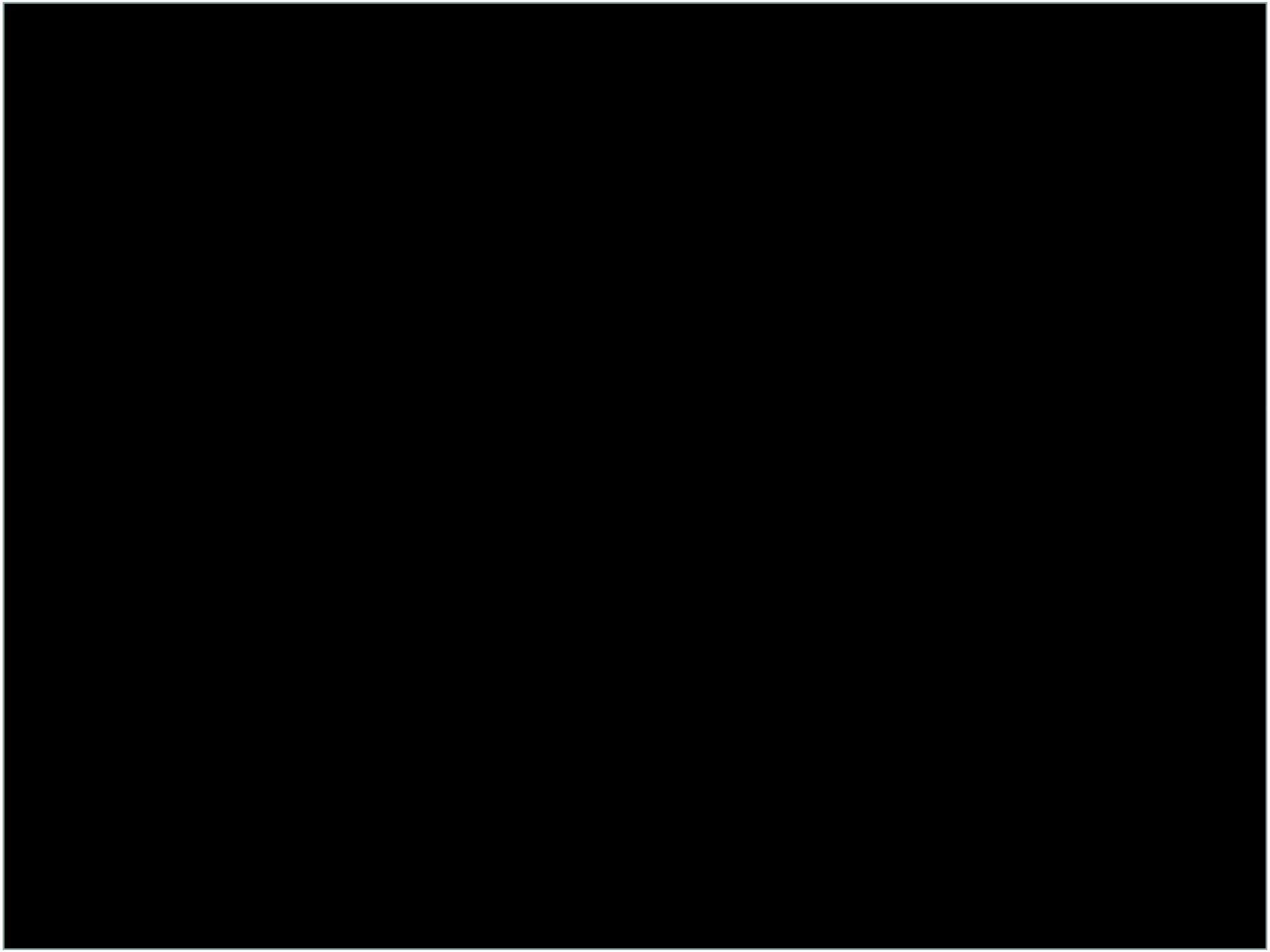
Achieving Excellence in Patient Safety the High Reliability Way

North Carolina Association for Healthcare Quality

April 15, 2010


VFA-131
414



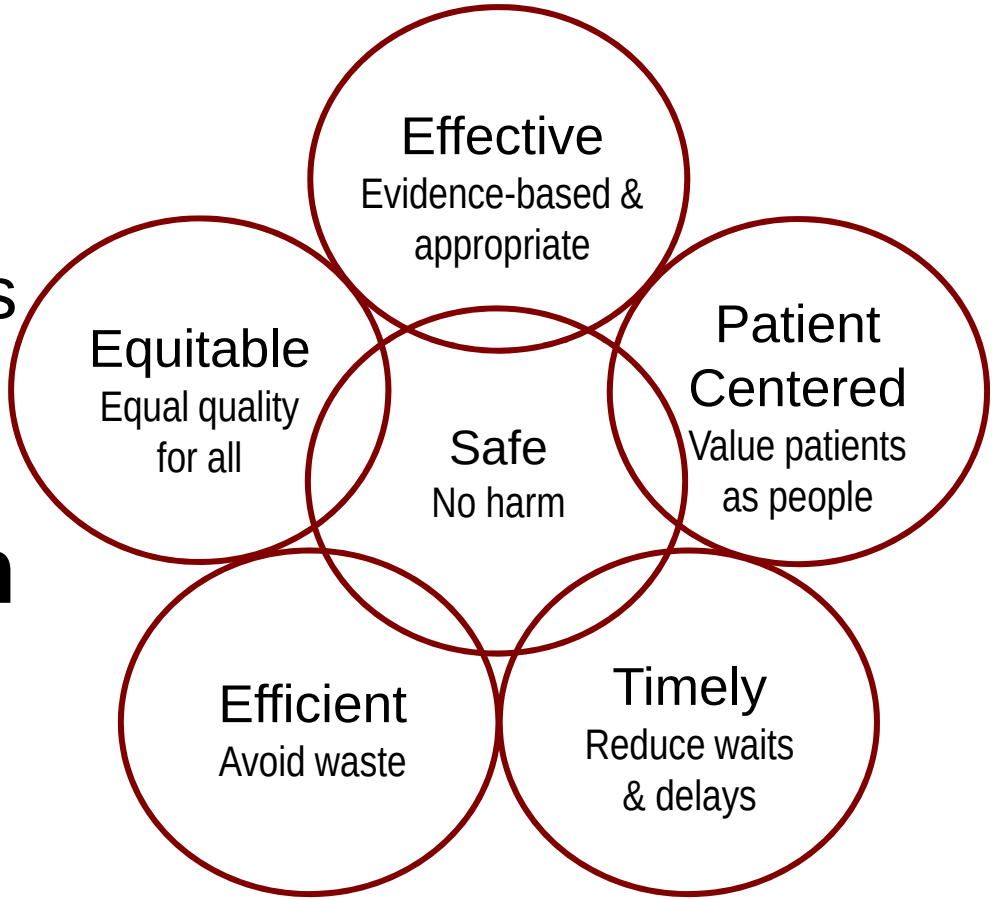
HPI – A *Reliability* Company

The **One** Vision

We lead the innovation that makes healthcare as reliable as it should be.

The **Zero** Mission

We create the Culture of Safety that achieves ZERO events of harm.



Six Aims for Improvement, Institute of Medicine

From Your Patient's Perspective

Don't hurt me

Heal me

Be nice to me

…in that order

IOM Report – 10 Years Later

New mom takes home wrong baby

Friday, September 11, 2009

WILLISON, N.D. (AP) - Staff members of Williston's Mercy Medical Center are investigating how the mother of a newborn went home with the wrong baby. The hospital says it happened last weekend, the mistake was discovered within an hour and the woman was quickly reunited with her own child. Mercy Chief Financial Officer Kerry Monson would not release details about how it happened or what families were involved. She read a prepared statement indicating hospital employees are disheartened by the incident, are investigating the facts surrounding it, are reviewing policies and procedures and will take appropriate action.

Mercy Medical Center in Willison, N.D.

The Savages struggled for 10 years to have a third child. Carolyn Savage decided to carry the baby to term after learning of the mistake and gave the baby back to its biological parents after giving birth.

Wrong-embryo baby's parents laud 'guardian angel'

Friday, September 26, 2009

TOLEDO, OH (AP) – An Ohio woman who gave birth to a baby boy after a clinic implanted her with the wrong embryo is a "guardian angel," the boy's biological parents said Saturday. Paul and Shannon Morell of suburban Detroit said in a statement that they would be "eternally grateful" to Carolyn Savage for her decision to give birth to their child despite the clinic's mistake.

The Savages extended thanks to people around the world for their support and prayers. They thanked medical professionals for their care and treatment throughout the pregnancy and delivery. The Savages say a fertility clinic outside Ohio transferred the wrong embryo in February. Ten days later, they got a call from a doctor at the clinic saying she was pregnant with someone else's child.

The Savages said in an interview with The Associated Press they never considered terminating the pregnancy or trying to fight for custody. They have hired attorneys who say they are working to make sure the fertility clinic accepts responsibility.

Reliability

*Reliability: The **probability** that a system, structure, component, process, person will successfully provide the intended function(s).*

Often a ratio such as 0.96 or 96%

Sometimes a frequency such 10^{-3} per year

It's All About Managing *RISK*

Risk = *Probability* x *Consequence*

So....

