ADAPTIVE CHANGE, CULTURE AND EFFECTIVE TEAMWORK

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Safe & Reliable Healthcare
Adjunct Professor of Medicine, Duke University
What is the Conversation at Jefferson?

• We’ve done all this great stuff and we’re still having problems
• The age of transparency and value is here and we can’t compete successfully on that basis.
• We still have common defects like central line infections, our sepsis outcomes are not optimal, we’re not highly reliable in surgery, and there are still pre-39 week social inductions despite our many meetings and numerous policies.
Is Higher Quality, Lower Cost Optional?

- Disruptive players – Walmart, CVS, Caymans, medical tourism
- Massive economic forces – where is the cost burden moving?
- Transparency – can I see how good your hospital is on my iPhone?
- Keeping the lights on
The Quality of Healthcare in America

- 30 evidenced based practices:
  - ACE inhibitors for CHF
  - Beta blockers / ASA for post MI
  - The chance of an average patient receiving appropriate care was 55%

The Quality of Health Care Delivered to Adults in the United States

Elizabeth A. McGlynn, Ph.D., Steven M. Asch, M.D., M.P.H., John Adams, Ph.D.,
Joan Keesey, B.A., Jennifer Hicks, M.P.H., Ph.D., Alison DeCristofaro, M.P.H.,
and Eve A. Kerr, M.D., M.P.H.

Abstract

Background
We have little systematic information about the extent to which standard processes involved in health care — a key element of quality — are delivered in the United States.

Methods
We telephoned a random sample of adults living in 12 metropolitan areas in the United States and asked them about selected health care experiences. We also received written consent to copy their medical records for the most recent two-year period and used this information to evaluate performance on 48 indicators of quality of care for 10 acute and chronic conditions as well as preventive care. We then constructed aggregate scores.

Results
Participants received 54.9 percent (95 percent confidence interval, 54.3 to 55.5) of recommended care. We found little difference among the proportion of recommended preventive care provided (54.9 percent), the proportion of recommended acute care provided (53.5 percent), and the proportion of recommended care provided for chronic conditions (56.1 percent). Among different medical functions, adherence to the processes involved in care ranged from 52.2 percent for screening to 98.5 percent for follow-up care. Quality varied substantially according to the particular medical condition, ranging from 78.7 percent of recommended care (95 percent confidence interval, 73.3 to 84.2) for senile cataract to 10.5 percent of recommended care (95 percent confidence interval, 6.8 to 14.6) for alcohol dependence.

Conclusions
The deficits we have identified in adherence to recommended processes for basic care pose serious threats to the health of the American public. Strategies to reduce these deficits in care are warranted.
Avoidable Patient Harm

- 30% of hospitalized patients have something happen to them you and I wouldn’t want to happen to us
- 6% are harmed seriously enough to stay in the hospital longer and go home with a disability
- >200,000 Medicare patients die every year from medical harm
Looking at Sepsis

• Up to 50% of patients are septic at the time of death in American Hospitals
• Some hospitals treat sepsis very consistently with good outcomes, many do not.
• Let’s look and see how you think you would do or where the important processes are to become “always events.”
Sepsis: Getting it Right or Wrong

1. Define Time Zero
2. Diagnosis / high Index Suspicion
3. Sepsis Bundle < 3 hours
4. Lactate > 4, unstable gets CVP, MVO2 measurement, pressors PRN
5. Who owns the patient? Warm handoff. No delay
SURVIVING SEPSIS CAMPAIGN BUNDLES

TO BE COMPLETED WITHIN 3 HOURS:
1) Measure lactate level
2) Obtain blood cultures prior to administration of antibiotics
3) Administer broad spectrum antibiotics
4) Administer 30 mL/kg crystalloid for hypotension or lactate ≥4 mmol/L

TO BE COMPLETED WITHIN 6 HOURS:
5) Apply vasopressors (for hypotension that does not respond to initial fluid resuscitation) to maintain a mean arterial pressure (MAP) ≥ 65 mm Hg
6) In the event of persistent arterial hypotension despite volume resuscitation (septic shock) or initial lactate ≥4 mmol/L (36 mg/dL):
   - Measure central venous pressure (CVP)*
   - Measure central venous oxygen saturation (Scvo₂)*
7) Remeasure lactate if initial lactate was elevated*

*Targets for quantitative resuscitation included in the guidelines are CVP of ≥8 mm Hg, Scvo₂ of ≥70%, and normalization of lactate.

Figure 1. Surviving Sepsis Campaign Care Bundles.
Sepsis – A Phased Approach

• Severe sepsis – 4 things every time within 3 hours
• Septic shock – hemodynamic monitoring, pressure support, etc.
• Patients who declare themselves in the hospital – surveillance and EWS
• Patients who return septic after discharge
Long-Term Cognitive Impairment after Critical Illness


BACKGROUND
Survivors of critical illness often have a prolonged and disabling form of cognitive impairment that remains inadequately characterized.

