November 6, 2017

# Applying a Human Factors Mindset Toward Improving Patient Safety

Joint Conference in Healthcare
Taipei, Taiwan

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# Presentation Overview

- ECRI background
- Survey of the healthcare landscape
- Personal perspectives
- Key definitions and sobering statistics
- “Award winning” performance improvement projects and their key characteristics for success
- First steps; establishing a culture of safety
- The start of a roadmap; Practical human factors-related tools for improving patient safety
- Discussion


 

# ECRI Institute

- ECRI is an independent non-profit that researches the best approaches to improving patient care.
- We have an interdisciplinary staff of over 400 researchers, scientists, engineers, statisticians, and healthcare professionals.
- We follow strict conflict-of-interest rules to maintain our objectivity and independence.
- For nearly 50 years we have dedicated ourselves to this mission, bringing the discipline of scientific research to discover which approaches are best.


 

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# Our Campus

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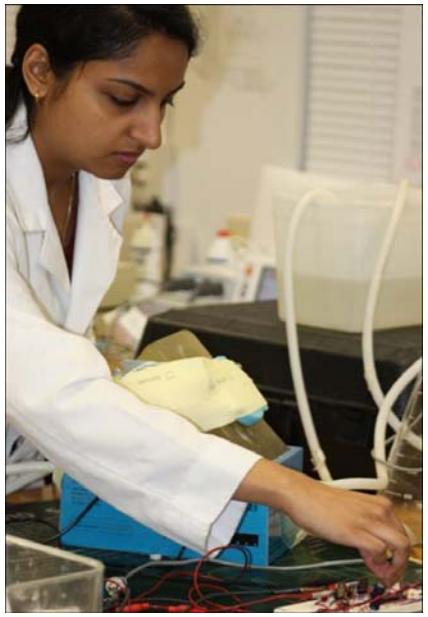
# Health Devices Evaluations and Guidance



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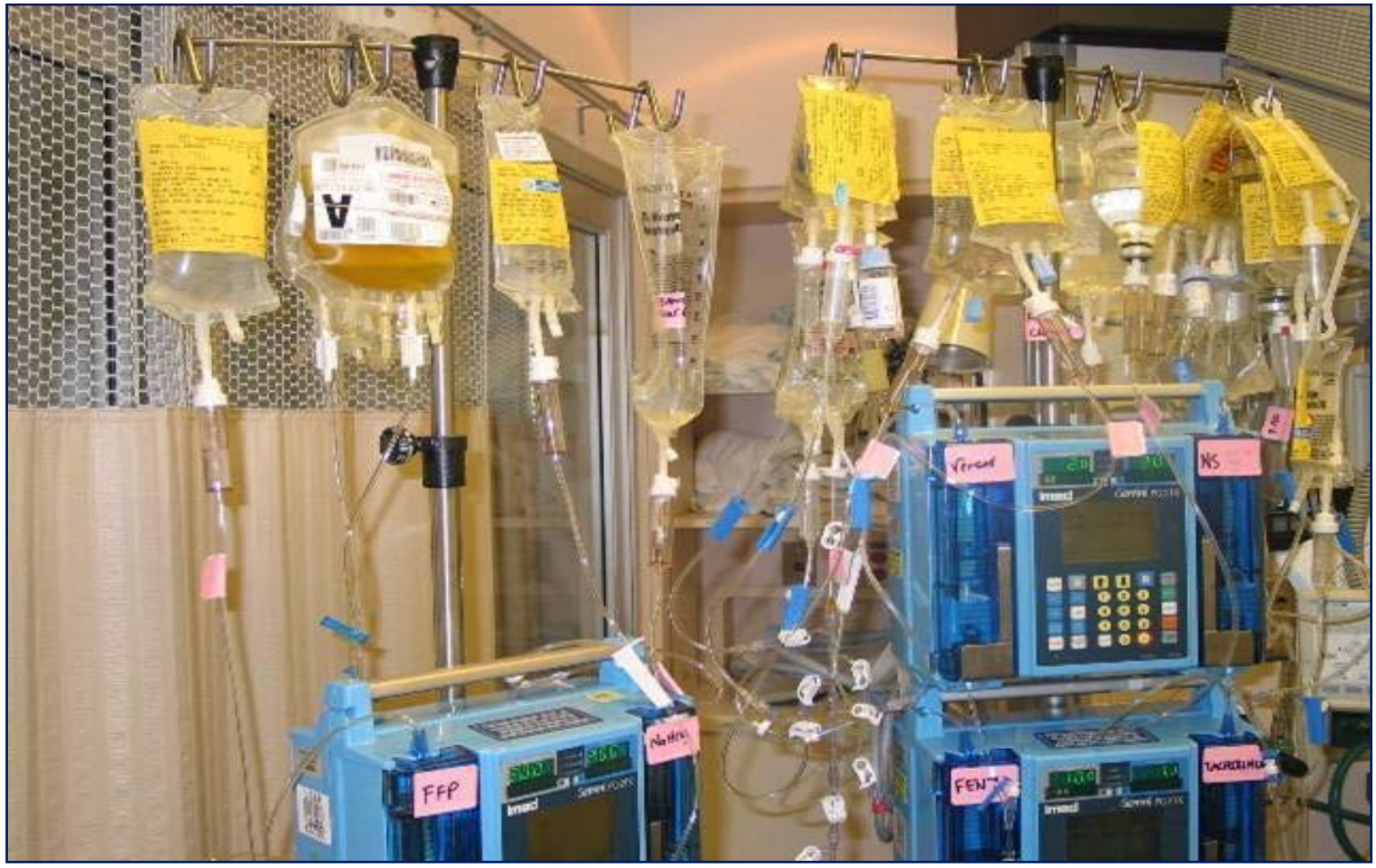
# Healthcare is Not User Friendly

