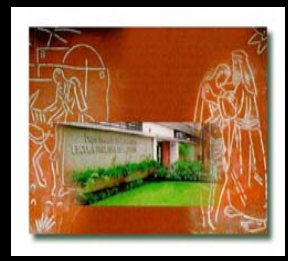


ADVERSE EVENTS: THE ERROR OF OUR WAYS

Mavilde LG Pedreira. RN, PhD.
Nursing Professor, Pediatric Critical Care.
Nursing Department.
Federal University of São Paulo – Brazil.

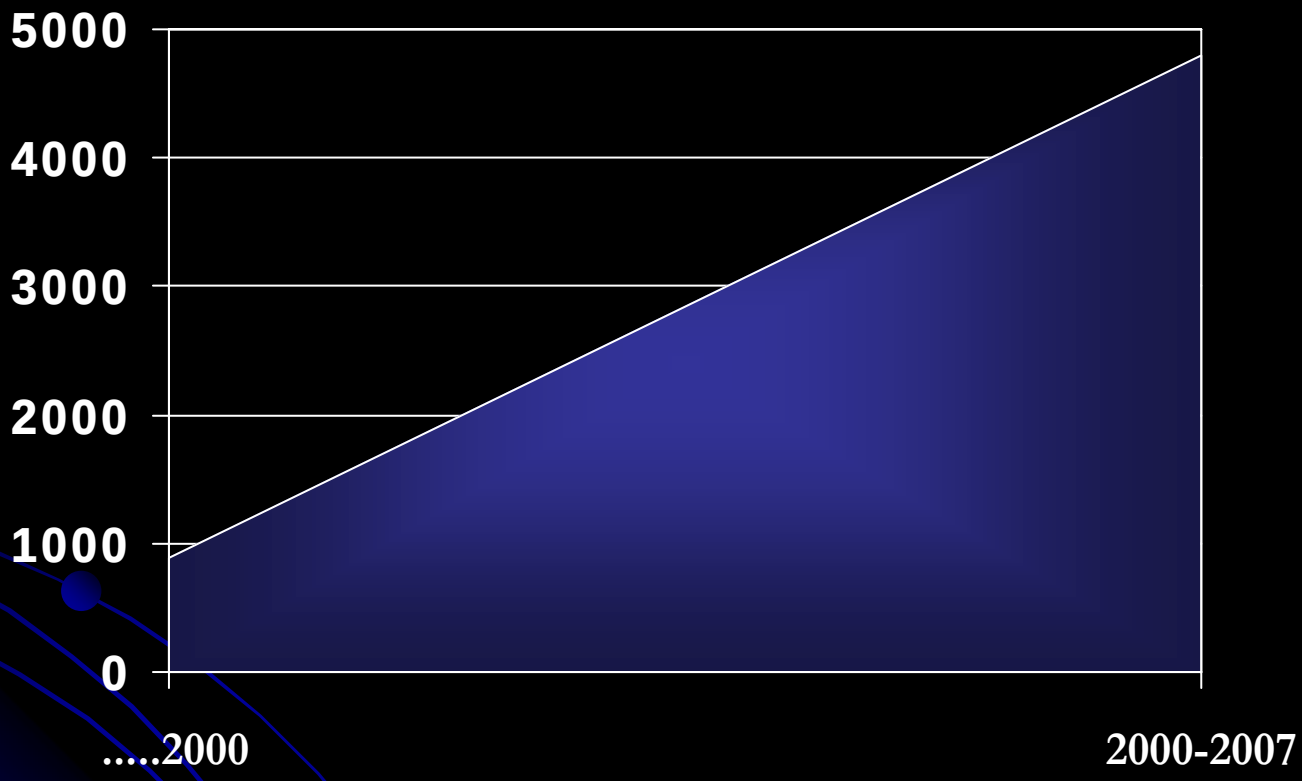
Adverse Events: The error of our ways

TO ERR IS HUMAN - BUILDING A SAFER HEALTH CARE SYSTEM

(Kohn, Currigan, Donaldson, 2000)

- **44,000-98,000 annual deaths.**
- **8th cause of death.**
  - **Car accidents (43,000).**
  - **Breast cancer (42,297).**
  - **AIDS (16,516).**

Adverse Events: The error of our ways



Adverse Events: The error of our ways

QSHC ONLINE

The "To Err is Human" report and the patient safety literature

H T Stelfox, S Palmisani, C Scurlock, E J Orav and D W Bates

Qual. Saf. Health Care 2006;15;174-178
doi:10.1136/qshc.2006.017947

Table 1 Types of patient safety publications

Type of article	No of articles per 100 000 MEDLINE publications: Before IOM report	After IOM report	Percentage change (95% CI)†	p value†
Original research	23.7	40.8	+72% (+55% to +91%)	<0.001
Editorials	8.6	39.1	+454% (+388% to +530%)	<0.001
Letters to the editor	9.1	23.9	+264% (+225% to +309%)	<0.001
Reviews	12.3	38.4	+313% (+274% to +358%)	<0.001
Guidelines	0.4	2.3	+516% (+264% to +1007%)	<0.001
News items	3.9	17.5	+450% (+357% to +566%)	<0.001
Other items	0.7	2.2	+301% (+72% to +524%)	<0.001

†p values and 95% confidence intervals were calculated from a Poisson comparison of publication rates before and after publication of the IOM report.

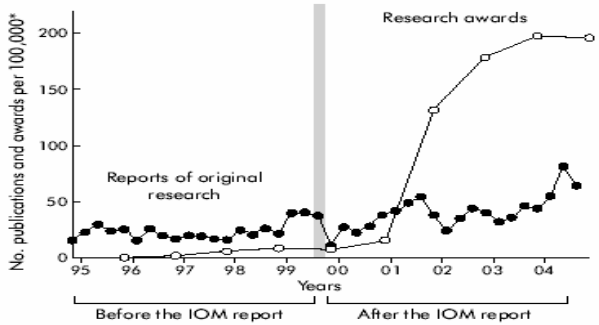


Figure 2 Patient safety research before and after publication of the IOM report *"To Err is Human"*. *Number of patient safety research publications and research awards per 100 000 MEDLINE publications and 100 000 federally funded biomedical research awards.

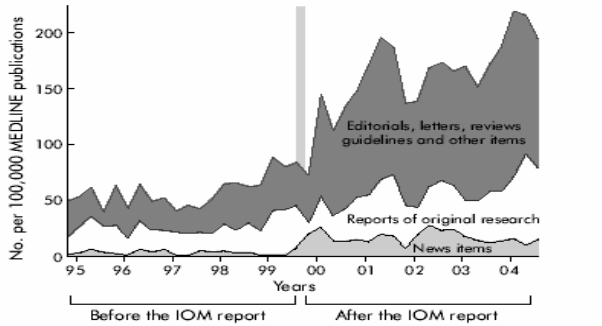


Figure 1 Patient safety publications before and after publication of the IOM report *"To Err is Human"*.