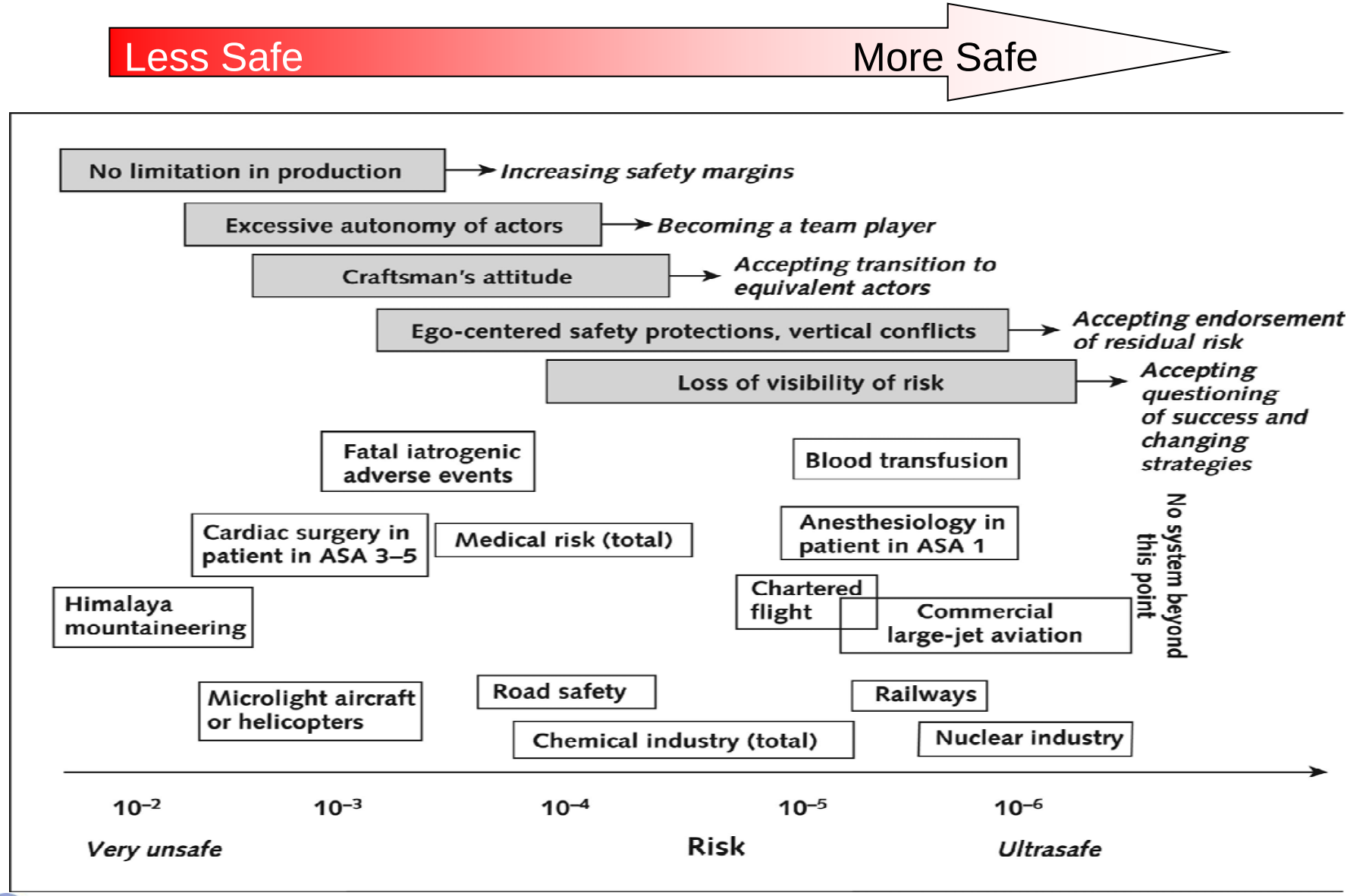
Minimize *Consequence* ***or*** reduce *Probability*

or both.

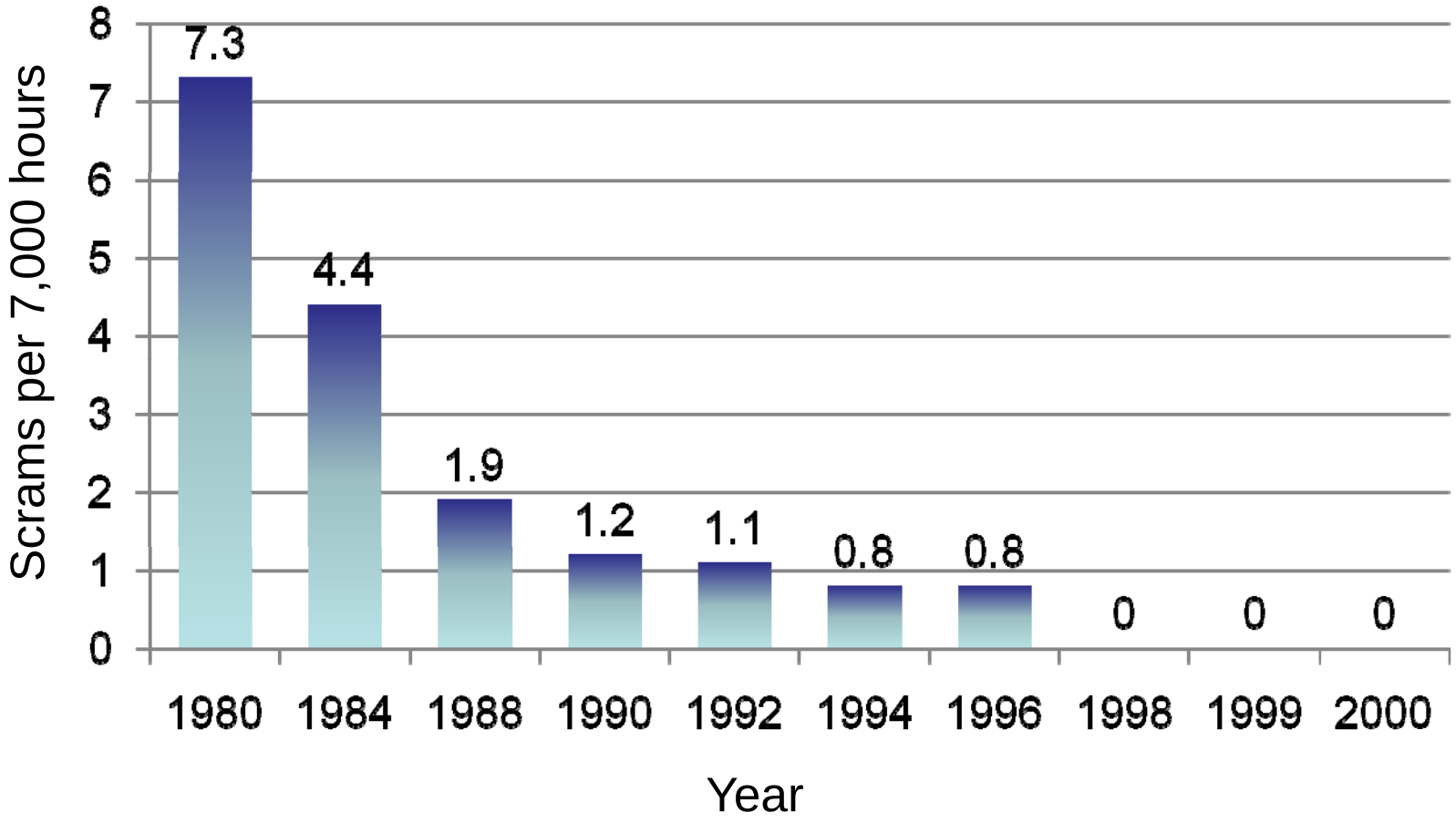
Risk

The threat of damage, injury, liability, loss, or other negative occurrence, caused by external or internal vulnerabilities, and which may be neutralized through pre-meditated action.

Applied Reliability



Reliability – U.S. Nuclear Power



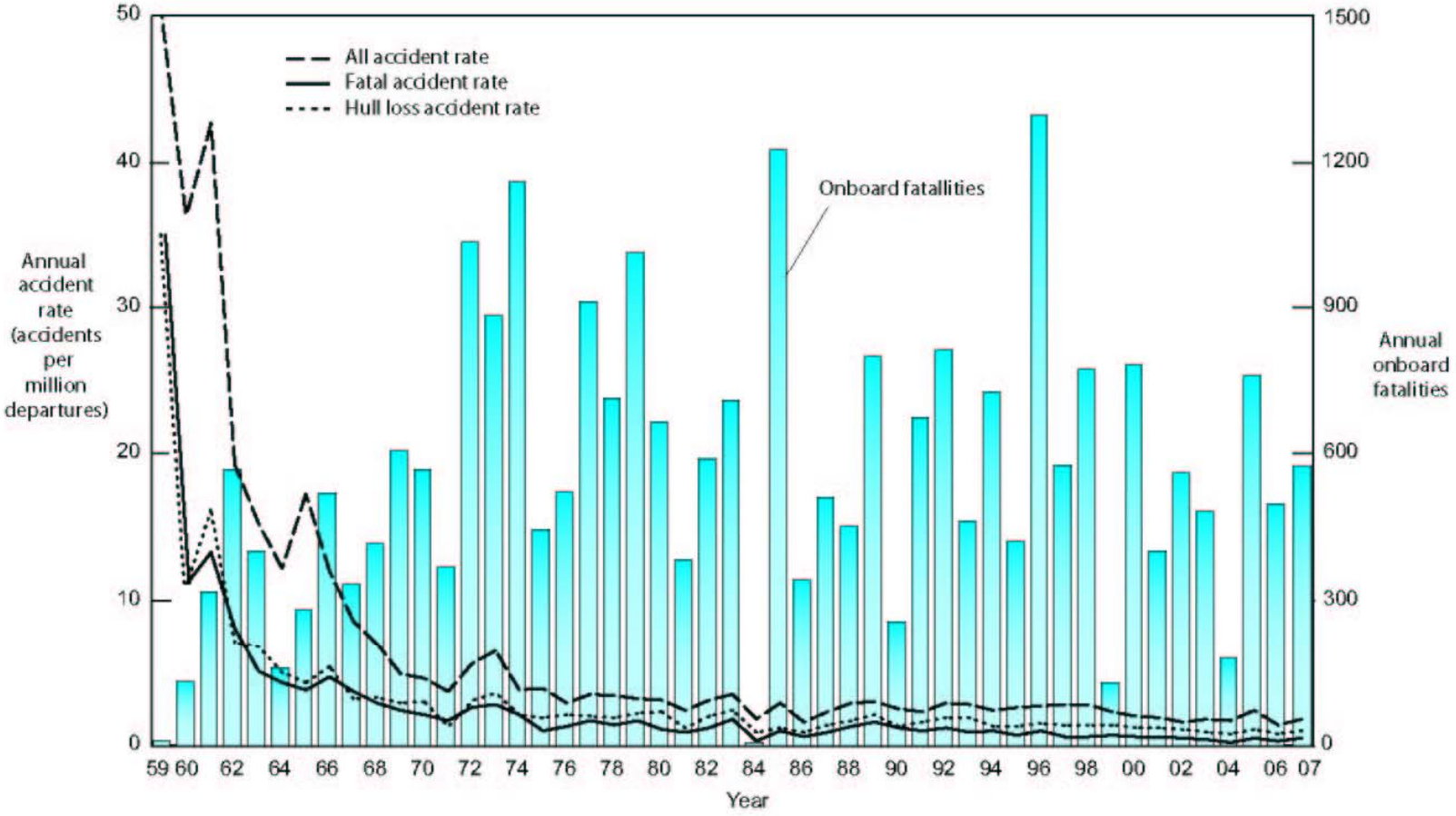
The unplanned automatic scrams per 7,000 hrs critical indicator tracks the median scram (automatic shutdown) rate for approximately one year (7,000 hrs) of operation. Unplanned automatic scrams result in thermal and hydraulic transients that affect plant systems. The scram rate has been significantly reduced since 1980. In 2000, 59% of operating plants had zero automatic scrams.