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# A Personal Story

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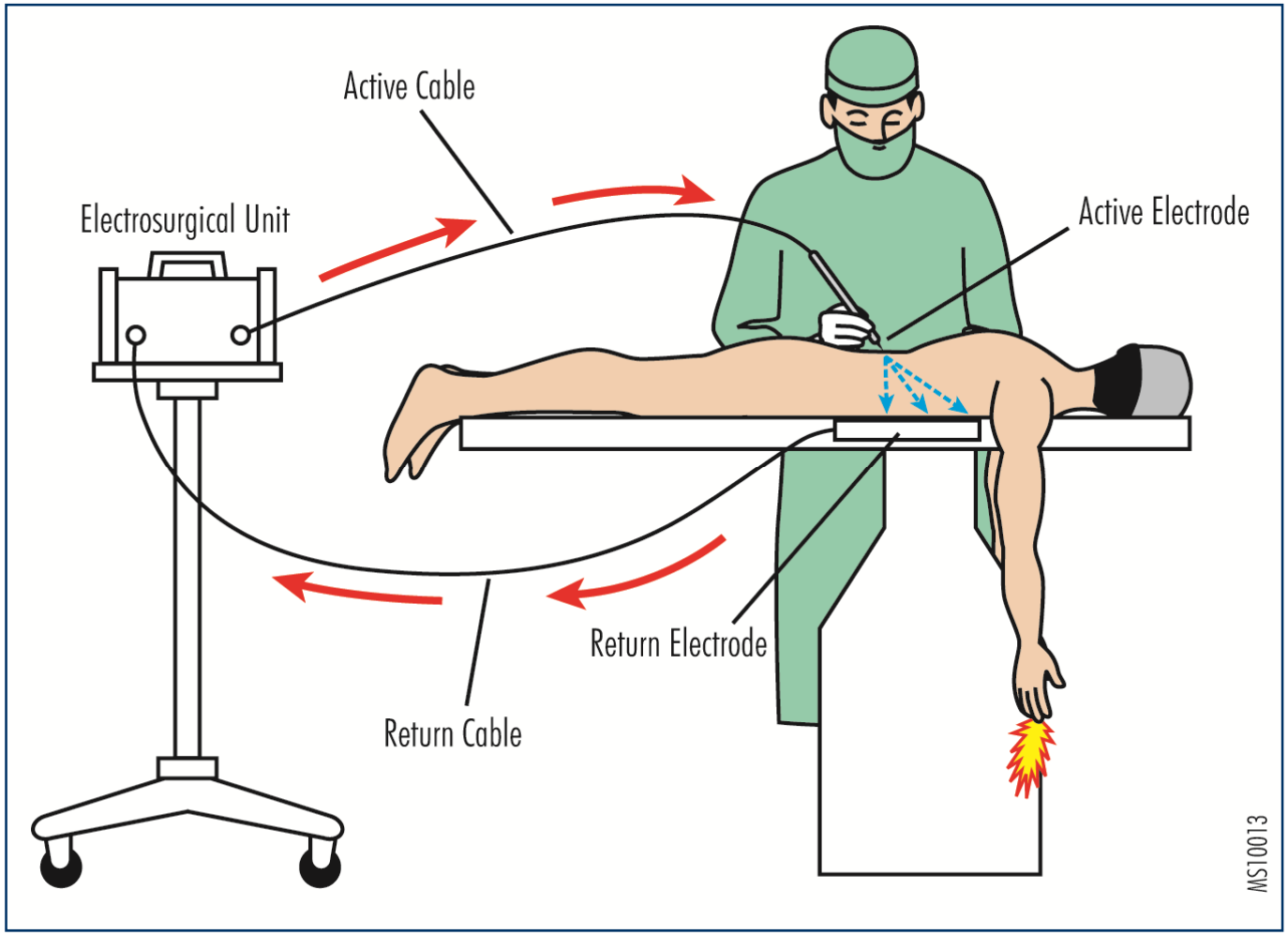
# Typical Problem Close to Home