METHODS
We enrolled adults with respiratory failure or shock in the medical or surgical intensive care unit (ICU), evaluated them for in-hospital delirium, and assessed global cognition and executive function 3 and 12 months after discharge with the use of the Repeatable Battery for the Assessment of Neuropsychological Status (population age-adjusted mean [±SD] score, 100±15, with lower values indicating worse global cognition) and the Trail Making Test, Part B (population age-, sex-, and education-adjusted mean score, 50±10, with lower scores indicating worse executive function). Associations of the duration of delirium and the use of sedative or analgesic agents with the outcomes were assessed with the use of linear regression, with adjustment for potential confounders.

RESULTS
Of the 821 patients enrolled, 6% had cognitive impairment at baseline, and delirium developed in 74% during the hospital stay. At 3 months, 40% of the patients had global cognition scores that were 1.5 SD below the population means (similar to scores for patients with moderate traumatic brain injury), and 26% had scores 2 SD below the population means (similar to scores for patients with mild Alzheimer's disease). Deficits occurred in both older and younger patients and persisted, with 34% and 24% of all patients with assessments at 12 months that were similar to scores for patients with moderate traumatic brain injury and scores for patients with mild Alzheimer's disease, respectively. A longer duration of delirium was independently associated with worse global cognition at 3 and 12 months (P=0.001 and P=0.04, respectively) and worse executive function at 3 and 12 months (P=0.004...
Cognitive Impairment: Sepsis

Before Sepsis

-3 years

-1 year

After Sepsis

+1 year

+ 3 years

% survivors cognitively impaired

Mild Cognitive Impairment
Moderate/Severe Cog Impairment

p < 0.001

Iwashyna T, JAMA 2010;304:1787-1794

Attribution: Dr. Wes Ely, Vanderbilt Univ.
Central Line Infections – Haven’t we fixed that problem?
Teamwork Climate Across Michigan ICUs

No BSI = 5 months or more w/ zero

The strongest predictor of clinical excellence: caregivers feel comfortable speaking up if they perceive a problem with patient care

Attribution: Bryan Sexton
An Intervention to Decrease Catheter-Related Bloodstream Infections in the ICU

Peter Pronovost, M.D., Ph.D., Dale Needham, M.D., Ph.D., Sean Berenholtz, M.D., David Sinopoli, M.P.H., M.B.A., Haitao Chu, M.D., Ph.D., Sara Cosgrove, M.D., Bryan Sexton, Ph.D., Robert Hyzy, M.D., Robert Welsh, M.D., Gary Roth, M.D., Joseph Bander, M.D., John Kepros, M.D., and Christine Goeschel, R.N., M.P.A.

• 103 ICUs, all but 5 in Michigan
• 1981 ICU-months of data and 375,757 catheter-days
• 16-18 months of follow-up

“Keystone ICU project”
• **Team leaders** - the ICUs were asked to designate at least one physician and one nurse as Team leaders

• Team leaders were *instructed in the science of safety*, and in the interventions

• This *information was disseminated* among their colleagues

• **Training of the team leaders** was accomplished through
  – conference calls every other week
  – coaching by research staff, and
  – statewide meetings twice a year

• **The teams received supporting information** on
  – the efficacy of each component of the intervention
  – suggestions for implementing each component, and
  – instruction in methods of data collection

• **Team leaders were partnered with their local hospital-based infection-control practitioners** to assist in the implementation of the intervention and to obtain data on catheter-related bloodstream infections at the hospital.
How did they do it?

- **Clinicians were educated** about practices to control infection and harm resulting from catheter-related bloodstream infections
- A **central-line cart** with necessary supplies was created
- A **checklist** was used to ensure adherence to infection-control practices
- **Providers were stopped** (in non-emergency situations) if these practices were not being followed
- **Removal of catheters was discussed** at daily rounds
- **Teams received feedback** regarding the number and rates of catheter-related bloodstream infection at monthly and quarterly meetings, respectively

- In April 2004, a **letter and a baseline survey were sent to the chief executive officers** of the participating hospitals. The letter outlined the evidence supporting the use of chlorhexidine and asked the CEOs to stock chlorhexidine in their hospitals before implementing the study intervention.
Improving Safety Requires a Learning System

- Safety is a characteristic of a **SocioTechnical system**
- System-level failures occur almost always because of unforeseen combinations of component failures
Safety Cultures Evolve

**UNMINDFUL**
“We show up, don’t we?”
Chronically Complacent

**REACTIVE**
“We safety is important. We do a lot every time we have an accident”

**SYSTEMATIC**
Systems being put into place to manage most hazards

**PROACTIVE**
“We methodically anticipate”—prevent problems before they occur

**GENERATIVE**
Organizational Culture “Genetically-wired” to produce safety

Where is Yours?