HPI®

Source: *Statistics Show US Nuclear Power Plants Always Improving,* Nuclear News, May 2001

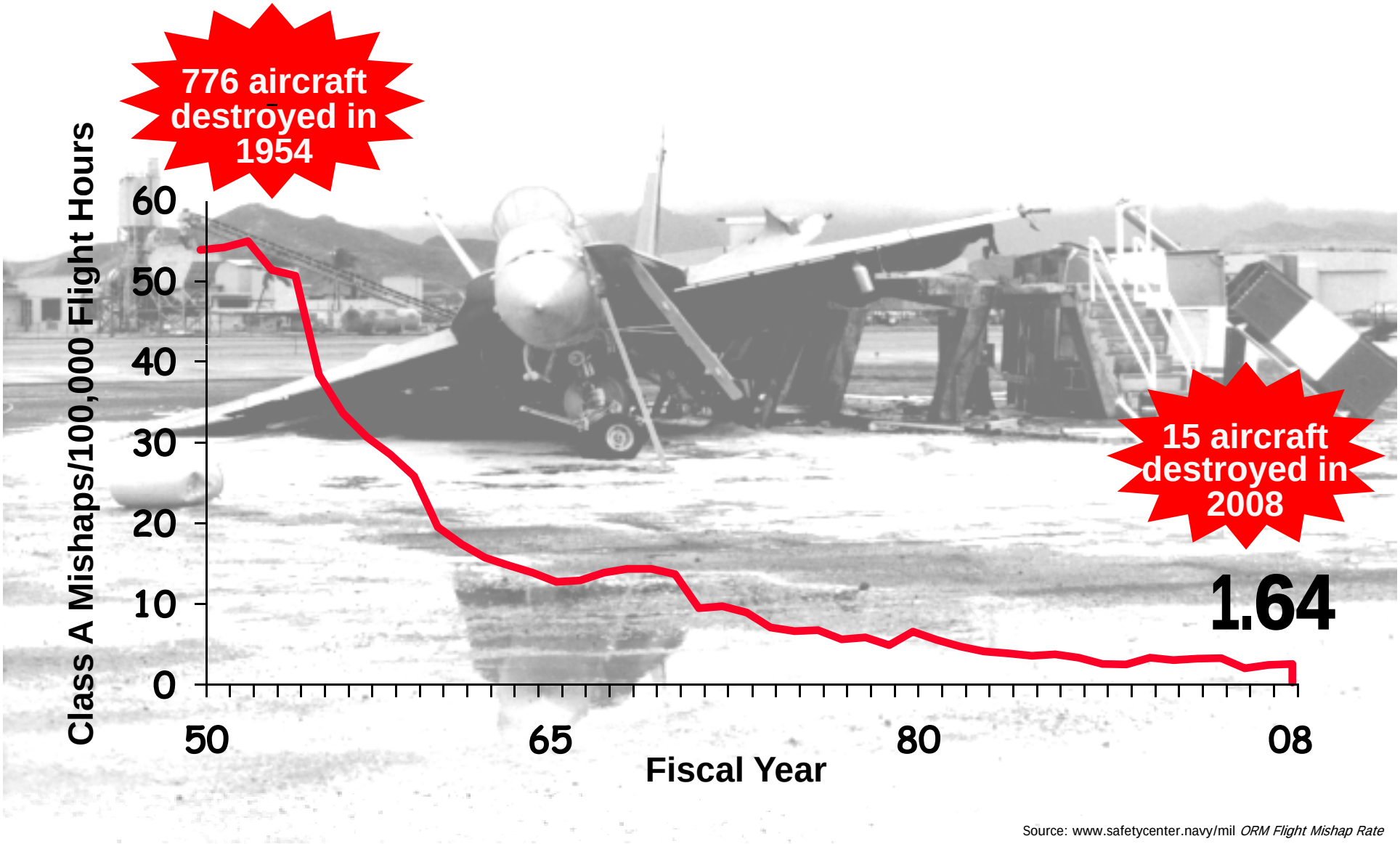
Reliability – Commercial Aviation

Accident Rates and Onboard Fatalities by Year
Worldwide Commercial Jet Fleet – 1959 Through 2007



BOEING

Reliability – Naval Aviation



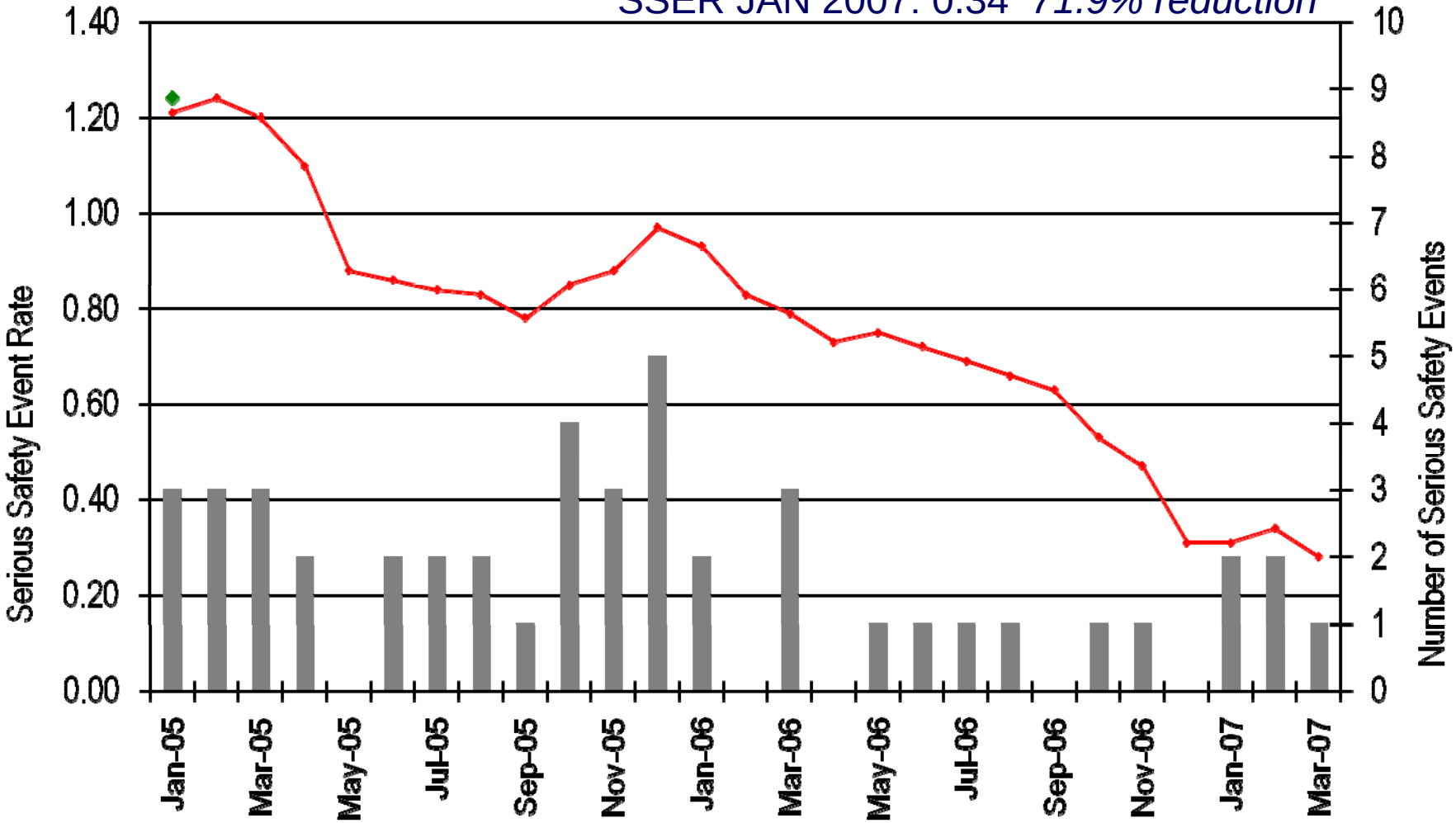
Source: www.safetycenter.navy/mil *ORM Flight Mishap Rate*