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# HIT - New Technology Spawns New Problems

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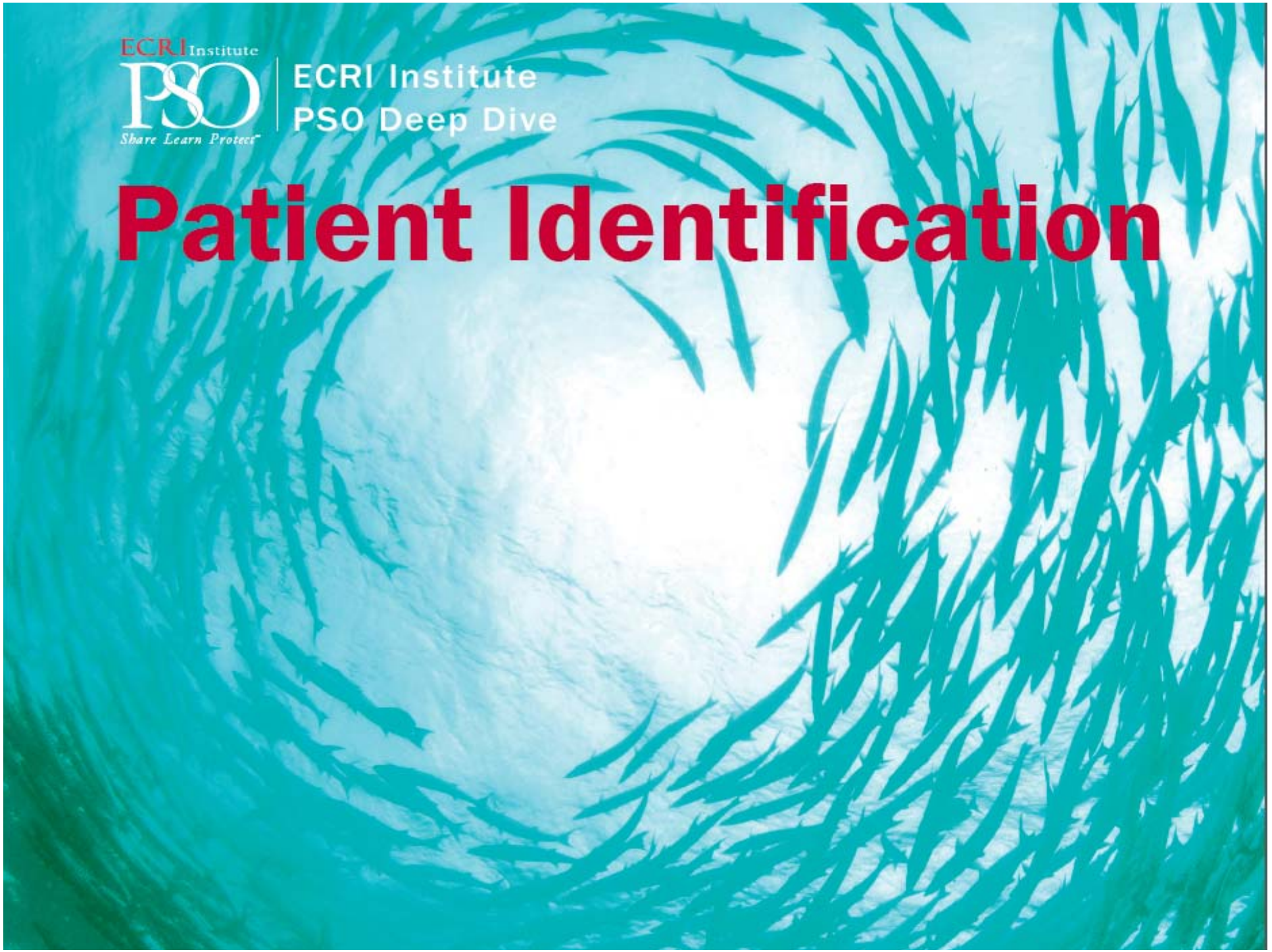
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PSO
Share Learn Protect
ECRI Institute
PSO Deep Dive
Patient Identification