Attribution: Prof. Patrick Hudson, Univ. Leiden
SocioTechnical Framework

- Patient & Family Centered Care
- Leadership – Senior and Clinical
- Effective Teamwork
- Psychological Safety
- Organizational Fairness
- Reliable Processes of Care
- Learning System - Improvement

Unmindful • Reactive • Systematic • Proactive • Generative
Senior Leadership

**GENERATIVE**
Organization wired for safety and improvement

**PROACTIVE**
Playing offense - thinking ahead, anticipating, solving problems

**SYSTEMATIC**
Systems in place to manage hazards

**REACTIVE**
Playing defense – reacting to events

**UNMINDFUL**
No awareness of safety culture

- Cyclic flow of information with feedback and organizational learning
- Systematic engagement with dialogue, support and learning
- Process for interaction between senior leaders and front line staff
- They’re here – something bad must have happened
- We don’t know or see them

Safe & Reliable Healthcare
Leadership Characteristics

- Non Negotiable Mutual Respect, Every Interaction, Every Day.
- Paul O’Neill – “Once you get used to taking the high road, putting values over expedience, and treating people like people and not the means, it gets easier and easier.
Adaptive versus Technical Leadership

- Known v. unknown problems
- Differences in style
- Knowing when to shift your leadership style
Chris Argyris

Teaching Smart People How to Learn

by Chris Argyris

FROM THE MAY 1991 ISSUE

• Why is it so hard?
• Single loop learning
• Double loop learning
• Not talking about the stuff we don’t talk about
Clinical Leadership

- Leaders create high degrees of psych safety and accountability.
- Leaders model the desired behaviors to drive culture of safety.
- Training and support exists for building clinical leadership.
- Episodic, completely dependent on the individual clinician.
- Absent for the most part.
Effective Leadership

- Set a positive active tone
- Think out loud to share the plan – common mental model
- Continuously invite people into the conversation for their expertise and concern
- Use their names
Drift = Risk

- **100% Agreement Non-acceptable**
- **Usual Space Of Action**
  - ‘Illegal normal’
  - Real Life standards 60-90%
- **Expected safe space of action as defined by professional standards**
- **Safety Reg’s & good practices, accreditation standards**

100% Expected safe space of action as defined by professional standards

**High**

- Production Performance
- Individual Benefits

**Low**

- VERY UNSAFE SPACE

**Accident**

Attribution: Dr. Rene Amalberti
Ambiguity and Workarounds as Contributors to Medical Error

Steven J. Spear, DBA, MS, MS, and Mark Schmidhofer, MD, MS

Why are some organizations error-prone—regularly subject to interruptions and inconveniences, some of which periodically coalesce catastrophically—whereas other organizations, although similar in the products and services they generate and the process technologies they use, are reliable, adaptable, and continuously self-improving, relentlessly learning from experience to get ever better?

Analyzing medical error reports and studies of high-performing, non-health care organizations reveals 2 differences. High performers know how to prevent problems from producing further consequences once they occur and how to prevent their recurrence. They do this by specifying how work is expected to proceed—who will do what for whom, with what purpose, when, where, and how—before work is actually done. Then, when anything contrary to expectations occurs, it is immediately identified as a problem. Through this approach, the effects of problems are contained, the causes are quickly investigated, process knowledge is deepened, and recurrence is prevented.

In contrast, error-prone organizations tolerate ambiguity, a prevailing lack of clarity over what is supposed to happen at any given time. Problems are thus hard to identify, and, even when recognized, they are worked around. People “get the job done,” but don’t initiate efforts to learn from the problem or improve the process.

We believe that coupling high degrees of specification with rapid responses to individual problems can improve health care. Superlative manufacturing, service, and military organizations apply this approach to myriad processes and situations, and initial health care trials of this approach have been promising. We discuss how such an approach could be initiated in health care more broadly.

For author affiliations, see end of text.
**Culture and Leadership**

**SPECIAL ARTICLE**

**A Surgical Safety Checklist to Reduce Morbidity and Mortality in a Global Population**


**BACKGROUND**

Surgery has become an integral part of global health care, with an estimated 234 million operations performed yearly. Surgical complications are common and often preventable. We hypothesized that a program to implement a 19-item surgical safety checklist designed to improve team communication and consistency of care would reduce complications and deaths associated with surgery.

**METHODS**

Between October 2007 and September 2008, eight hospitals in eight cities (Toronto, Canada; New Delhi, India; Amman, Jordan; Auckland, New Zealand; Manila, Philippines; Kilimanjaro, Tanzania; London, England; and Seattle, WA) representing a variety of economic circumstances and diverse populations of patients participated in the World Health Organization’s Safe Surgery Saves Lives program. We prospectively collected data on clinical processes and outcomes from 3733 consecutively enrolled patients 16 years of age or older who were undergoing nonsurgical cancer surgery. We subsequently collected data on 895 consecutively enrolled patients after the introduction of the Surgical Safety Checklist. The primary end point was the rate of complications, including death, during hospitalization within the first 30 days after the operation.

**RESULTS**

The rate of death was 1.5% before the checklist was introduced and declined to 0.8% afterward (P=0.003). Inpatient complications occurred in 11.0% of patients at baseline and in 7.0% after introduction of the checklist (P=0.003).

**CONCLUSIONS**

Implementation of the checklist was associated with concomitant reductions in the rates of death and complications among patients at least 16 years of age who were undergoing nonsurgical cancer surgery in a diverse group of hospitals.

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**SPECIAL ARTICLE**

**Introduction of Surgical Safety Checklists in Ontario, Canada**

David R. Urbach, M.D., Anand Govindarajan, M.D., Refik Sasin, M.Sc., Andrew S. Wilton, M.Sc., and Nancy N. Baxter, M.D., Ph.D.