Adverse Events: The error of our ways

QSHC ONLINE

The "To Err is Human" report and the patient safety literature

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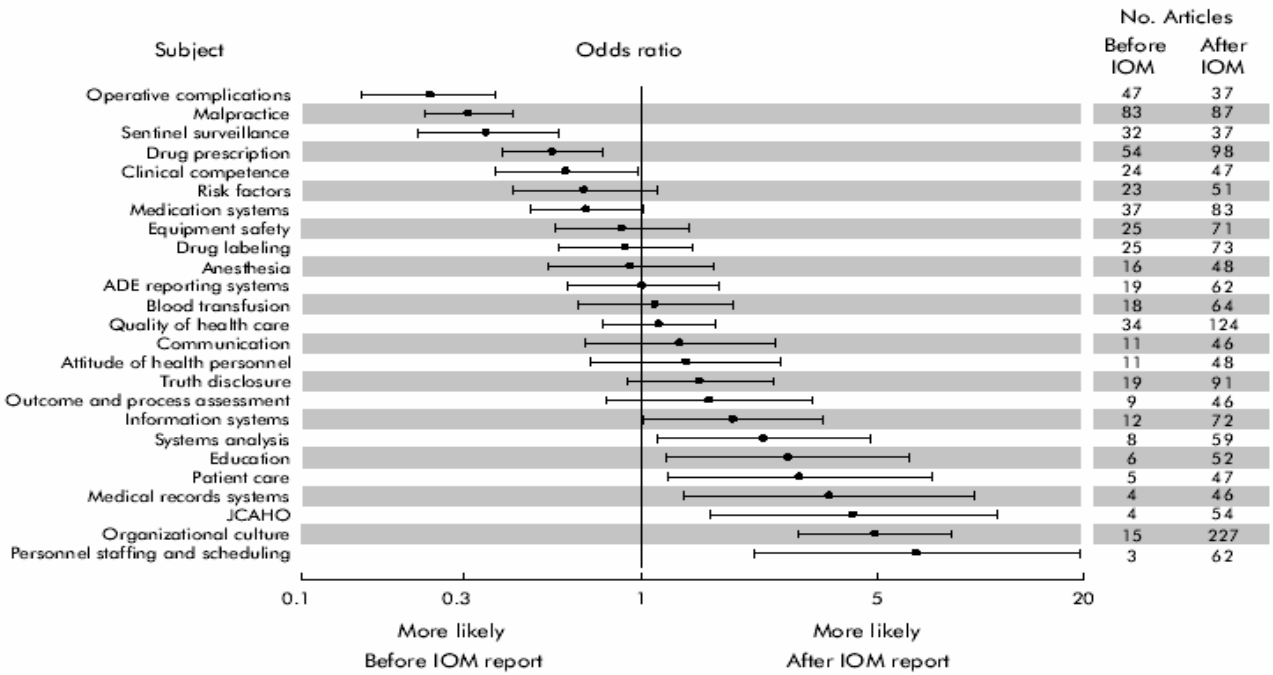


Figure 3 Principal subject of patient safety publications before and after publication of the IOM report "*To Err is Human*".

Adverse Events: The error of our ways

Adverse Event: Injury caused by a medical management rather than the underlying clinical condition of the patient.

Preventable Adverse Event: Injury resulting from an error.

Brennan et al. N Engl J Med 1991; 324:370-6.
Leape L et al. N Engl J Med 1991; 342: 377-84.

Adverse Events: The error of our ways

Reason J. Human error. Cambridge University Press. 1990.

An error is defined as the failure of a planned action to be completed as intended (error of execution) or the use of a wrong plan to achieve an aim (error in planning).

Adverse Events: The error of our ways

- **Industry X Health Care System.**
- **Good clinicians do not make mistakes:**

“Not me” Syndrome

Hughes RG, Ortiz E. Medication errors: Why they happen, and how they can be prevented. Am J Nurs 2005; 105(3): 14-24.

Adverse Events: The error of our ways

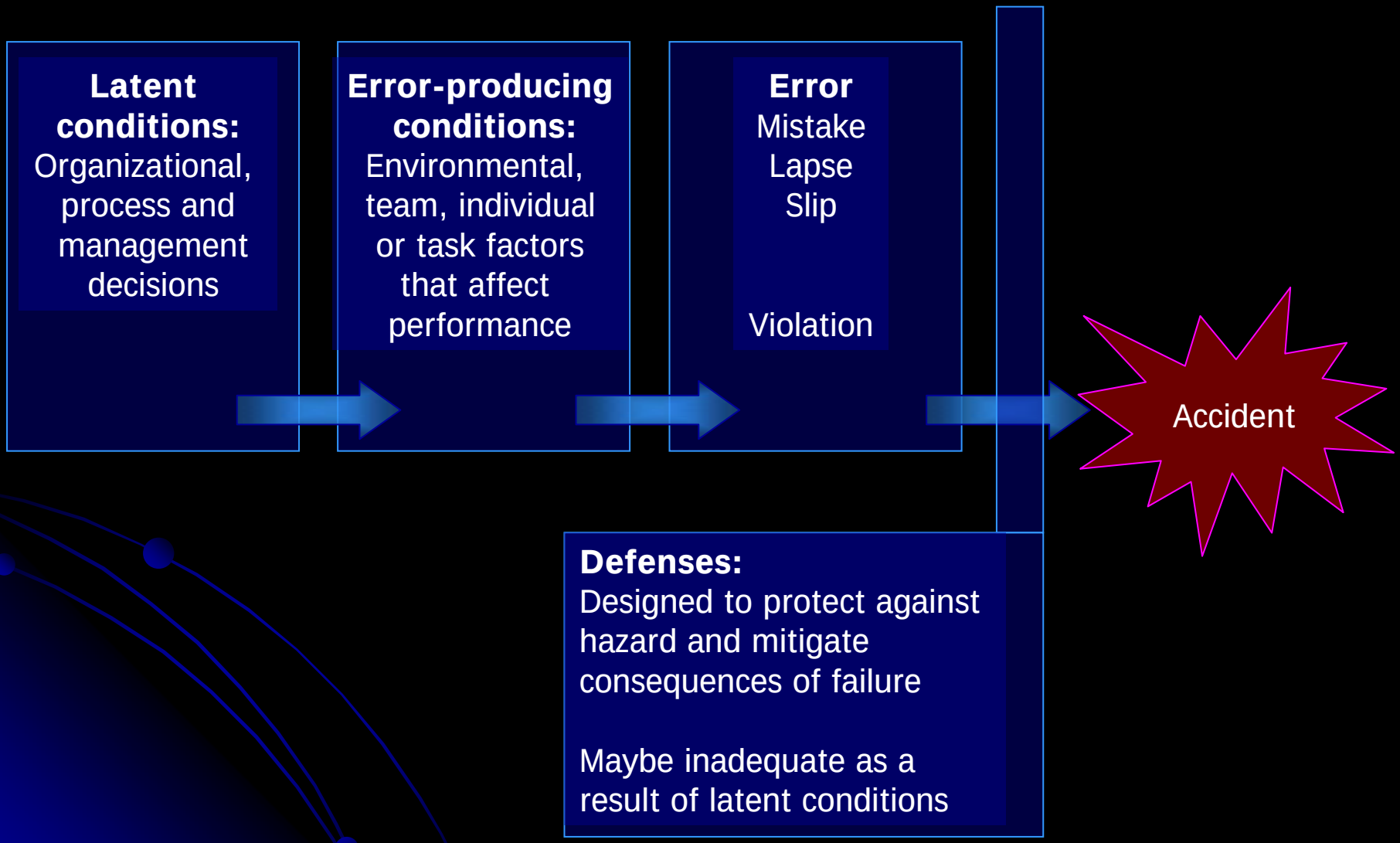
- Embarrassment and Fear
  - Colleagues
  - Patients
  - Families
  - Employers
  - Regulatory agencies