SSER Serious Safety Event Rate SM

1000 Bed Midwest Hospital

SSER JAN 2005: 1.21

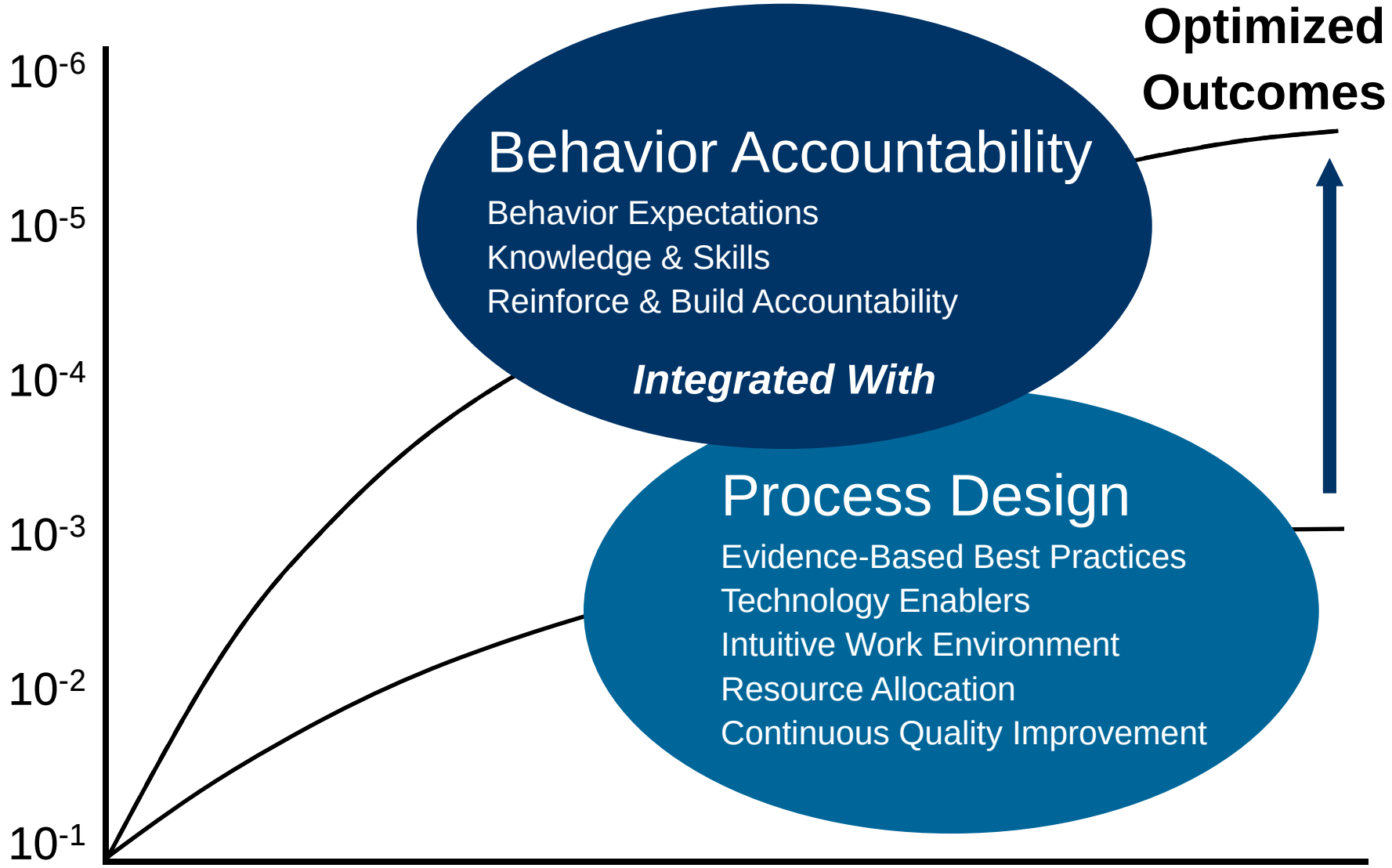
SSER JAN 2007: 0.34 *71.9% reduction*



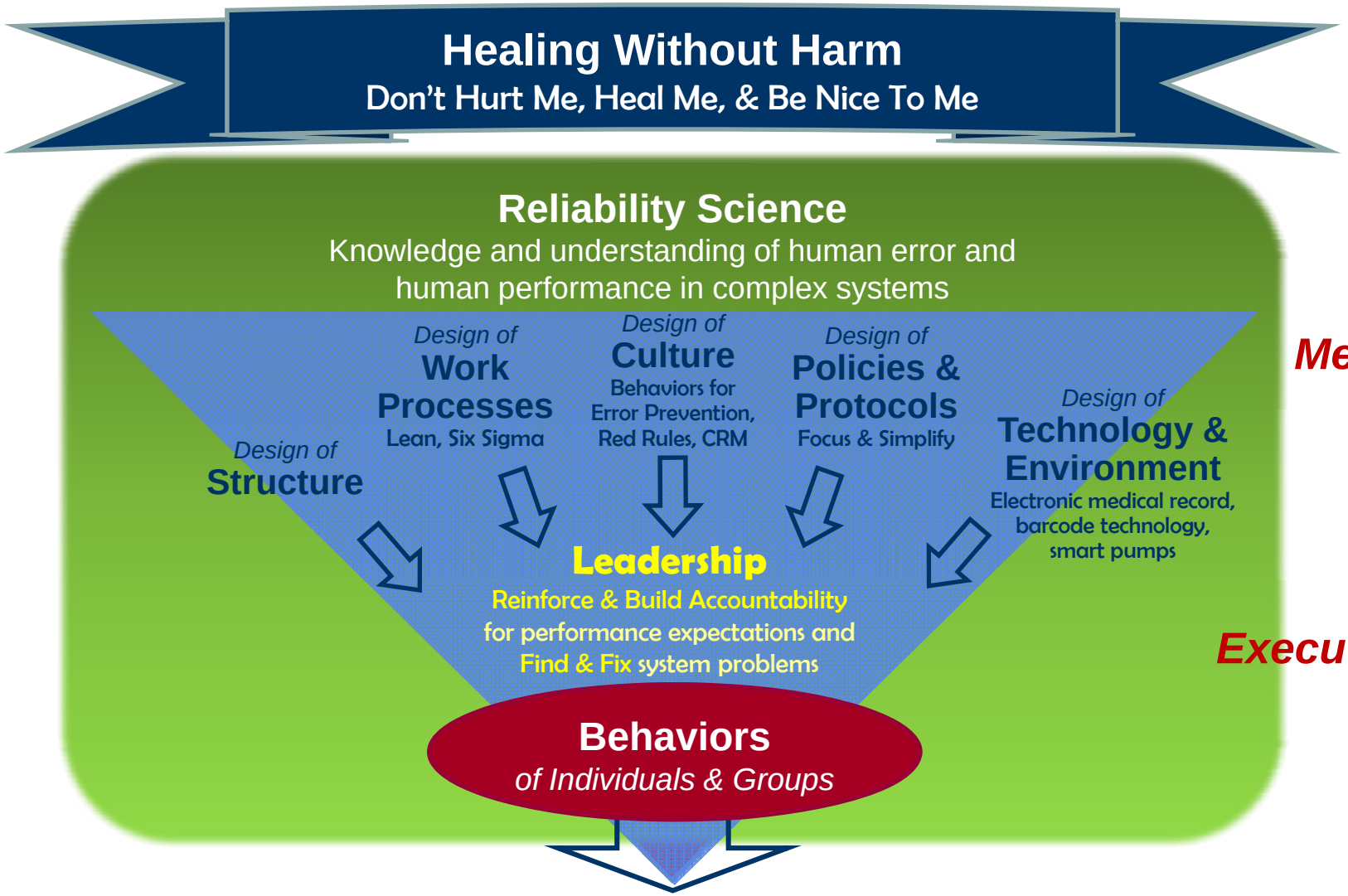
◆ Start of Safety Culture Engagement

HPI®

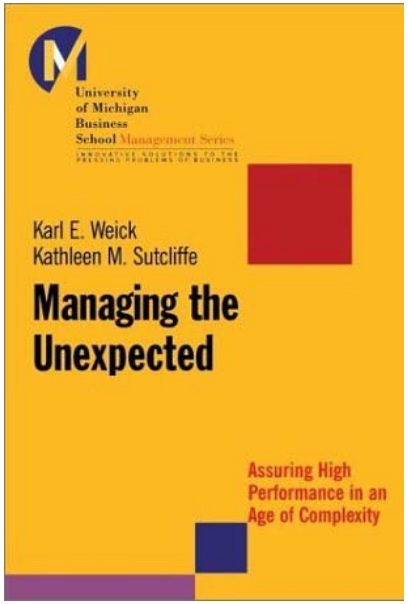
Reliability: *Not By Process Design Alone*



Reliability Culture



High Reliability Organizations (HROs) "operate under very trying conditions all the time *and yet manage* to have fewer than their fair share of accidents."



Managing the Unexpected
By Karl E Weick & Kathleen M Sutcliffe

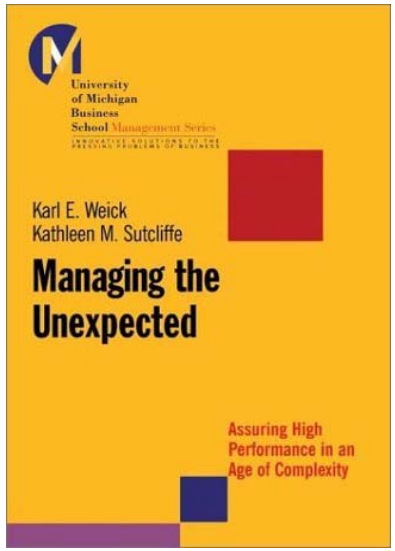
Five Principles of HROs

Preoccupation with Failure

– Regarding small, inconsequential errors as a symptom that something's wrong
– We spend time identifying activities we do not want to go wrong
– When giving report to an oncoming nurse, we discuss what to look out for

Sensitivity to Operations

Paying attention to what's happening on the front-line – Ongoing interaction and information-sharing about the human and organizational factors that determine the safety of a system as a whole



Reluctance to Simplify *interpretations*

Taking deliberate steps to question assumptions and received wisdom to create a more complete and nuanced picture of ongoing operations

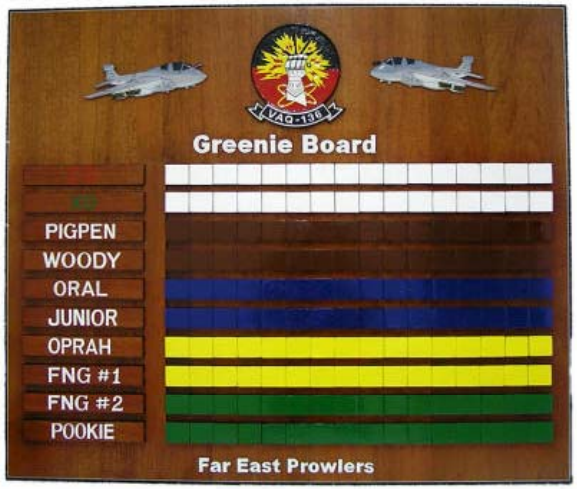
Commitment to Resilience

Developing capabilities to detect, contain, and bounce back from errors that have already occurred, before they worsen and cause more serious harm

Deference to Expertise

During high-tempo operations, decision-making authority migrates to the person or people with the most expertise with the problem at hand, regardless of rank