**ABSTRACT**

**BACKGROUND**

Evidence from observational studies that the use of surgical safety checklists results in striking improvements in surgical outcomes led to the rapid adoption of such checklists worldwide. However, the effect of mandatory adoption of surgical safety checklists is unclear. A policy encouraging the universal adoption of checklists by hospitals in Ontario, Canada, provided a natural experiment to assess the effectiveness of checklists in typical practice settings.

**METHODS**

We surveyed all acute care hospitals in Ontario to determine when surgical safety checklists were adopted. Using administrative health data, we compared operative mortality, rate of surgical complications, length of hospital stay, and rates of hospital readmission and emergency department visits within 30 days after discharge among patients undergoing a variety of surgical procedures before and after adoption of a checklist.

**RESULTS**

During 3-month periods before and after adoption of a surgical safety checklist, a total of 101 hospitals performed 109,341 and 106,370 procedures, respectively. The adjusted risk of death during a hospital stay or within 30 days after surgery was 0.71% (95% confidence interval [CI], 0.66 to 0.76) before implementation of a surgical checklist and 0.65% (95% CI, 0.60 to 0.70) afterward (odds ratio, 0.91; 95% CI, 0.80 to 1.03; P=0.13). The adjusted risk of surgical complications was 3.86% (95% CI, 3.76 to 3.96) before implementation and 3.82% (95% CI, 3.71 to 3.92) afterward (odds ratio, 0.95; 95% CI, 0.90 to 1.03; P=0.29).

**CONCLUSIONS**

Implementation of surgical safety checklists in Ontario, Canada, was not associated with significant reductions in operative mortality or complications. (Funded by the Canadian Institutes of Health Research.)
The Ideal Unit
Culture – how do you approach it?

- How do you measure it?
- At what level – hospital v. unit based?
- What response rate is the desired minimum?
- Does it reflect the perceptions of caregivers at a unit level?
- What is the process of debriefing and addressing the issues raised?
- How is the process used to build trust, improve culture and drive visible learning?
- Follow with qualitative assessment and explicit actions
Safety Culture

• Culture is behavior over time
• High performing cultures are very clear about defining the behaviors that create value and the behaviors that create unacceptable risk
• The Social Glue
• What We Say v. What We Do is critical
Psychological Safety Is Local

In this clinical area, it is difficult to speak up if I perceive a problem with patient care.

Note: Use the multicolored bars to see how you fit with the benchmark archive. If you have less red and more green than the benchmark, you are more positive than the benchmark. If the colors all match up, you are about the same as the benchmark.
Psychological Safety

We are our own image consultants and best image protectors

To protect one’s image, if you don’t want to look:

- STUPID
  - Don’t ask questions
- INCOMPETENT
  - Don’t ask for feedback
- NEGATIVE
  - Don’t be doubtful or criticize
- DISRUPTIVE
  - Don’t suggest anything innovative

PSYCHOLOGICAL SAFETY CHANGES THIS PARADIGM

Source: Amy Edmondson
Culture is related to...

Teamwork Climate Scores Across Facility

<table>
<thead>
<tr>
<th>Department</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCU</td>
<td>28</td>
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<tr>
<td>REHAB</td>
<td>33</td>
</tr>
<tr>
<td>OR</td>
<td>36</td>
</tr>
<tr>
<td>EMERG</td>
<td>41</td>
</tr>
<tr>
<td>5 WEST</td>
<td>45</td>
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<tr>
<td>6 WEST</td>
<td>45</td>
</tr>
<tr>
<td>Peds</td>
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</tr>
<tr>
<td>Geri</td>
<td>49</td>
</tr>
<tr>
<td>Dialysis</td>
<td>51</td>
</tr>
<tr>
<td>Periop</td>
<td>52</td>
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<tr>
<td>Pharm</td>
<td>55</td>
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<tr>
<td>3 west</td>
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<tr>
<td>ICU</td>
<td>62</td>
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<td>NICU</td>
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<tr>
<td>Peds</td>
<td>80</td>
</tr>
<tr>
<td>OB</td>
<td>98</td>
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</tbody>
</table>

- HCAHPS: 50
- Medication Errors per Month: 6.1
- Days between C Diff Infections: 40
- Days between Stage 3 Pressure Ulcers: 18

Illustrative Data: Extracted from Blinded Client Data
... AND UNFAVORABLE EMPLOYEE OUTCOMES

Teamwork Climate Scores Across Facility

- CCU: 28
- REHAB: 33
- OR: 36
- EMERG: 41
- 5 WEST: 45
- 6 WEST: 45
- Peds: 49
- Geri: 49
- Dialysis: 51
- Periop: 52
- Pharo: 55
- 3 West: 62
- ICU: 62
- NICU: 73
- SICU: 75
- Peds: 80
- OB: 98

<60% Score = Danger Zone

Illustrative Data: Extracted from Blinded Client Data

- Employee Satisfaction: 55
- Employee Injury per 1000 days: 16
- Employee Absenteeism per 1000 days: 15
- RN Vacancy Rate: 9

- 91
- 0.1
- 10
- 1
Perceptions of Hospital Safety Climate and Incidence of Readmission

Luke O. Hansen, Mark V. Williams, and Sara J. Singer

**Objective.** To define the relationship between hospital patient safety climate (a measure of hospitals’ organizational culture as related to patient safety) and hospitals’ rates of rehospitalization within 30 days of discharge.