Adverse Events: The error of our ways

- **Who did it?**
  - **Why did this happen?**
  - **How did this happen?**
  - **When did this happen?**

Freedom of accidental injury

Adverse Events: The error of our ways



Wheeler SJ, Wheeler DW. Medication errors in anaesthesia and critical care. Anaesthesia 2005; 60: 257-73.

PATIENT SAFETY AND THE RELIABILITY OF HEALTH CARE SYSTEMS
Series Editors: Paul Barach, MD, MPH, and
Donald M. Berwick, MD, MPP

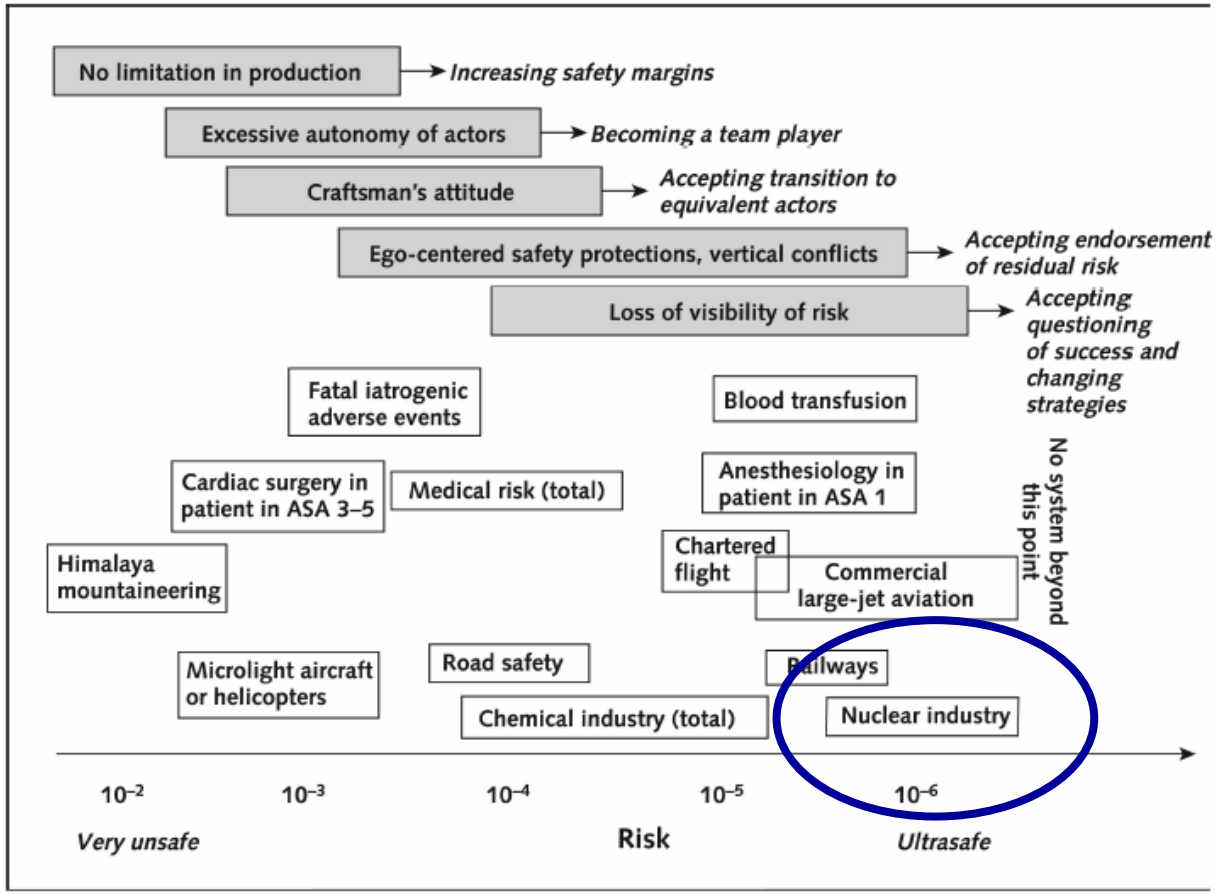
IMPROVING PATIENT CARE

Five System Barriers to Achieving Ultrasafe Health Care

René Amalberti, MD, PhD; Yves Auroy, MD; Don Berwick, MD, MPP; and Paul Barach, MD, MPH

Ann Intern Med. 2005;142:756-764.

Figure 1. Average rate per exposure of catastrophes and associated deaths in various industries and human activities.



Chernobyl (CCCL – today Ukraine) – April 26th, 1986.

- Large nuclear accident in history.
- Thousands of deaths.
- Ecological repercussion.