# A “Low-Tech” Source for Identification Errors


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## Variety of Medical "Messages" and Colors Used on Patient Wristbands in Pennsylvania Facilities

| Message \ Colors | Purple | Blue | Teal | Green | Red | Pink | Orange | Yellow | White |
|---|---|---|---|---|---|---|---|---|---|
| DNR | ■ | ■ | | | ■ | ■ | | ■ | |
| Limited DNR | | | ■ | | | | | | |
| Fall Risk | ■ | ■ | | ■ | ■ | ■ | ■ | ■ | |
| Restricted Extremity | ■ | ■ | | ■ | ■ | ■ | ■ | ■ | |
| Allergy (other than latex) | ■ | ■ | | ■ | ■ | ■ | ■ | ■ | |
| Allergy to Latex | ■ | ■ | | ■ | | | | | |
| Tape Allergy | | ■ | | | | | | | |
| Procedure Site | ■ | | | | | | | ■ | |
| Blood Type/Blood Bank ID | | | | ■ | ■ | ■ | | | |
| No Blood Products | | | | | | ■ | | | |
| Outpatient or ER Patient | | ■ | | ■ | | ■ | ■ | ■ | |
| Peds/Mother-Child Match | | | | | | | | ■ | |
| Parent/guardian | | ■ | | | | | | | |
| Similar Name | | ■ | | | | | | | |
| Observation | | | | | | | ■ | | |
| Isolation | | | | ■ | | | | ■ | |
| Elopement | | ■ | | | | | | | |
| Pacemaker | | ■ | | | | | | | |
| Anticoagulants | | ■ | | | | | | | |
| Nothing by Mouth (NPO) | | | | | | | | ■ | |
| Dietary Restrictions | ■ | | | | | | | | |
| Diabetics | | ■ | | | | | | | |

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http://patientsafety.pa.gov/EducationalTools/PatientSafetyTools/wristbands/Documents/wristband_ed_poster.pdf

# Commentary from the WHO

Human factors examines the relationship between human beings and the systems with which they interact by focusing on improving efficiency, creativity, productivity and job satisfaction, with the goal of minimizing errors. A failure to apply human factors principles is a key aspect of most adverse events in health care.

http://www.who.int/patientsafety/education/curriculum/who_mc_topic-2.pdf

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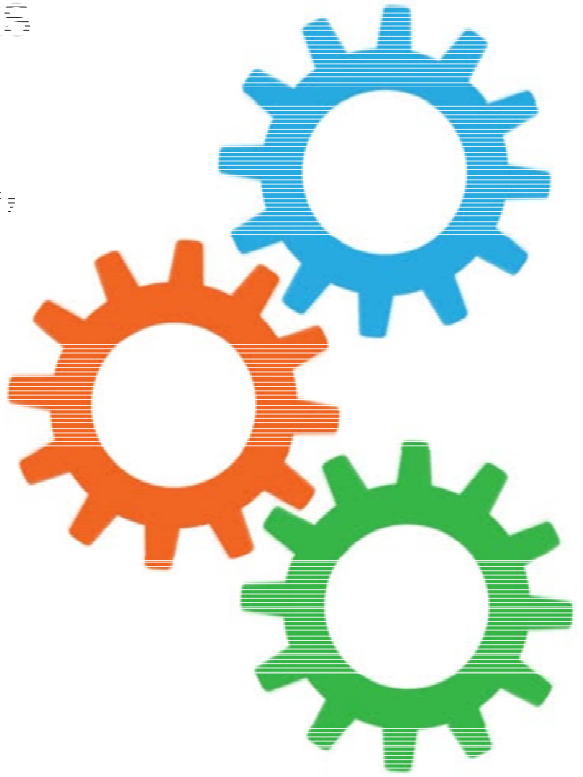
# The Importance of Systems Thinking

- A system is a set of independent parts with a common goal.
- The parts include people, procedures, and the infrastructure of the organization that constantly interact with one another.
- High-reliability organizations (regardless of size) implement systems thinking and systems-based solutions to support patient safety initiatives.