**Data Sources.** A safety climate survey administered to a random sample of hospital employees ($n = 36,375$) in 2006–2007 and risk-standardized hospital readmission rates from 2008.

**Study Design.** Cross-sectional study of 67 hospitals.

**Data Collection.** Robust multiple regressions used 30-day risk-standardized readmission rates as dependent variables in separate disease-specific models (acute myocardial infarction [AMI], heart failure [HF], pneumonia), and measures of safety climate as independent variables. We estimated separate models for all hospital staff as well as physicians, nurses, hospital senior managers, and frontline staff.

**Principal Findings.** There was a significant positive association between lower safety climate and higher readmission rates for AMI and HF ($p < .05$ for both models). Frontline staff perceptions of safety climate were associated with readmission rates ($p < .01$), but senior management perceptions were not. Physician and nurse perceptions related to AMI and HF readmissions, respectively.

**Conclusions.** Our findings indicate that hospital patient safety climate is associated with readmission outcomes for AMI and HF and those associations were management level and discipline specific.
Wrong Site Surgery or Retained Foreign Body in 17 Operating Rooms
Using Cultural Data and Teamwork to Drive Improvement

- 2009 Percent Favorable
- 2010 Percent Favorable
- 2010 Hospital Partner

Safe & Reliable Healthcare
Domain: Resilience/Burnout

People are affected by events here in an unhealthy way (94)

- Working too hard on their jobs (96)
- Burned out from their work (96)
- Exhausted from their work (96)
- Frustrated by their jobs (96)

Percentage:
- 100%
- 80%
- 60%
- 40%
- 33%
- 31%
- 20%
- 0%
- 49%
- 59%
Domain: Work/Life Balance

- Skipped a meal (88)
- Changed personal/family plans because of work (89)
- Slept less than 5 hours in a night (94)
- Had difficulty sleeping (93)
- Worked through a day/shift without any breaks (89)
- Ate a poorly balanced meal (89)
- Arrived home late from work (89)

Safe & Reliable Healthcare
Effective Teamwork

**GENERATIVE**
Organization wired for safety and improvement

**PROACTIVE**
Playing offense - thinking ahead, anticipating, solving problems

**SYSTEMATIC**
Systems in place to manage hazards

**REACTIVE**
Playing defense – reacting to events

**UNMINDFUL**
No awareness of safety culture

- Teamwork and continuous learning deeply embedded and central to our culture
- Teamwork methodically taught and modeled across the organization
- Training and tools available, partial implementation
- Focus on teamwork awareness / training in response to adverse events
- If people would just do their jobs we’d have no problems
Teams

- **What Teams Do:**
  - Plan Forward
  - Reflect Back
  - Communicate Clearly
  - Manage Conflict

The associated behaviors:

- Brief (huddle, pause, timeout, check-in)
- Debrief
- Structured Communication SBAR and Repeat-Back
- Critical Language
Gary Klein – Expert Decision making

- Experts pattern match
- Quick and accurate as long as one tests
- Mental simulation is common and valuable – high performing teams simulate together
- What about the newbies?
Objective: To study the role of human factors on surgical outcomes, with a series of 243 arterial switch operations performed by 21 surgeons taken as a model.

Methods: The following data were collected: patient-specific and procedural variables, self-assessment questionnaires, and a written report from a human factors researcher who observed the operation. The relationship of patient-specific variables to outcomes (death and death and/or near miss) was used to develop a multivariable baseline model to analyze the role of human factors after adjustment for these variables.

Results: The overall mortality was 6.6% with 24.3% of cases resulting in death and death and/or near misses. The self-assessment questionnaires were found to be unhelpful. Major and minor human failures were extracted from the written report. Major negative events were potentially life-threatening failures, whereas minor events were failures that, in isolation, were not expected to have serious consequences. Major events were closely related to death ($P < .001$) and death and/or near misses ($P < .001$). Appropriate compensation, however, sharply reduced the risk of death ($P = .003$). The total number of minor events was also closely related to both death and death and/or near misses ($P < .001$).

Conclusion: The study highlights the role of human factors in negative surgical outcomes. Even in the most eventful circumstances, however, appropriate human factors defense mechanisms can lead to a successful outcome. (J Thorac Cardiovasc Surg 2000;119:661-72)
Errors and the Burden of Errors: Attitudes, Perceptions, and the Culture of Safety in Pediatric Cardiac Surgical Teams

Agnes Bognár, MD, Paul Barach, MD, MPH, Julie K. Johnson, MSPH, PhD, Robert C. Duncan, PhD, David Birnbach, MD, MPH, Donna Woods, EdM, PhD, Jane L. Holl, MD, MPH, and Emile A. Bacha, MD

Department of Ophthalmology, School of Medicine, University of Szeged, Szeged, Hungary; Department of Anesthesiology, College of Medicine and Public Health, University of South Florida, Tampa, Florida; The Center for Patient Safety, University of Utrecht School of Medicine, Utrecht, the Netherlands; University of Chicago, Chicago, American Board of Medical Specialties, Evanston, Illinois; Departments of Epidemiology and Public Health, and Anesthesiology, University of Miami Miller School of Medicine, Miami, Florida; Institute for Healthcare Studies, Feinberg School of Medicine, Northwestern School University, Chicago, Illinois; and Cardiac Surgery, Children’s Hospital Boston and Harvard Medical School, Boston, Massachusetts

**Background.** The fear of committing clinical errors in perioperative care has a negative impact on the psychological well-being of surgical team members and ultimately on patient care. We assessed the perceptions and attitudes of surgical teams relative to committing errors, the impact of errors, and the culture of safety.