16.000 deaths

PATIENT SAFETY AND THE RELIABILITY OF HEALTH CARE SYSTEMS
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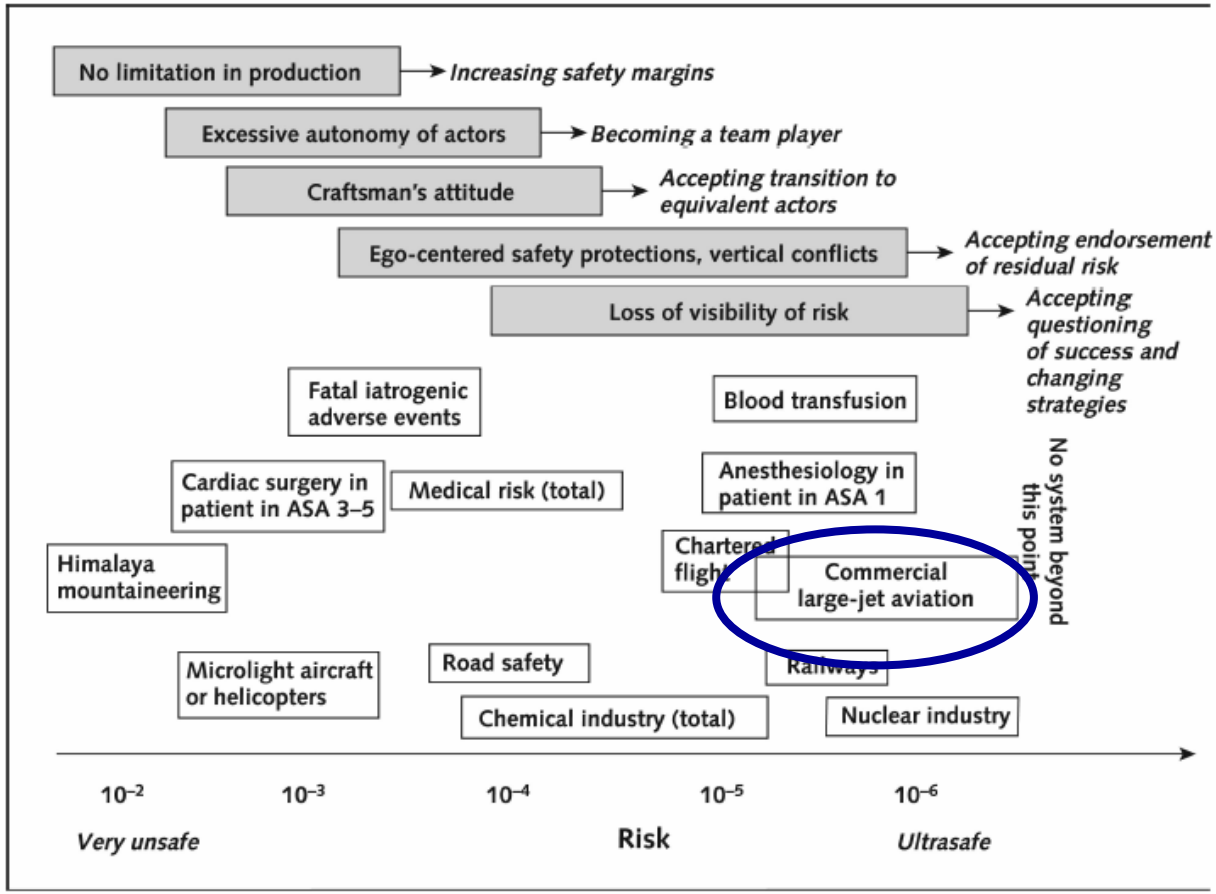
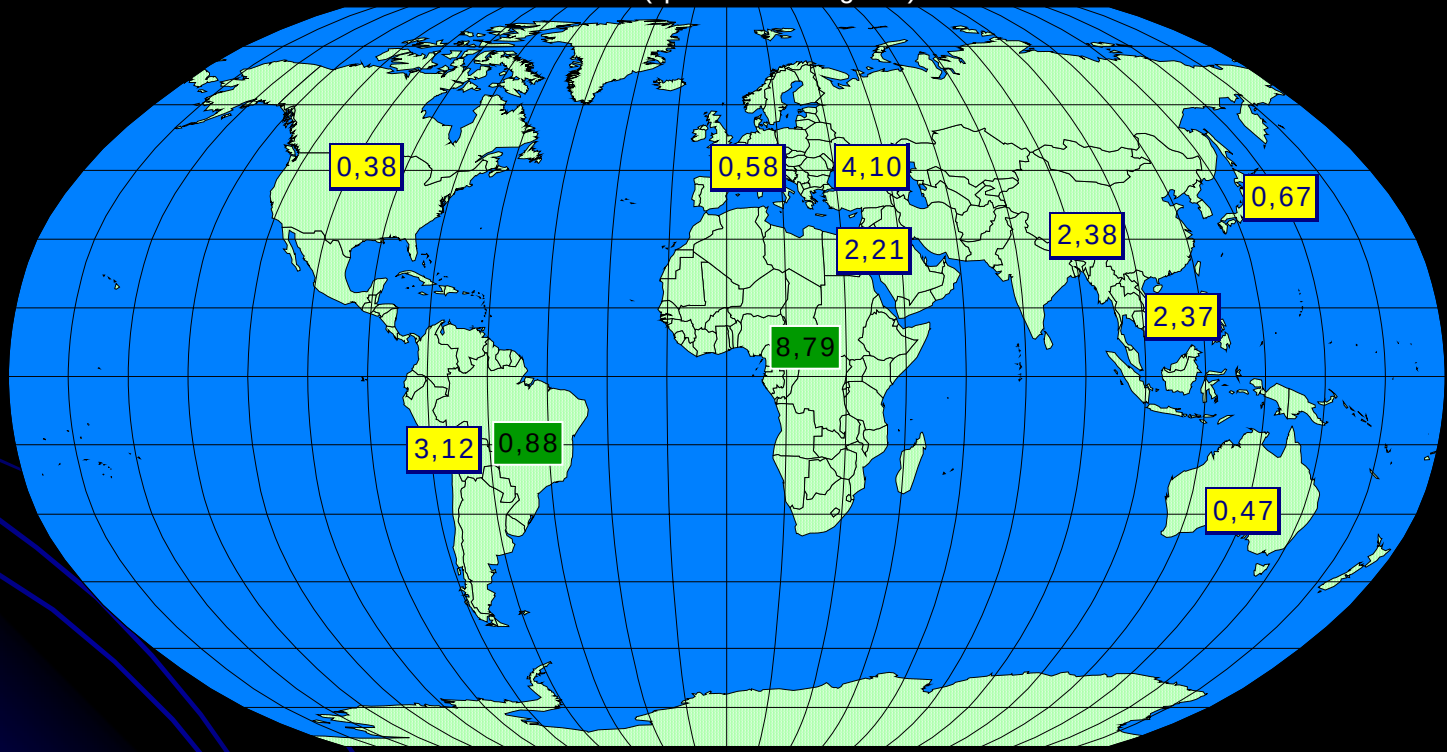