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# We Have a Long Way to Go

- More than 400,000 estimated patient deaths in the United States each year are due to preventable harm

- Nearly 1 in every 20 adults experiences a diagnostic error in the outpatient setting

- As many as 5% of medications administered during surgery involve an error; of those, 79% are believed to be preventable.

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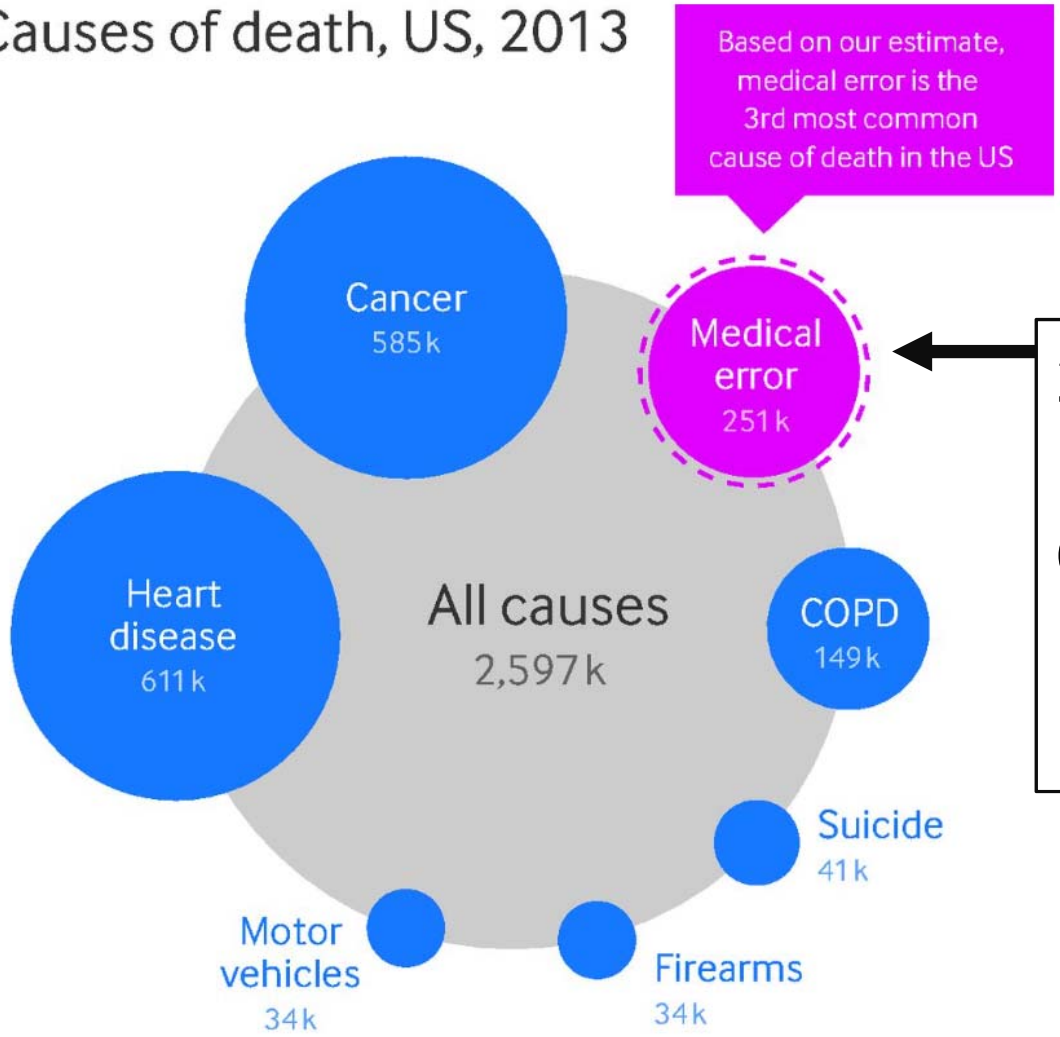
# Causes of death, US, 2013




251,000 Deaths Caused by Medical Error!

However, we're not even counting this - medical error is not recorded on US death certificates



**Data source:**
http://www.cdc.gov/nchs/data/nvsr/nvsr64/nvsr64_02.pdf

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# Dramatic Improvement in Response to Clinical Alarms

- Complaints of long delays in responding to critical alarms in a telemetry monitoring unit
- Task force of almost 20 clinical engineers and technicians, nurses, doctors, researchers, and administrators
- Measured an average of over 9 minutes to respond to alarms
- Identified a two-way voice activated wireless communication system solution
- Reduced response time by 93% (down to 39 seconds)!