**Methods.** Pediatric cardiac surgery team members at three academic hospitals were surveyed. The survey included scaled, open-ended questions and a clinical vignette. Respondents were asked about the safety climate, team climate, stress recognition, and the impact of error as they relate to making and the anticipation of making clinical errors.

**Results.** The response rate was 69%. Safety attitudes were influenced by the work environment climate. Many respondents felt unable to express disagreement and had difficulty raising safety concerns. Staffing levels, equipment availability, production pressures, and hectic schedules were concerns. Respondents admitted that errors occurred repeatedly, and that guidelines and policies were often disregarded.

**Conclusions.** A psychometrically sound teamwork culture tool was used and demonstrated that surgical teams are influenced by the recognition of medical errors and that these errors carry significant personal burden. The findings suggest that the safety attitudes among team members may impact their performance and need to be carefully taken into consideration. Providers’ reluctance to share safety events with others, as well as the perceived powerlessness to prevent events, must be addressed as part of an overall strategy to improve patient care outcomes. The study points to the need to address teamwork culture in efforts to improve patient care.

### Bognar: Teamwork/ Psych Safety

<table>
<thead>
<tr>
<th>Factor</th>
<th>N</th>
<th>% Agreed</th>
<th>Mean ± SEM</th>
<th>Factor Loading</th>
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</thead>
<tbody>
<tr>
<td><strong>Factor 1. Team Climate (Cronbach’s α = 0.89)</strong></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>In our OR it is difficult to speak up if I perceive a problem with</td>
<td>55</td>
<td>29</td>
<td>2.96 ± 0.14</td>
<td>-0.86</td>
</tr>
<tr>
<td>patient care</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surgeon and anesthetist maintain open channels of communication</td>
<td>58</td>
<td>86</td>
<td>1.70 ± 0.11</td>
<td>0.79</td>
</tr>
<tr>
<td>throughout the procedure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surgeon and perfusionist maintain open channels of communication</td>
<td>59</td>
<td>93</td>
<td>1.39 ± 0.09</td>
<td>0.78</td>
</tr>
<tr>
<td>throughout the procedure</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Nurse input about patient care is well received in the OR</td>
<td>54</td>
<td>65</td>
<td>2.22 ± 0.12</td>
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<td>It is easy for our OR staff to ask questions when there is something</td>
<td>56</td>
<td>75</td>
<td>2.20 ± 0.12</td>
<td>0.73</td>
</tr>
<tr>
<td>that they don’t understand</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morale in our OR is high</td>
<td>55</td>
<td>45</td>
<td>2.60 ± 0.13</td>
<td>0.72</td>
</tr>
<tr>
<td>Disagreements in the OR are appropriately resolved (ie, what is</td>
<td>52</td>
<td>73</td>
<td>2.10 ± 0.12</td>
<td>0.64</td>
</tr>
<tr>
<td>best for the patient)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senior staff encourage questions from junior medical and nonmedical</td>
<td>52</td>
<td>65</td>
<td>2.27 ± 0.13</td>
<td>0.67</td>
</tr>
<tr>
<td>staff during operations</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am frequently unable to express disagreement with the attendings in</td>
<td>56</td>
<td>41</td>
<td>2.75 ± 0.13</td>
<td>-0.60</td>
</tr>
<tr>
<td>our OR</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OR staff are briefed before surgical procedures</td>
<td>50</td>
<td>44</td>
<td>2.56 ± 0.13</td>
<td>0.54</td>
</tr>
</tbody>
</table>
### Bognar – Safety Climate

**Factor 2. Safety Climate (Cronbach’s α = 0.75)**

<table>
<thead>
<tr>
<th>Statement</th>
<th>N</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debriefing after errors occur is common</td>
<td>48</td>
<td>29</td>
<td>2.92 ± 0.14</td>
<td>0.68</td>
</tr>
<tr>
<td>My patient safety is not reduced when I am interrupted</td>
<td>60</td>
<td>33</td>
<td>2.75 ± 0.09</td>
<td>0.67</td>
</tr>
<tr>
<td>The culture in our OR makes it easy to learn from mistakes of others</td>
<td>51</td>
<td>43</td>
<td>2.68 ± 0.13</td>
<td>0.65</td>
</tr>
<tr>
<td>My decision making is as good in medical emergencies as in routine situations</td>
<td>60</td>
<td>78</td>
<td>1.88 ± 0.10</td>
<td>0.64</td>
</tr>
<tr>
<td>I receive appropriate feedback about my performance</td>
<td>55</td>
<td>62</td>
<td>2.20 ± 0.13</td>
<td>0.49</td>
</tr>
<tr>
<td>Nurses should not question decisions made by attendings</td>
<td>61</td>
<td>5</td>
<td>3.52 ± 0.08</td>
<td>0.49</td>
</tr>
<tr>
<td>The attending surgeon should be formally in charge of the OR during the surgical procedure</td>
<td>57</td>
<td>63</td>
<td>2.07 ± 0.16</td>
<td>0.47</td>
</tr>
<tr>
<td>Effective coordination of OR staff requires that the personalities of others be taken into account</td>
<td>56</td>
<td>82</td>
<td>1.86 ± 0.11</td>
<td>−0.43</td>
</tr>
<tr>
<td>It is difficult to discuss mistakes when they occur in the OR</td>
<td>52</td>
<td>60</td>
<td>2.42 ± 0.14</td>
<td>−0.41</td>
</tr>
</tbody>
</table>