Safety in Commercial Jet Aviation

Fatal accident rates per area of World

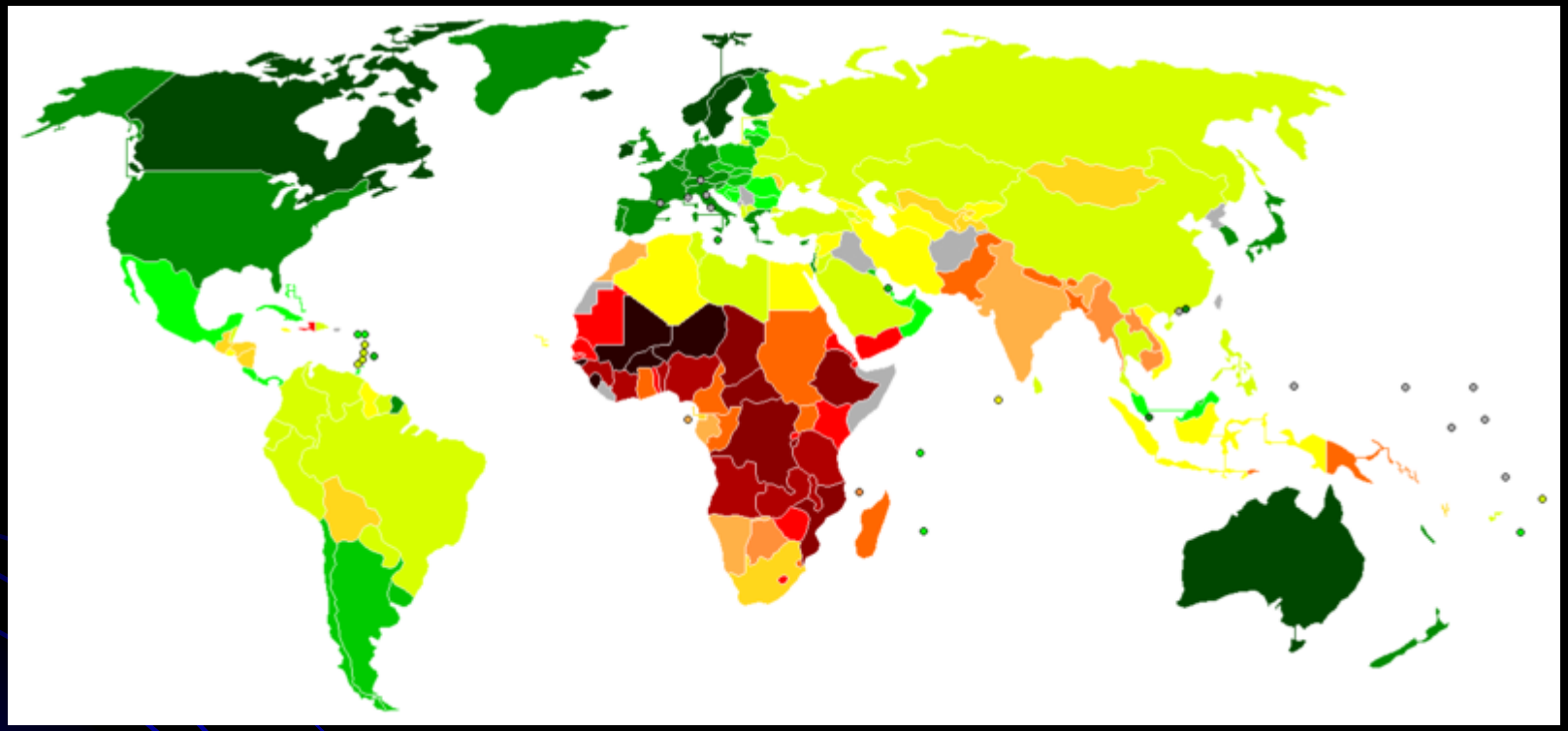
(per million flights)



World average: 0,92

Dr. Andrade D. presentation
Source: Serra, P.R.F.
PE-Safety ITA, 2007

Adverse Events: The error of our ways



Human Development Index

- 0.950 and over
- 0.900-0.949
- 0.850-0.899
- 0.800-0.849
- 0.750-0.799
- 0.700-0.749
- 0.650-0.699
- 0.600-0.649
- 0.550-0.599
- 0.500-0.549
- 0.450-0.499
- 0.400-0.449
- 0.350-0.399
- 0.300-0.349
- under 0.300
- n/a

PATIENT SAFETY AND THE RELIABILITY OF HEALTH CARE SYSTEMS
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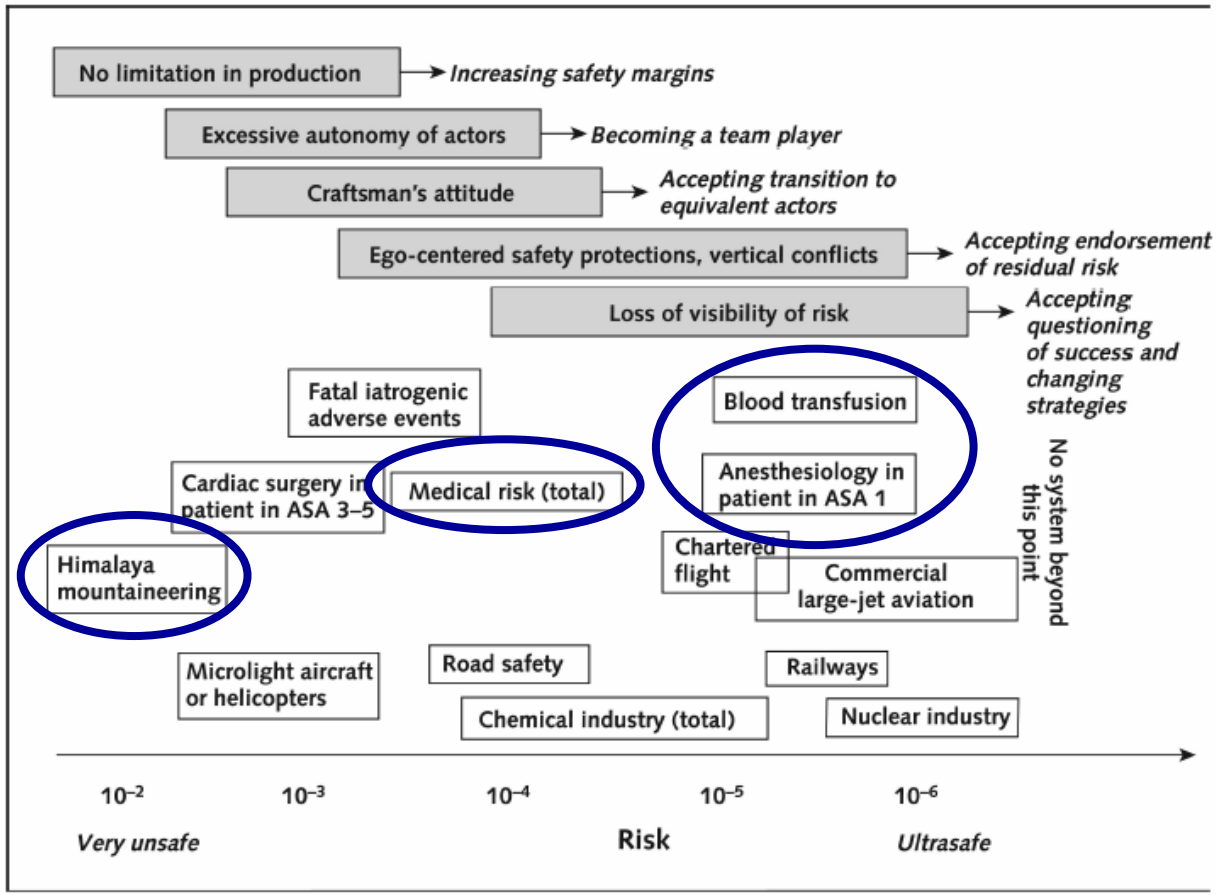
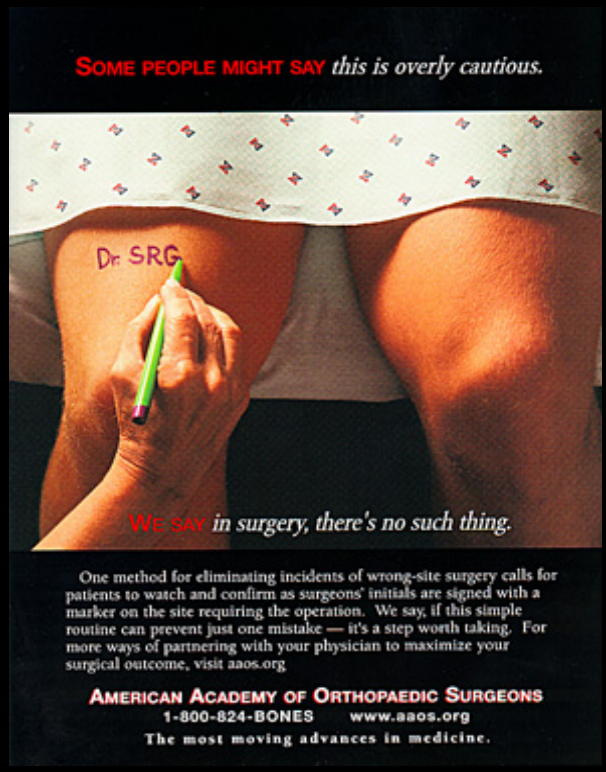