Regarding small, inconsequential errors as a symptom that something's wrong…



Preoccupation with Failure

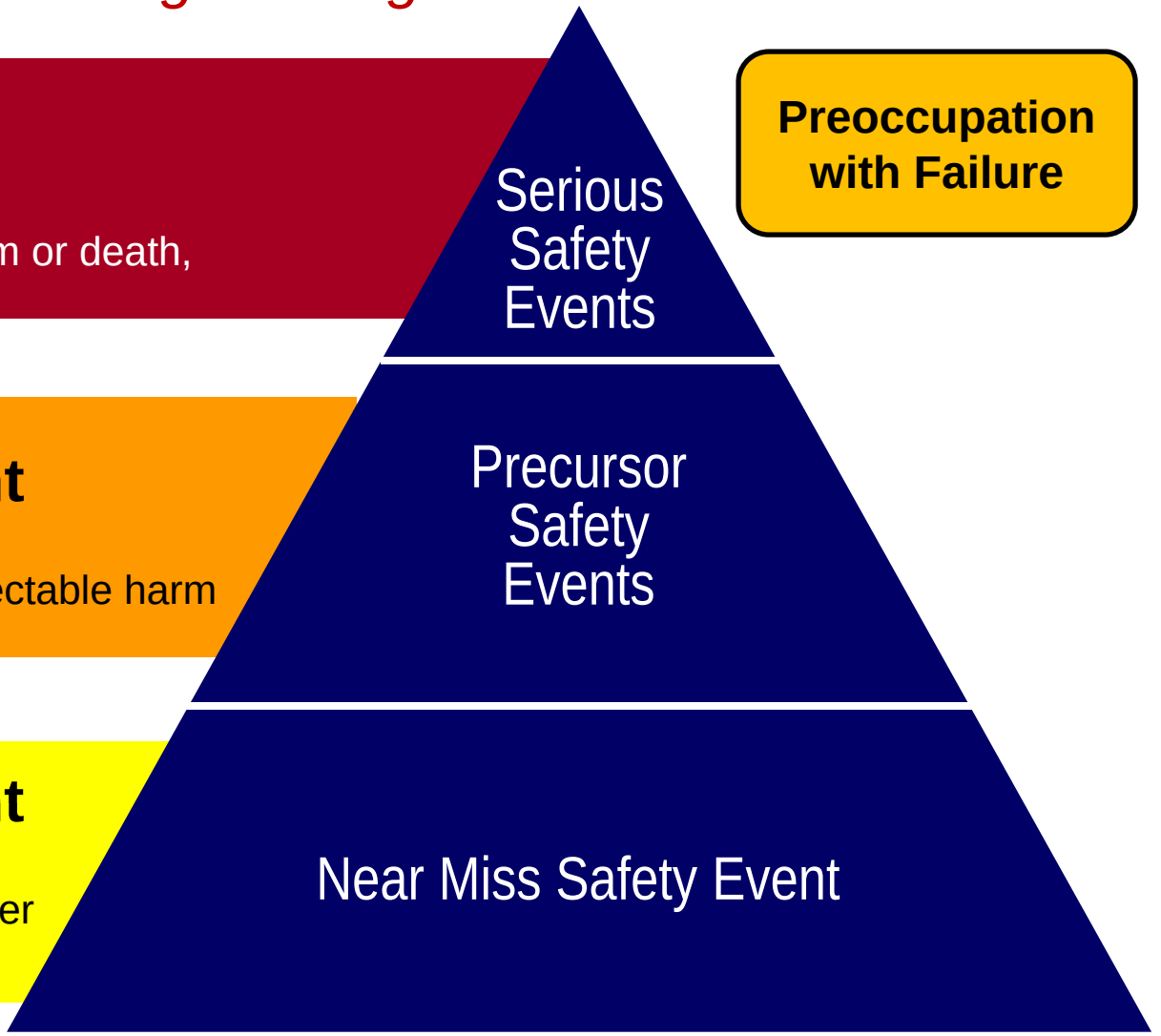
Regarding small, inconsequential errors as a symptom that something's wrong…

SEC Safety Event Classification SM

Serious Safety Event
- Reaches the patient
- Results in moderate to severe harm or death,

Precursor Safety Event
- Reaches the patient
- Results in minimal harm or no detectable harm

Near Miss Safety Event
- Does not reach the patient
- Error is caught by a detection barrier or by chance



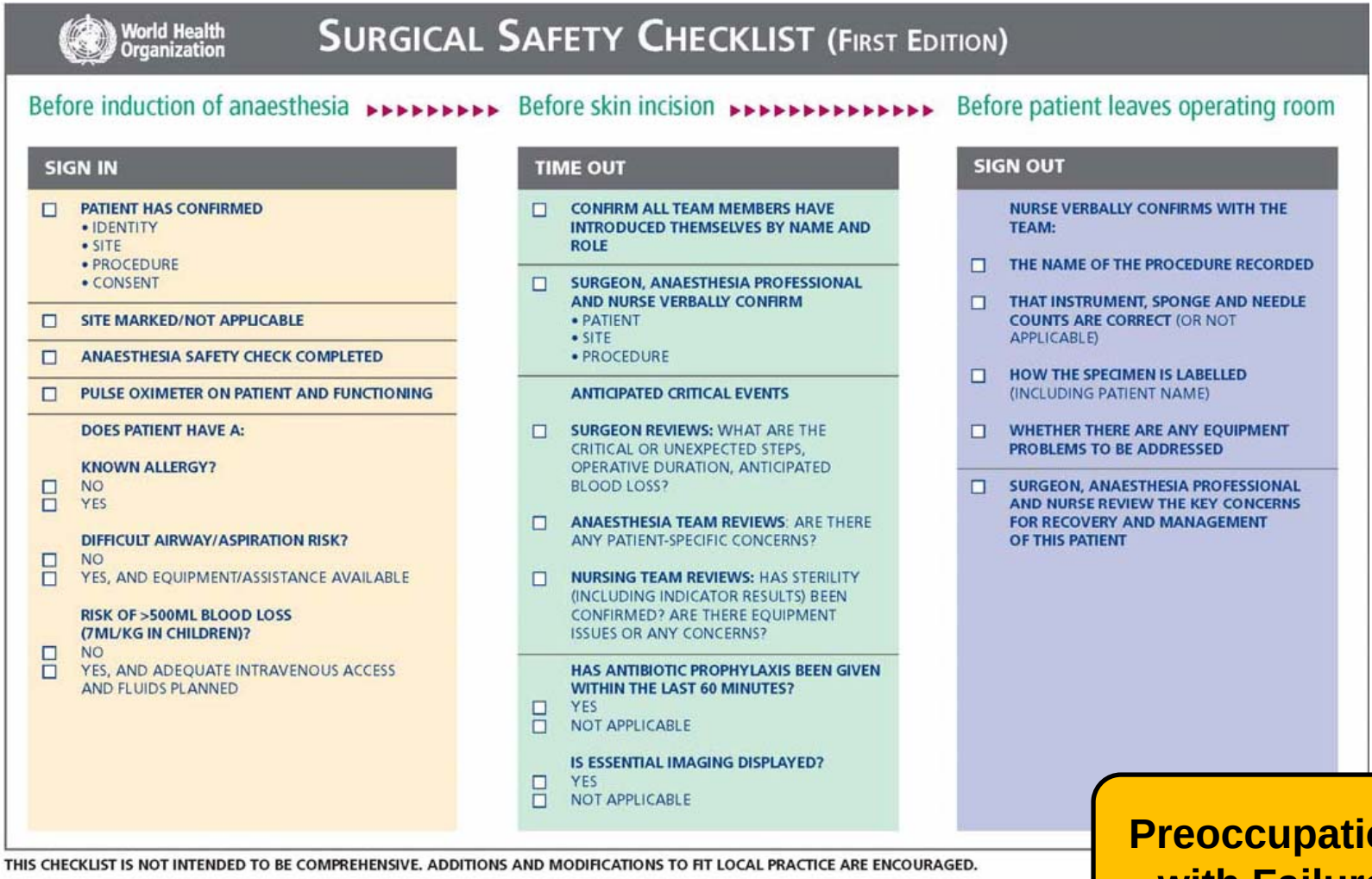
Preoccupation with Failure

HPI®

We spend time identifying activities we do not want to go wrong…

B-17 Flying Fortress

We spend time identifying activities we do not want to go wrong…



World Health Organization

SURGICAL SAFETY CHECKLIST (FIRST EDITION)

Before induction of anaesthesia ▸▸▸▸▸▸▸▸▸ Before skin incision ▸▸▸▸▸▸▸▸▸▸▸▸▸ Before patient leaves operating room

SIGN IN

- ☐ PATIENT HAS CONFIRMED
  - IDENTITY
  - SITE
  - PROCEDURE
  - CONSENT
- ☐ SITE MARKED/NOT APPLICABLE
- ☐ ANAESTHESIA SAFETY CHECK COMPLETED
- ☐ PULSE OXIMETER ON PATIENT AND FUNCTIONING

DOES PATIENT HAVE A:

KNOWN ALLERGY?
- ☐ NO
- ☐ YES

DIFFICULT AIRWAY/ASPIRATION RISK?
- ☐ NO
- ☐ YES, AND EQUIPMENT/ASSISTANCE AVAILABLE

RISK OF >500ML BLOOD LOSS (7ML/KG IN CHILDREN)?
- ☐ NO
- ☐ YES, AND ADEQUATE INTRAVENOUS ACCESS AND FLUIDS PLANNED

TIME OUT

- ☐ CONFIRM ALL TEAM MEMBERS HAVE INTRODUCED THEMSELVES BY NAME AND ROLE
- ☐ SURGEON, ANAESTHESIA PROFESSIONAL AND NURSE VERBALLY CONFIRM
  - PATIENT
  - SITE
  - PROCEDURE

ANTICIPATED CRITICAL EVENTS

- ☐ SURGEON REVIEWS: WHAT ARE THE CRITICAL OR UNEXPECTED STEPS, OPERATIVE DURATION, ANTICIPATED BLOOD LOSS?
- ☐ ANAESTHESIA TEAM REVIEWS: ARE THERE ANY PATIENT-SPECIFIC CONCERNS?
- ☐ NURSING TEAM REVIEWS: HAS STERILITY (INCLUDING INDICATOR RESULTS) BEEN CONFIRMED? ARE THERE EQUIPMENT ISSUES OR ANY CONCERNS?