 

# Johns Hopkins Hospital

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# Major Reduction in Non-actionable Clinical Alarms

- Response to widely reported problem of alarm fatigue
- Anther multi-disciplinary team
- Led by nursing and clinical engineering
- Recorded number and type of alarms occurring in each care unit
  - Analysis found 317 and 771 alarms per bed per day in two different critical care units
- Adjusted alarm setting parameters
- Resulted in a 43% reduction in alarm frequency
  - Without a negative impact on clinical care or outcomes

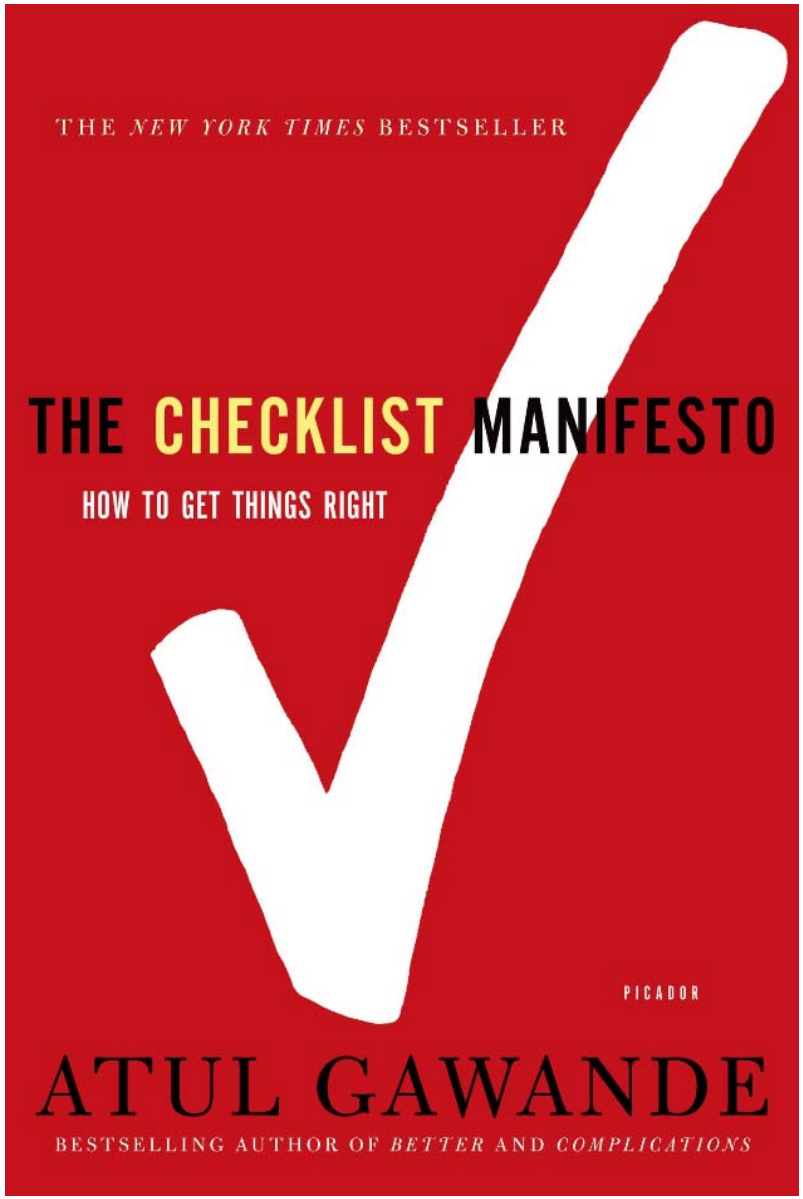

 

# Key Award Winning Project Characteristics

- Identification of a problem
- Assignment of an interdisciplinary team
- Careful measurement of what was actually going on
- Analysis of possible solutions, considering:
  - Workflow, technology, culture, infrastructure, clinical impact
- Deployment of the new solution
  - With strong buy-in from clinical staff
- Measurement of performance to confirm improvement
- Sharing of results (internally and externally)



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# Central Line Blood Stream Infections

- Peter Pronovost from Johns Hopkins
- Initial research identified basic causes to dangerous central line infections
- Deployed a simple checklist-based fix at Johns Hopkins that brought infection rate down to zero
- Replicated at over 100 hospitals in Michigan