Adverse Events: The error of our ways



Adverse Events: The error of our ways

Concise Definitive Review — R. Phillip Dellinger, MD, FCCM, Section Editor

How will we know patients are safer? An organization-wide approach to measuring and improving safety

Peter Pronovost, MD, PhD; Christine G. Holzmueller, BLA; Dale M. Needham, MD, PhD; J. Bryan Sexton, PhD; Marlene Miller, MD, MSc; Sean Berenholtz, MD, MHS; Albert W. Wu, MD, MPH; Trish M. Perl, MD, MSc; Richard Davis, PhD; David Baker, MBA; Laura Winner, MSN, MBA; Laura Morlock, PhD

(Crit Care Med 2006; 34:1988–1995)

- How often do we harm patients?
- How often do we provide the interventions that patients should receive?
- How do we know we learned from defects?
- How well have we created a culture of safety?

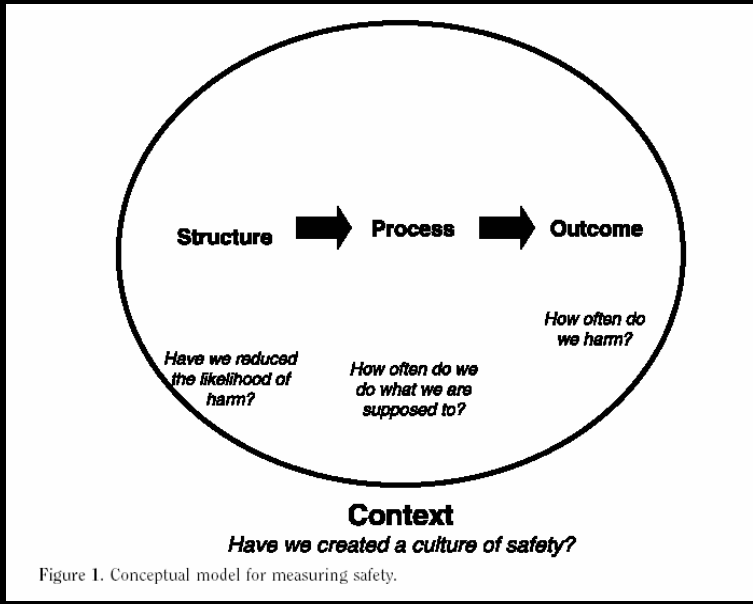
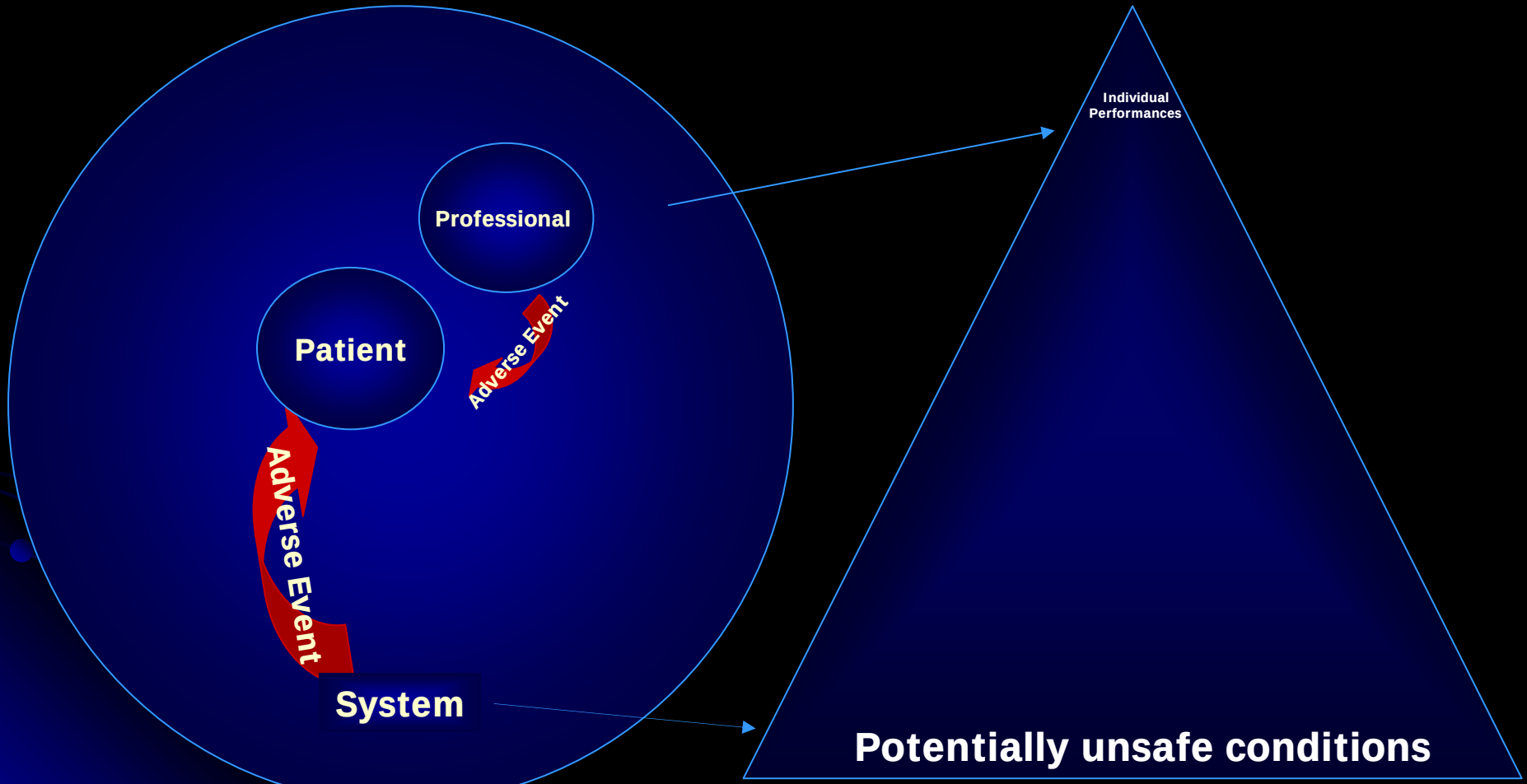