HAS ANTIBIOTIC PROPHYLAXIS BEEN GIVEN WITHIN THE LAST 60 MINUTES?
- ☐ YES
- ☐ NOT APPLICABLE

IS ESSENTIAL IMAGING DISPLAYED?
- ☐ YES
- ☐ NOT APPLICABLE

SIGN OUT

NURSE VERBALLY CONFIRMS WITH THE TEAM:

- ☐ THE NAME OF THE PROCEDURE RECORDED
- ☐ THAT INSTRUMENT, SPONGE AND NEEDLE COUNTS ARE CORRECT (OR NOT APPLICABLE)
- ☐ HOW THE SPECIMEN IS LABELLED (INCLUDING PATIENT NAME)
- ☐ WHETHER THERE ARE ANY EQUIPMENT PROBLEMS TO BE ADDRESSED
- ☐ SURGEON, ANAESTHESIA PROFESSIONAL AND NURSE REVIEW THE KEY CONCERNS FOR RECOVERY AND MANAGEMENT OF THIS PATIENT

THIS CHECKLIST IS NOT INTENDED TO BE COMPREHENSIVE. ADDITIONS AND MODIFICATIONS TO FIT LOCAL PRACTICE ARE ENCOURAGED.

Preoccupation with Failure

When giving report, we discuss what to look out for…

Clear

Complete

Accurate

Sent and Received

"I am ready to relieve you Sir"
"I am ready to be relieved"

- *Base Course and Speed*
- *Engineering Data / Equipment Casualties*
- *Expected Weather / Navigation*
- *When to wake CO / XO*

"I relieve you Sir"
"I stand relieved"
"This is ____, _____ has the Deck"

Frequent & Formal

When giving report to an oncoming nurse, we discuss what to look out for…

Situation

Background

Assessment

Recommendation

Use the SBAR technique when communicating vital patient information or making a request.

Patient

Plan

Purpose

Problems

Precautions

Use the 5P Handoff process when transferring patient care responsibility

Preoccupation with Failure

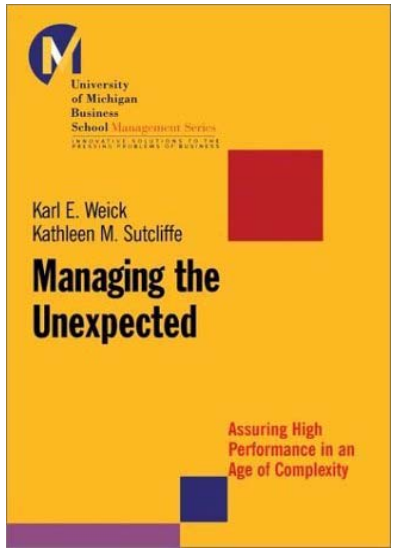
Five Principles of HROs

Preoccupation with Failure

Operating with a chronic wariness of the possibility of unexpected events that may jeopardize safety by engaging in proactive and preemptive analysis and discussion

Sensitivity to Operations

- *Leaders get out and look for the holes in the Swiss Cheese*
- *We're able to give real-time guidance and resource allocation*
- *We have a good "map" of each other's talents and skills on the unit*



Reluctance to Simplify *interpretations*

Taking deliberate steps to question assumptions and received wisdom to create a more complete and nuanced picture of ongoing operations

Commitment to Resilience

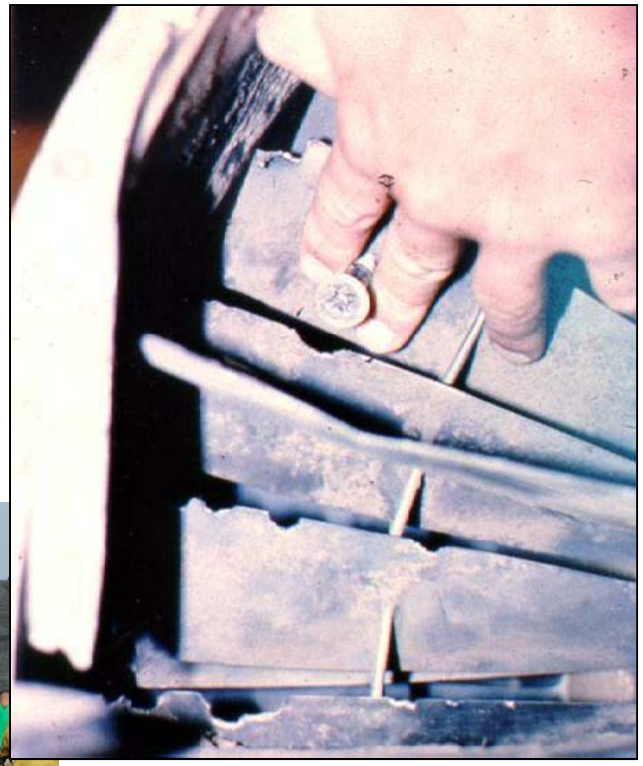
Developing capabilities to detect, contain, and bounce back from errors that have already occurred, before they worsen and cause more serious harm

Deference to Expertise

During high-tempo operations, decision-making authority migrates to the person or people with the most expertise with the problem at hand, regardless of rank

Leaders get out and look for the holes in the Swiss Cheese…

FOD Walkdown



Sensitivity to Operations

Leaders get out and look for the holes in the Swiss Cheese…

Rounding to Influence

It's not about being seen.
It's about what you *see*, what you *ask* and what you *say*.

What It Is

- A technique for reinforcing behaviors or performance expectations

Sensitivity to Operations

Why It Works

- Connects expectations to core values
- Assesses knowledge of expectations
- Identify problems impacting the ability of people to follow expectations
- Engages commitment to practice expectations

We're able to give real-time guidance and resource allocation…

Admiral's Daily Update

- USS Enterprise Battlegroup
- 9:00-9:30 am, everyday at sea
- All department heads and warfare commanders
- Held via video tele-conference call
- 100% attendance expected
- Entire day's schedule (Battle Rhythm) revolves around update

Sensitivity to Operations

We're able to give real-time guidance and resource allocation…

Barbara Summers, President
Community Hospital North

Daily Check-In at Community

- 9:00-9:15 AM, Monday-Friday
- All departments directors
- Held via conference call
- Facilitated by senior leader
- 90% attendance expectation – send a representative if you can't participate

Sensitivity to Operations

Daily Check-in is a huddle of the leader and direct reports at the start of the day to maintain **awareness** of operations and to give direction about **priority and responsibility** for problem resolution.

We have a good "map" of each other's talents and skills on the unit…

- Unit-based huddles
- After shift change
- Review acuity and staffing
- Review possible "gotchas"

Sensitivity to Operations

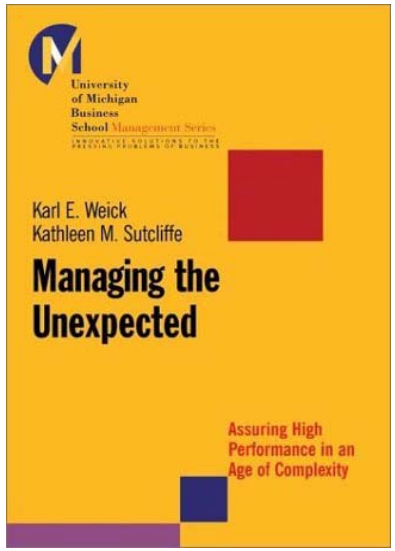
Five Principles of HROs

Preoccupation with Failure

Operating with a chronic wariness of the possibility of unexpected events that may jeopardize safety by engaging in proactive and preemptive analysis and discussion

Sensitivity to Operations

Paying attention to what's happening on the front-line – Ongoing interaction and information-sharing about the human and organizational factors that determine the safety of a system as a whole



Reluctance to Simplify *interpretations*

– We discuss alternatives on how to go about our normal work activities
– We're not afraid to ask questions and voice safety concerns

Commitment to Resilience

Developing capabilities to detect, contain, and bounce back from errors that have already occurred, before they worsen and cause more serious harm

Deference to Expertise

During high-tempo operations, decision-making authority migrates to the person or people with the most expertise with the problem at hand, regardless of rank

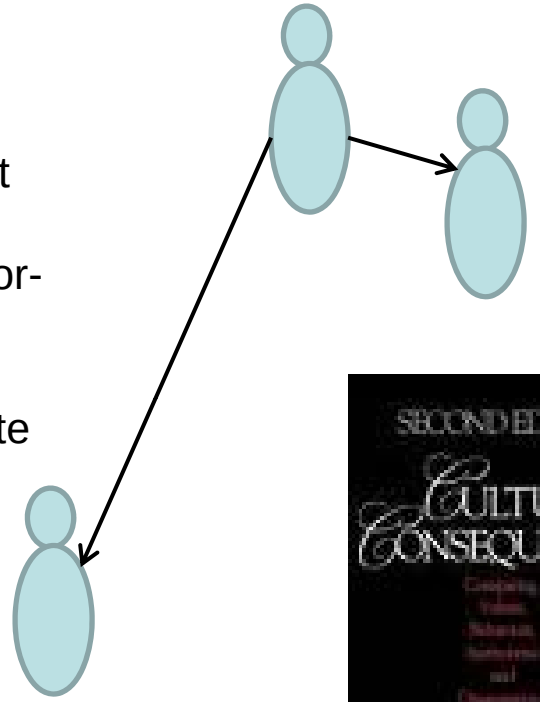
We discuss alternatives on how to go about our normal work activities…
We're not afraid to ask questions and voice safety concerns…

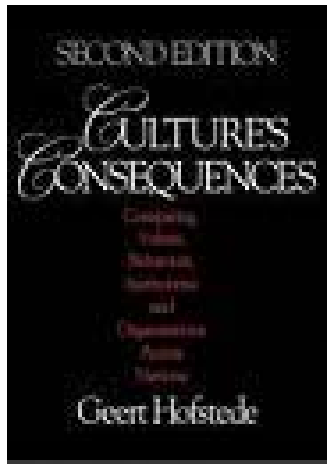
Reluctance to Simplify

Power Distance

Geert Hofstede's Power Distance

- Extent to which the less powerful expect and accept that power is distributed unequally
- Measure of interpersonal power or influence superior-to-subordinate as perceived by the subordinate
- Leads to strong Authority Gradients, which is the perception of authority as perceived by the subordinate





