burnett, and Carthey: The Measurement and Monitoring of Safety. Health Foundation, 2013

**Note: in many instances,
the answers to these 4
questions will be
narratives, not numbers.**

Leaders are responsible for everything in an organization, especially what goes wrong.

Paul O'Neill

Questions?