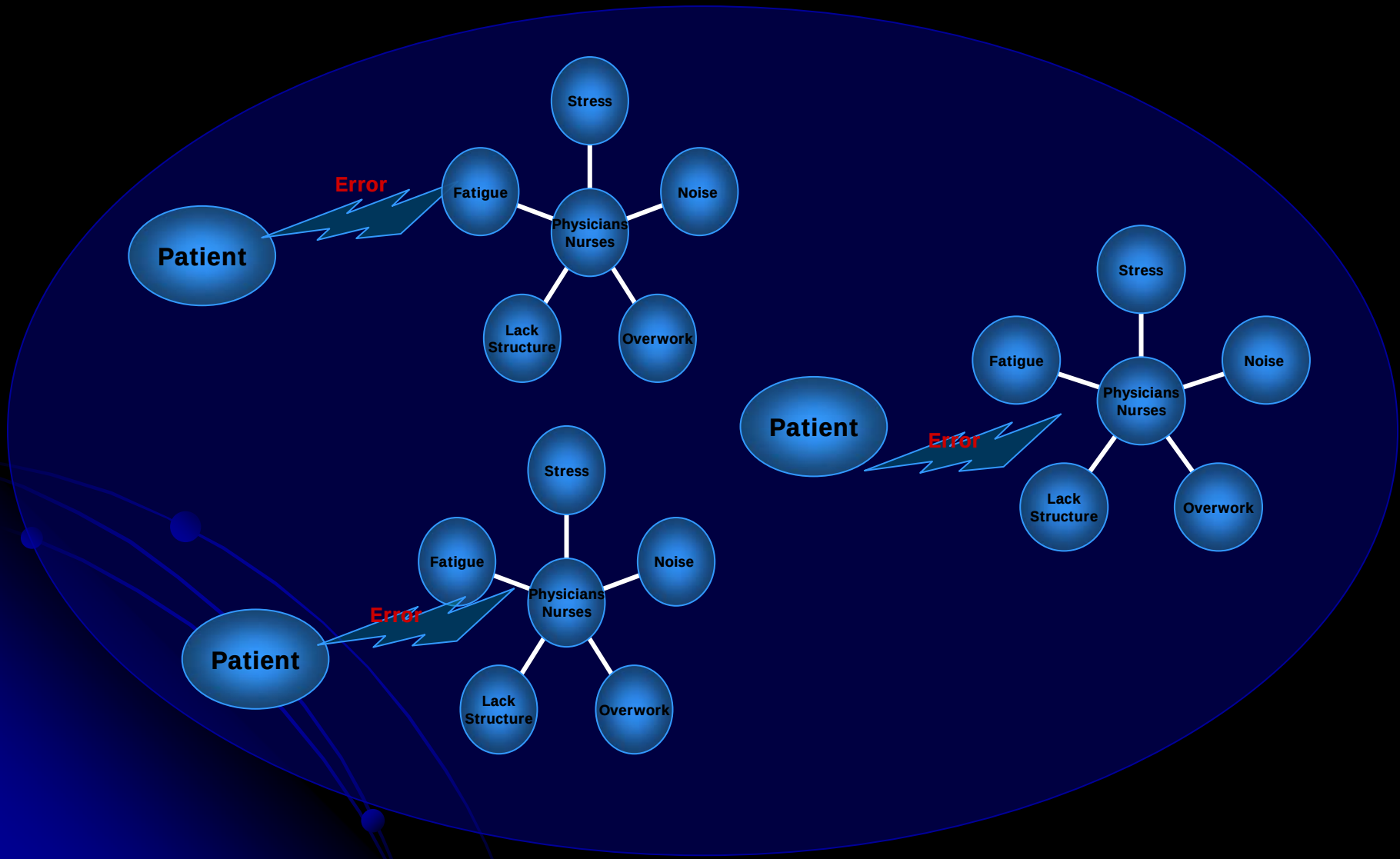
Figure 1. Conceptual model for measuring safety.

Adverse Events: The error of our ways



Kohn LT, Corrigan JM, Donaldson MS. To err is human: building a safer health care system. IOM, Washington DC, NAP, 1999.

Adverse Events: The error of our ways



Van der Castle B, Kim J, Pedreira MLG, Goosen W, Bates, DW. Information technology and patient safety in nursing practice: an international perspective. Int J Med inform 2004; 73:607-14.

Adverse Events: The error of our ways

- Perkins GD et al. *Crit Care* 2003; 7:129–32; Coombes A et al. Ar*ch Intern Med* 2004; 64:389–92:
  - Autopsy studies find missed diagnoses that would have changed therapy and improved outcome in 30% of deceased ICU patients.
- Brooks A, Holroyd B, Riley B. *Injury* 2004; 35: 407–10:
  - Up to 22% of trauma patients have injuries that are missed at the time of their initial evaluations.
- Van den Bemt PM et al. *Crit Care Med* 2002; 30:846–50:
  - Errors in drug administration (other than timing) may occur in 30% of ICU patients.