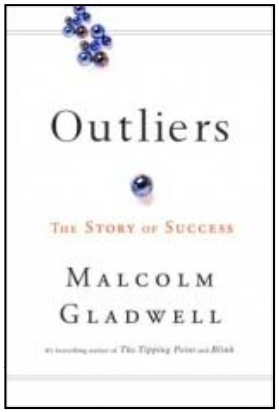
USA

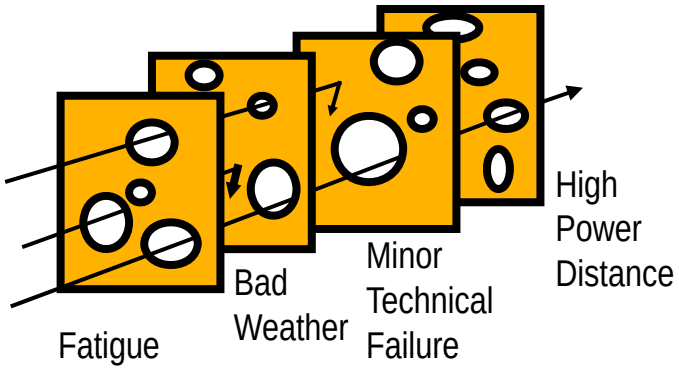
- Moderate to low PD (38th of 50 countries)
- Surgeons & anesthesiologists view low
- Nurses view as significantly higher

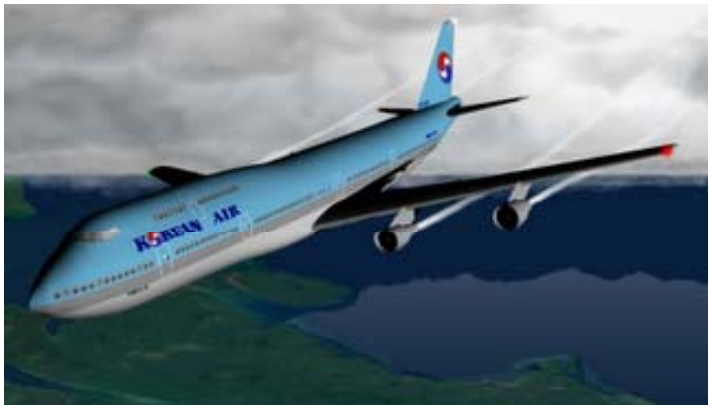
Culture is more often a source of conflict than of synergy. Cultural differences are a nuisance at best and often a disaster."

Geert Hofstede, Emeritus Professor, Maastricht University

Korean Airlines Flight 801







Are we the same – or different?

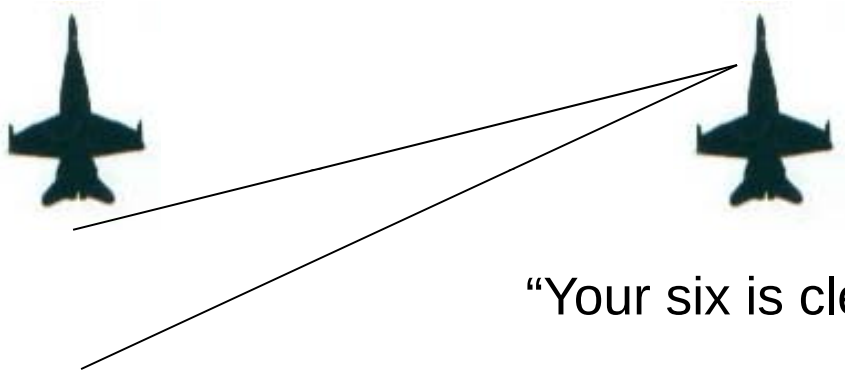
Commonalities between aviation and healthcare

1. Everyone makes mistakes
2. Fixes include a combination of technology, process and people
3. Collaborative Interactive Teams = better crosschecking
4. Power Distance and Authority Gradients deter the flow of information
5. Focusing on Organizational Culture can flatten Power Distance

Cross-Checking in Action

Remember what Maverick says:

"Never leave your wingman"



"Your six is clear!"

Take advantage of working together!

- Check the accuracy of each other's work
- Identify slips and lapses
- Point out unusual situations or hazards
- Impromptu consultation

Key to Successful Checking

Be willing to check others

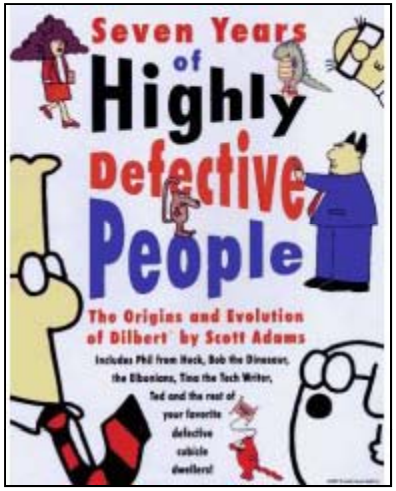
AND

be willing to have others check us

Cross-Checking in Healthcare

On your own, a person is only as reliable as a human can be:

1 defect per thousand opportunities



Malcolm Baldrige National Quality Award

Cross-checking multiplies the error probability:

0.001 x 0.001 = 1 defect per million opportunities

HRO Lesson: Together we are Six Sigma quality (3.4 dpmo*)

* defects per million opportunities

A Cross Checking Success Story

1661 central line days infection free
- and counting!

Hospitals Taking More Steps To Prevent Infections

Amy Jeter , The Virginian-Pilot " March 21, 2010

DAVID B. HOLLINGSWORTH | THE VIRGINIAN-PILOT

Erica Fluegel, a nurse at Sentara Bayside Hospital, checks Mary Elsa McKinley's IV on March 10.

The patient in Sentara Bayside Hospital's critical care unit suffered from septic shock and needed a catheter near her heart. ***Knowing that such central lines can cause serious bloodstream infections, Dr. Nadeem Inayet proceeded with caution***. He confirmed the patient's name and announced the planned procedure. He noted that consent had been given and sterile equipment was available . Inayet washed his hands, donned a mask, gloves, gown and hat and draped the patient from head to toe with a sterile covering. He washed the insertion area with a special antiseptic. He administered a local anesthetic and ***was about to begin when a nurse suddenly said, "Stop." The cover had moved, exposing the patient's bare left foot. They discarded the open equipment tray and started over.*** From the very beginning. "It was fantastic," Inayet later said. Inayet and others in the unit attribute the hospital's success to a variety of factors, …The unit also encourages nurses to speak up more, including stopping a procedure if they see a violation of an infection control practice.

"It's about culture," Inayet said, "and it's about changing it."

Practice Peer Checking and Coaching using ARCC

A responsibility to protect in a manner of mutual respect – an assertion and escalation technique

Use the lightest touch possible…

Ask a question

Make a **R**equest

Voice a **C**oncern

Use **C**hain of Command

A Safety Phrase – "I have a Concern…"

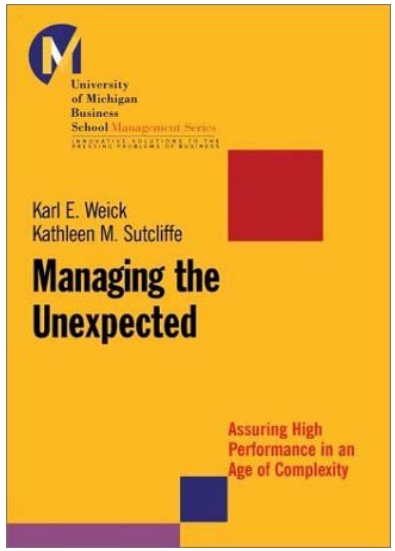
Five Principles of HROs

Preoccupation with Failure

Operating with a chronic wariness of the possibility of unexpected events that may jeopardize safety by engaging in proactive and preemptive analysis and discussion

Sensitivity to Operations

Paying attention to what's happening on the front-line – Ongoing interaction and information-sharing about the human and organizational factors that determine the safety of a system as a whole



Reluctance to Simplify *interpretations*

Taking deliberate steps to question assumptions and received wisdom to create a more complete and nuanced picture of ongoing operations

Commitment to Resilience

- *We talk about mistakes and ways to learn from them*
- *When errors happen, we discuss how we could have prevented them*

Deference to Expertise

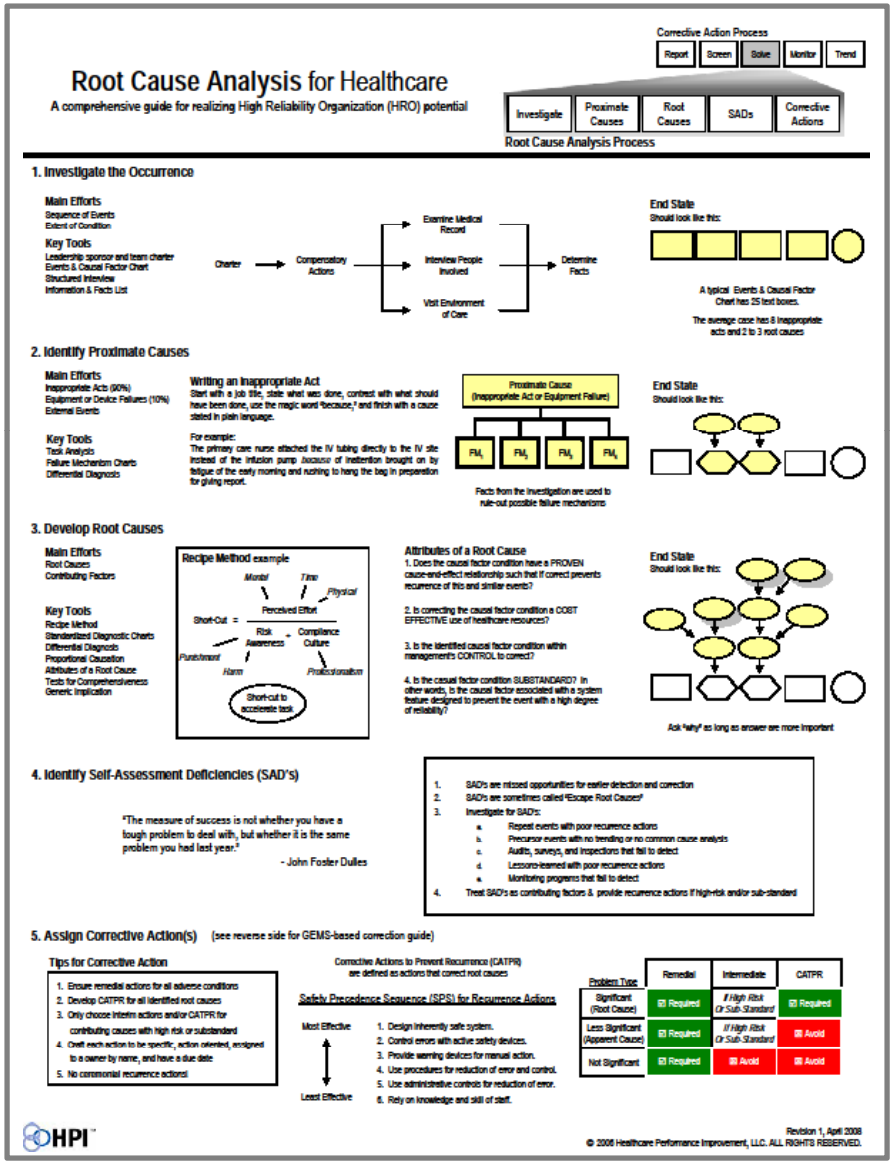
During high-tempo operations, decision-making authority migrates to the person or people with the most expertise with the problem at hand, regardless of rank