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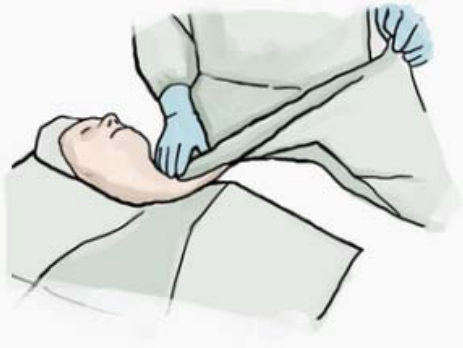
## Five steps to prevent central line infections

**1** Wash hands using soap or alcohol prior to placing the catheter.

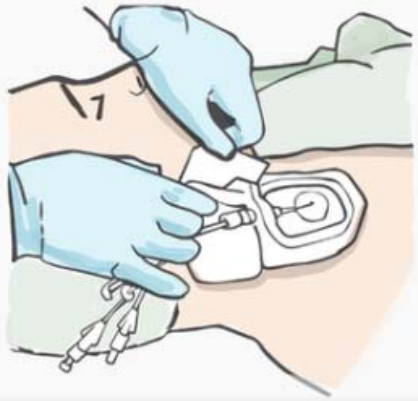
**2** Wear sterile gloves, hat, mask and gown.

**3** Completely cover the patient with sterile drapes. Avoid placing the catheter in the groin, if possible.



**4** Clean the insertion site on the patient's skin with chlorhexidine antiseptic solution.

**5** Remove catheters when they are no longer needed.



SOURCE: *Safe Patients, Smart Hospitals. Peter Pronovost*

Vox

# Good News/Bad News

- Straight-forward performance measure
  - Central line blood infections
- New reporting requirements
  - In January 2011, the Centers for Medicare and Medicaid Services (CMS) began requiring acute care hospitals participating in their Inpatient Prospective Payment System (IPPS) to report CLABSIs in adult, pediatric, and neonatal intensive care units.
- Simple fix (Pronovost's checklist)
- Yet central line infections killed nearly 10,000 hospital patients in 2013

# Culture Trumps Process

Sir Liam Donaldson
WHO Envoy for Patient Safety

http://www.leadinghealthsystemsnetwork.org/#!Webinar-recording-available-The-Road-to-Safer-Care-The-Challenge-for-Health-Systems/c1eu6/55afb8f90cf286eab0294fde

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# 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**

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# Leading a Culture of Safety – A Blueprint for Success


https://www.osha.gov/shpguidelines/docs/Leading_a_Culture_of_Safety-A_Blueprint_for_Success.pdf

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A culture of safety is an environment where _____ is the primary goal, which comes from _____, communication, and implementation of modern safety concepts.

- Risk management; teamwork
- Loss control; risk management
- X Safety; teamwork
- Safety; risk management

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## SECTION E: Patient Safety Grade

**Please give your work area/unit in this hospital an overall grade on patient safety.**

| ☒ A | ☐ B | ☐ C | ☐ D | ☐ E |
|---|---|---|---|---|
| Excellent | Very Good | Acceptable | Poor | Failing |

## SECTION F: Your Hospital

**Please indicate your agreement or disagreement with the following statements about your hospital.**

| **Think about your hospital…** | **Strongly Disagree** ▼ | **Disagree** ▼ | **Neither** ▼ | **Agree** ▼ | **Strongly Agree** ▼ |
|---|---|---|---|---|---|
| 1. Hospital management provides a work climate that promotes patient safety | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☒ 5 |
| 2. Hospital units do not coordinate well with each other | ☒ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 |
| 3. Things “fall between the cracks” when transferring patients from one unit to another | ☒ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 |
| 4. There is good cooperation among hospital units that need to work together | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☒ 5 |

https://www.ahrq.gov/professionals/quality-patient-safety/patientsafetyculture/hospital/index.html