**Factor 3. Stress Recognition (Cronbach’s α = 0.72)**

<table>
<thead>
<tr>
<th>Statement</th>
<th>N</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatigue impairs my performance during critical phases of patient care</td>
<td>60</td>
<td>73</td>
<td>2.16 ± 0.11</td>
<td>0.84</td>
</tr>
<tr>
<td>Stress from personal problems adversely affects my performance</td>
<td>61</td>
<td>46</td>
<td>2.77 ± 0.12</td>
<td>0.79</td>
</tr>
<tr>
<td>When my workload becomes excessive, my performance is impaired</td>
<td>55</td>
<td>75</td>
<td>2.04 ± 0.12</td>
<td>0.71</td>
</tr>
<tr>
<td>High levels of workload are common in our OR</td>
<td>53</td>
<td>94</td>
<td>1.60 ± 0.09</td>
<td>0.40</td>
</tr>
</tbody>
</table>
### Bognar – Error Burden

**Factor 3. Error Burden (Cronbach’s $\alpha = 0.75$)**

<table>
<thead>
<tr>
<th>Statement</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Cronbach’s $\alpha$</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have seen others make errors that had the potential to harm patients</td>
<td>58</td>
<td>91</td>
<td>1.59</td>
<td>0.77</td>
</tr>
<tr>
<td>I am more likely to err in a tenser hostile situation</td>
<td>60</td>
<td>85</td>
<td>1.75</td>
<td>0.72</td>
</tr>
<tr>
<td>I have made mistakes that had the potential to harm patients</td>
<td>59</td>
<td>83</td>
<td>1.88</td>
<td>0.58</td>
</tr>
<tr>
<td>I am ashamed when I make a mistake in front of other OR staff</td>
<td>55</td>
<td>75</td>
<td>2.07</td>
<td>0.56</td>
</tr>
<tr>
<td>I have seen the same mistakes occur again and again</td>
<td>54</td>
<td>33</td>
<td>2.90</td>
<td>0.55</td>
</tr>
<tr>
<td>Medical errors occur every day in our OR</td>
<td>49</td>
<td>41</td>
<td>2.75</td>
<td>0.45</td>
</tr>
<tr>
<td>There are frequent changes to the schedules</td>
<td>54</td>
<td>91</td>
<td>1.52</td>
<td>0.45</td>
</tr>
<tr>
<td>Errors committed during patient management are not important, as long as</td>
<td>59</td>
<td>3</td>
<td>3.78</td>
<td>-0.43</td>
</tr>
<tr>
<td>the patient improves</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OR personnel often disregard rules or guidelines</td>
<td>56</td>
<td>39</td>
<td>2.89</td>
<td>0.41</td>
</tr>
</tbody>
</table>
Effect of a Comprehensive Surgical Safety System on Patient Outcomes

Eefje N. de Vries, M.D., Ph.D., Hubert A. Prins, M.D., Ph.D., Rogier M.P.H. Crolla, M.D., Adriaan J. den Outer, M.D.,* George van Andel, M.D., Ph.D., Sven H. van Helden, M.D., Ph.D., Wolfgang S. Schlack, M.D., Ph.D., M. Agnès van Putten, B.Sc., Dirk J. Gouma, M.D., Ph.D., Marcel G.W. Dijkgraaf, Ph.D., Susanne M. Smorenburg, M.D., Ph.D., and Marja A. Boermeester, M.D., Ph.D., for the SURPASS Collaborative Group†

ABSTRACT

BACKGROUND

Adverse events in patients who have undergone surgery constitute a large proportion of iatrogenic illnesses. Most surgical safety interventions have focused on the operating room. Since more than half of all surgical errors occur outside the operating room, it is likely that a more substantial improvement can be achieved by targeting the entire surgical pathway.
“ProvenCareSM”

A Provider-Driven Pay-for-Performance Program for Acute Episodic Cardiac Surgical Care

Alfred S. Casale, MD, Ronald A. Paulus, MD, Mark J. Selna, MD, Michael C. Doll, PA-C, Albert E. Bothe, Jr., MD, Karen E. McKinley, RN, Scott A. Berry, MS, Duane E. Davis, MD, Richard J. Gilfillan, MD, Bruce H. Hamory, MD, and Glenn D. Steele, Jr., MD

Objective: To test whether an integrated delivery system could successfully implement an evidence-based pay-for-performance program for coronary artery bypass graft (CABG) surgery.