Developing capabilities to detect, contain, and bounce back from errors that have already occurred, before they worsen and cause more serious harm

Commitment to Resilience

We talk about mistakes and ways to learn from them…
When errors happen, we discuss how we could have prevented them…

- Cause analysis
- Transparency
- Story telling



Root Cause Analysis for Healthcare

A comprehensive guide for realizing High Reliability Organization (HRO) potential

Corrective Action Process: Report | Screen | Bake | Monitor | Trend

Investigate | Proximate Causes | Root Causes | SADs | Corrective Actions

Root Cause Analysis Process

1. Investigate the Occurrence

Main Efforts
Sequence of Events
Extent of Condition

Key Tools
Leadership sponsor and team charter
Events & Causal Factor Chart
Structured Interview
Information & Facts List

Charter → Compensatory Actions → Examine Medical Record; Interview People Involved; Visit Environment of Care → Determine Facts

End State
Should look like this:

A typical Events & Causal Factor Chart has 25 text boxes.

The average case has 8 inappropriate acts and 2 to 3 root causes

2. Identify Proximate Causes

Main Efforts
Inappropriate Acts (90%)
Equipment or Device Failures (10%)
External Events

Key Tools
Task Analysis
Failure Mechanism Charts
Differential Diagnosis

Writing an Inappropriate Act
Start with a job title, state what was done, contrast with what should have been done, use the magic word "because," and finish with a cause stated in plain language.

For example:
The primary care nurse attached the IV tubing directly to the IV site instead of the infusion pump *because* of inattention brought on by fatigue of the early morning and rushing to hang the bag in preparation for giving report.

Proximate Cause (Inappropriate Act or Equipment Failure) → FM1 | FM2 | FM3 | FM4

Facts from the investigation are used to rule-out possible failure mechanisms

End State
Should look like this:

3. Develop Root Causes

Main Efforts
Root Causes
Contributing Factors

Key Tools
Recipe Method
Standardized Diagnostic Charts
Differential Diagnosis
Proportional Causation
Attributes of a Root Cause
Tests for Comprehensiveness
Generic Implication

Recipe Method example

Mental | Time | Physical | Perceived Effort | Short-Cut = Risk Awareness + Compliance Culture | Punishment | Harm | Professionalism

Short-cut to accelerate task

Attributes of a Root Cause
1. Does the causal factor condition have a PROVEN cause-and-effect relationship such that if correct prevents recurrence of this and similar events?
2. Is correcting the causal factor condition a COST EFFECTIVE use of healthcare resources?
3. Is the identified causal factor condition within management's CONTROL to correct?
4. Is the causal factor condition SUBSTANDARD? In other words, is the causal factor associated with a system feature designed to prevent the event with a high degree of reliability?

End State
Should look like this:

Ask "why" as long as answer are more important

4. Identify Self-Assessment Deficiencies (SAD's)

"The measure of success is not whether you have a tough problem to deal with, but whether it is the same problem you had last year."
- John Foster Dulles

1. SADs are missed opportunities for earlier detection and correction
2. SADs are sometimes called "Escape Root Causes"
3. Investigate for SADs:
   a. Repeat events with poor recurrence actions
   b. Precursor events with no trending or no common cause analysis
   c. Audits, surveys, and inspections that fail to detect
   d. Lessons-learned with poor recurrence actions
   e. Monitoring programs that fail to detect
4. Treat SAD's as contributing factors & provide recurrence actions if high-risk and/or sub-standard

5. Assign Corrective Action(s) (see reverse side for GEMS-based correction guide)

Tips for Corrective Action
1. Ensure remedial actions for all adverse conditions
2. Develop CATPR for all identified root causes
3. Only choose interim actions and/or CATPR for contributing causes with high risk or substandard
4. Craft each action to be specific, action oriented, assigned to a owner by name, and have a due date
5. No ceremonial recurrence actions!

Corrective Actions to Prevent Recurrence (CATPR) are defined as actions that correct root causes

Safety Precedence Sequence (SPS) for Recurrence Actions

Most Effective ↕ Least Effective

1. Design inherently safe system.
2. Control errors with active safety devices.
3. Provide warning devices for manual action.
4. Use procedures for reduction of error and control.
5. Use administrative controls for reduction of error.
6. Rely on knowledge and skill of staff.

Problem Type	Remedial	Intermediate	CATPR
Significant (Root Cause)	☑ Required	If High Risk Or Sub-Standard	☑ Required
Less Significant (Apparent Cause)	☑ Required	If High Risk Or Sub-Standard	☒ Avoid
Not Significant	☑ Required	☒ Avoid	☒ Avoid

HPI™

Revision 1, April 2008

HPI®

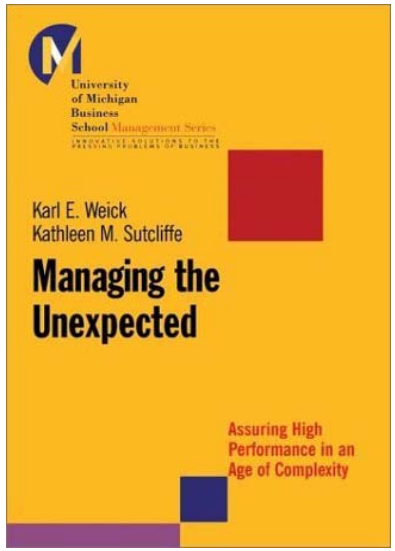
Five Principles of HROs

Preoccupation with Failure

Operating with a chronic wariness of the possibility of unexpected events that may jeopardize safety by engaging in proactive and preemptive analysis and discussion

Sensitivity to Operations

Paying attention to what's happening on the front-line – Ongoing interaction and information-sharing about the human and organizational factors that determine the safety of a system as a whole



Reluctance to Simplify *interpretations*

Taking deliberate steps to question assumptions and received wisdom to create a more complete and nuanced picture of ongoing operations

Commitment to Resilience

Developing capabilities to detect, contain, and bounce back from errors that have already occurred, before they worsen and cause more serious harm

Deference to Expertise

– *We take advantage of the unique skills of our colleagues*
– *When a patient crisis occurs, we rapidly pool our collective expertise to resolve it*

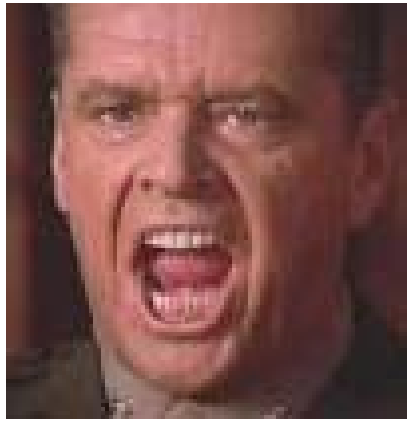
We take advantage of the unique skills of our colleagues…

- On the flight deck:
  - Rank has no privilege
  - Junior officers “own” landing performance
  - Junior sailors can shut down the flight deck

We need to take advantage of the unique skills of our colleagues…

ISMP Acute Care MedicationSafetyAlert!®

- Institute for Safe Medication Practices 2003 Survey
  - 2095 healthcare providers (1565 nurses, 354 pharmacists)
  - 88% condescending language or tone
  - 87% impatience with questions
  - 79% reluctance or refusal to answer questions or phone calls
  - 48% strong verbal abuse
  - 43% threatening body language



Why does it matter?

34% felt the highly respected reputation of the prescriber was intimidating and avoided clarification

31% allowed physician to give medication despite reservations

49% altered their handling of order clarifications or questions

49% felt pressure to accept, dispense or administer a medication despite concerns

75% used avoidance techniques to clarify orders

Can We Function as a Team?

When a patient crisis occurs, we need to rapidly pool our collective expertise to resolve it…

- 75% of surgeons rated teamwork “High”
- Others on the team “not-so-much”
  - 39% of anesthesiologists
  - 28% of surgical nurses
  - 25% of anesthesia nurses
  - 10% of residents

50% of surgeons felt junior team members should not question the decisions of senior physicians

Source: Internal Bleeding, Whachter & Shojania, 2004

Miracle on the Hudson

We MUST Function as a Team

I am very happy to know that, unlike at other appearances we've made, I don't have to explain here what 'crew' means."

– Captain Chesley "Sulley" Sullenberger, in remarks after an emotional, 2-minute standing ovation at the ALPA 55th Air Safety Forum Awards Banquet in Washington, DC

The crew of US Airways Flight 1549 receiving ALPA's first-ever Distinguished Safety Award in August of 2009

Contact Information

Steve Kreiser, CDR (USN Ret.), MBA, MSM
Consultant
Tel: 757.353.7833
Email: steve@hpiresults.com