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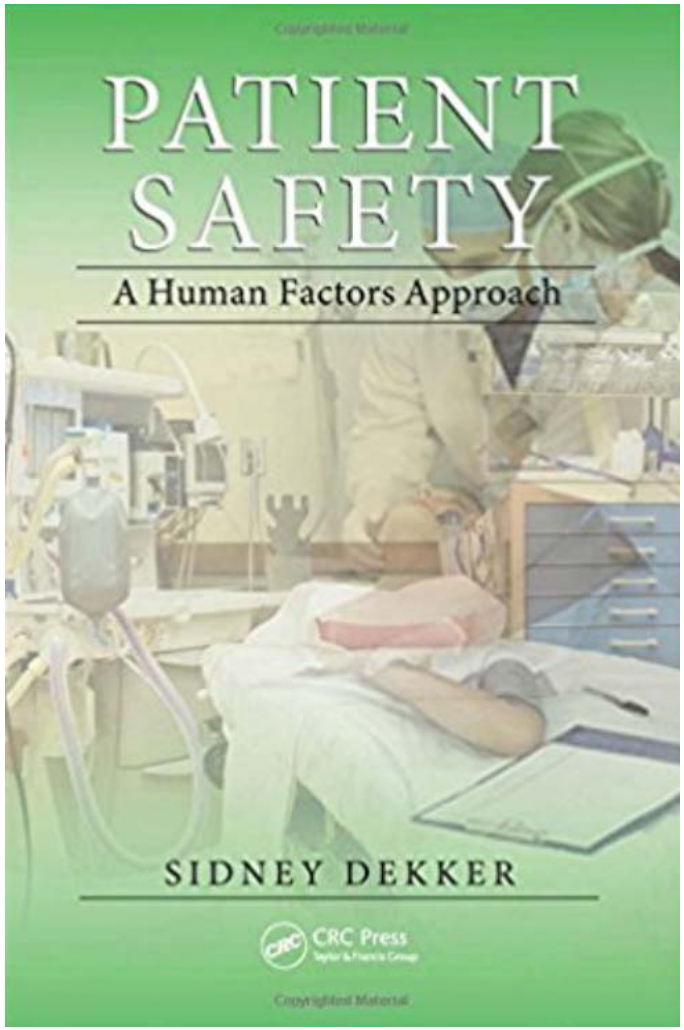
# Practical Tools for Creating Patient Safety

- Safety reporting and organizational learning
- Adverse event investigation
- Human factors and resource management training
- Briefings and checklists




https://www.crcpress.com/Patient-Safety-A-Human-Factors-Approach/Dekker/p/book/9781439852255

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# The Value of Problem Reporting

- Helps prevent problems from recurring but also helps meet the requirements of the government, insurers, or certifying bodies.
- Can help lower the institution's liability profile (in some countries).
- Contributes to transparent operations in the healthcare system when encouraged in a non-punitive way
- Available information for future research/investigations
- From a broader perspective, it can ultimately benefit the entire healthcare community.


 


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# Observation and Simulation

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https://www.ted.com/talks/peter_weinstock_lifelike_simulations_that_make_real_life_surgery_safer?utm_campaign=tedspread-a&utm_medium=referral&utm_source=tedcomshare#t-6640

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# It’s Not Just Within the Hospital Walls


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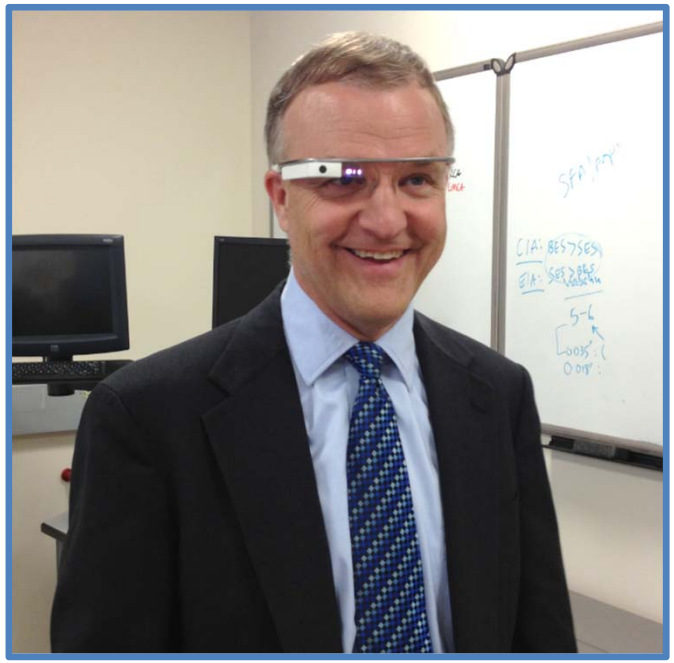
# Final Thoughts

- Look for where you are performing well
  - Find out why and how it can be replicated
- Closely monitor for improvement opportunities
  - Workflow is a good area to focus on
- Find strong leaders to push your changes across all levels of care
- Front line support is a must
- Measure to see how it worked and report your results



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# Questions?

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## Thank You