Methods: The program consisted of 3 components: (1) establishing implementable best practices; (2) developing risk-based pricing; (3) establishing a mechanism for patient engagement. Surgeons reviewed all class I and IIa “2004 American Heart Association/American College of Cardiology Guidelines for CABG Surgery” and translated them into 40 verifiable behaviors. These were embedded within a new ProvenCareSM program and “hardwired” within the electronic health record system, including order sets, templates, and “time outs”. Concurrently preoperative, inpatient, and postoperative care within 90 days was packaged into a fixed price. A Patient Compact was developed to highlight the importance of patient activation. All elective CABG patients treated between February 2, 2006 and February 2, 2007 were included (ProvenCareSM Group) and compared with 137 patients treated in 2005 (Conventional Care Group).

Results: Initially, only 59% of patients received all 40 best practice components. At 3 months, program compliance reached 100%, but fell transiently to 86% over the next 3 months. Reliability subsequently increased to 100% and was sustained for the remainder of the study period. The overall trend in reliability was significant at P = 0.001. Thirty-day clinical outcomes showed improved trends (Table 1) but only the likelihood of discharge to home reached statistical significance. Length of stay decreased by 16% and mean hospital charges fell 5.2%.

Conclusion: A provider-driven pay-for-performance process for CABG, enabled by an electronic health record system, can reliably deliver evidence-based care, fundamentally alter reimbursement incentives, and may ultimately improve outcomes and reduce resource use.


Healthcare delivery in the United States faces significant quality and cost problems. Medical care is often inappropriate when judged against accepted standards with numerous examples of excess utilization and conversely, appropriately indicated care is frequently not provided.1 This inconsistency leads to wide, unexplained variation in rates of procedures, expenditures, and outcomes.2 Landmark publications by the Institute of Medicine and the Rand Corporation3-5 have focused increased professional and public attention on these issues. Nevertheless, healthcare providers continue to be paid for units of care delivered independent of quality or results achieved. Poor outcomes, such as postoperative complications that require reoperation, often result in more payment.

Care reliability is inconsistent. Best practice guidelines are sometimes based on equivocal evidence, and are often ignored or poorly applied.6 Translation of even the best guidelines into actual behavior is difficult and slow-paced. The fragmentation of our delivery systems7 and the influence of diverse and often opposing economic factors can overwhelm the influence of science and well-meaning intentions in determining acceptance and dissemination of best practices.8

Strategies to improve this system have included mandates from regulators, federal and state agencies, and payers. Public reports of outcome measures are often derived from administrative databases and have typically had only modest influence on physician and patient behavior.9 Oversight from medical societies, state licensing agencies, hospital medical staff offices, and specialty societies is not sufficient and is based largely on identifying and reacting to care failures rather than proactively focusing on failure avoidance.

Several innovative provider-initiated programs [eg, Department of Veterans Affairs National Surgical Quality...
Bristol Southmead Maternity

Safest OB unit around
100% of staff train in drills
50% reduction in low apgars
70% reduction in harm with shoulder dystocia
Sustained improvement over time

Safe & Reliable Healthcare
Debriefing – Linking teamwork and Improvement

• What did we do well?
• What did we learn so we can do it better the next time?
• What got in the way that needs to be fixed?
ICU Percent of Patients Receiving all Four Aspects Of Ventilator Bundle

1: Marked beds at 30 degree angle
2: Fact Sheet for staff education
3: Poster with weekly data feedback
4: Vent bundle posted in all vent patient rooms
5: Began initial trials of Daily goal sheet and pre-extubation sheet
6: Initiated Powerpoint education for RT/RN
7: Initiated Clinical Pharm rounds
8: 1st test of multidisciplinary rounds
9: Expanded use of Pre-extubation sheet
10: Staff education on Goal sheet; mini inservices on unit on SBT and Pre-extubation sheet
11: Incorporated Goal Sheet into Multidisciplinary Rounds
12: Impact Extravaganza (staff/MD education)
13: Expanded multidisciplinary rounds to include additional disciplines
14: Check compliance on night shift past 2 weeks
15: New sign at HOB,
16: One on one follow up by Nursing & RT managers on collaboration in weaning process
GRI VAP Prevention Bundle Reliability and VAP rate per 1000 ventilator days

Aim: > 95% reliability by March 2009

Ventilator Associated Pneumonia rate per 1000 ventilator days

Median over first 6 months

Ventilator Associated Pneumonia care bundle reliability (%)

DG sheet change; prompts added

Retesting at DG sheet; handling script; change DG sheet

Script of questions to ask Drs

Last VAP 02/01/2009

Malcolm Daniel
Department of Anaesthesia
Glasgow Royal Infirmary
The Ideal Unit
Acute Medicines Unit, Ninewells Hospital, Dundee, Scotland
Arun Chaudhur, Medical Director

O2 Prescribing
DVT Prescribing Compliance
Compliance with Med. Reconciliation

SNAP-CAP
ABX Prescribing Compliance
Blood Culture Contamination
Pressure Ulcer Prevention Bundle

Early Warning Scores Bundle
Hand Hygiene
The Defect or Learning Board

Total Number of Defects: 117
% of Defects Completed: 43%
% Of Defects In Progress: 41%
% of Defects Not in Progress: 11%

Defects without movement in >30 Day: 33
Defects without movement in >60 Day: 27

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