Adverse Events: The error of our ways

- Durie M, Beckmann U, Gillies DM. *Anaesth Intensive Care* 2002; 30:60–5:
  - Major adverse effects from arterial cannulas have been reported in many as 15% of ICU patients (e.g., inadequate securing, accidental dislodgement, incorrect setup, distal ischemia, infection).
- McGee DC, Gould MK. *N Engl J Med* 2003; 358:1123–33
  - Insertion, use, and removal of CVC results in mechanical, infectious, or thrombotic complications in as many as 26% of ICU patients.
  - Prevention: use of alternate sites of insertion, removing catheters as soon as they are no longer needed, using ultrasound guidance during placement.
- Chastre J, Fagon J-Y. *Am J Respir Crit Care Med* 2002; 165:867–903.
  - 28% of ICU patients developed VAP.
  - Prophylactic measures are not uniformly employed.

Adverse Events: The error of our ways

Preventable Adverse Event: Injury resulting from an error.

Patient safety: To provide the right care, to the right patient, in the right away, in the right moment, and using the best scientific information.

Brennan et al. N Engl J Med 1991; 324:370-6.
Leape L et al. N Engl J Med 1991; 342: 377-84.

Intensive Care Med (2006) 32:1591–1598
DOI 10.1007/s00134-006-0290-7

ORIGINAL

Andreas Valentin
Maurizia Capuzzo
Bertrand Guidet
Rui P. Moreno
Lorenz Dolanski
Peter Bauer
Philipp G. H. Metnitz

Patient safety in intensive care: results from the multinational Sentinel Events Evaluation (SEE) study

Table 3 Sentinel events related to lines, catheters and drains

Item	Total No. of patients	Unplanned dislodgement No. of patients (%)[a]	Inappropriate disconnection No. of patients (%)[a]
Arterial line	1,214	27 (2.2)	11 (0.9)
Central venous line	1,368	19 (1.4)	12 (0.9)
Pulmonary artery catheter	105	4 (3.8)	0
Dialysis catheter	159	6 (3.8)	3 (1.9)
Foley catheter	1,579	24 (1.5)	13 (0.8)
Enteral nutrition probe	1,050	47 (4.5)	11 (1.0)
Intracranial probe, drain	67	1 (1.5)	0
Chest drain	264	4 (1.5)	4 (1.5)
Others	455	12 (2.6)	9 (2.0)

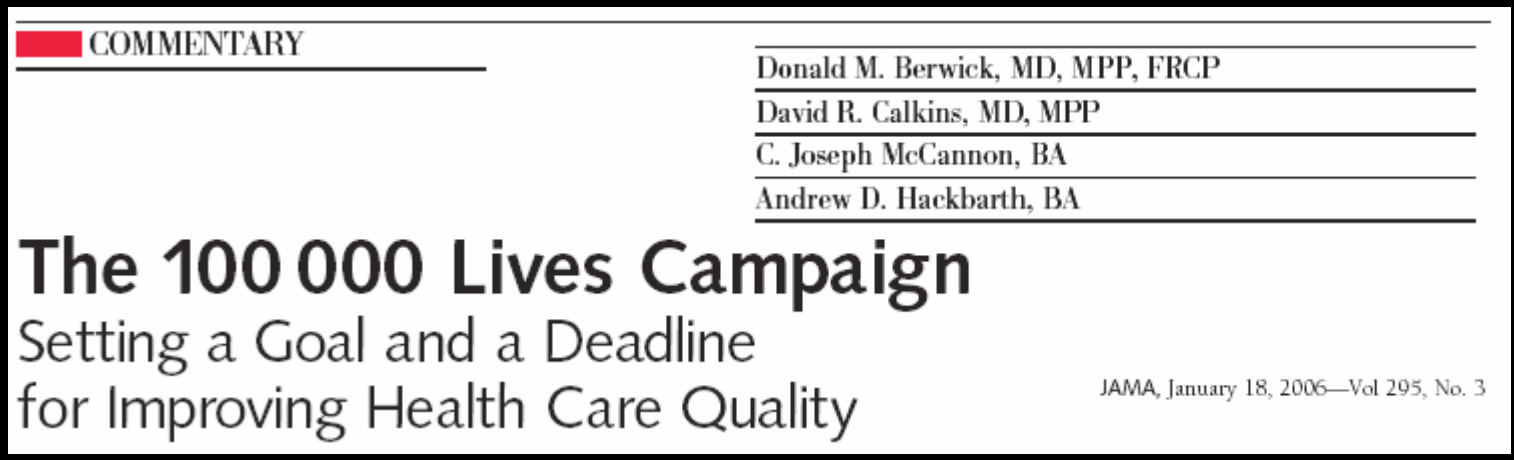
[a] Percentages refer to all patients exposed to the respective item

Table 5 Stepwise multiple logistic regression: final model

Variable	OR	Lower 95% CI	Upper 95% CI
Patient-to-nurse ratio	Nonlinear	Nonlinear	Nonlinear
Risk time (h)	1.06	1.04	1.08
Any organ failure	1.13	1.00	1.28
NEMS item "specific interventions in the ICU"	1.62	1.18	2.22

The estimate of the variance on the logit scale on ICU level (assuming a normally distributed random effect) is 0.72 ± 0.18 (mean $\pm$ SE).

Adverse Events: The error of our ways



COMMENTARY

Donald M. Berwick, MD, MPP, FRCP
David R. Calkins, MD, MPP
C. Joseph McCannon, BA
Andrew D. Hackbarth, BA

The 100 000 Lives Campaign

Setting a Goal and a Deadline for Improving Health Care Quality

JAMA, January 18, 2006—Vol 295, No. 3

- Deploy Medical Emergency Teams.
- Prevent Adverse Drug Events through Medication Reconciliation.
- Prevent Central-Lines Related Infections.
- Prevent Surgical Site Infections.
- Prevent Ventilator-Associated Pneumonia.

Adverse Events: The error of our ways

From best evidence to best practice: effective implementation of change in patients' care

THE LANCET • Vol 362 • October 11, 2003 • www.thelancet.com

Richard Grol, Jeremy Grimshaw

- Continuous development of health-care innovations presents a constant promise of more effective and safe patients' care.
- 10 000 - MEDLINE every year and 350 000 by the Cochrane collaboration.
- Major difficulties arise in introducing these innovations into routine daily practice.
- USA and the Netherlands:
  - 30–40% of patients do not receive care according to present scientific evidence.
  - 20–25% of care provided is not needed or is potentially harmful.

SPECIAL COMMUNICATION

Lucian L. Leape, MD
Donald M. Berwick, MD

Five Years After *To Err Is Human*

What Have We Learned?

JAMA, May 18, 2005—Vol 293, No. 19

Table. Clinical Effectiveness of Safe Practices

Intervention	Results
Perioperative antibiotic protocol	Surgical site infections decreased by 93%*
Physician computer order entry	81% Reduction of medication errors[28,29]
Pharmacist rounding with team	66% Reduction of preventable adverse drug events[30]
	78% Reduction of preventable adverse drug events[31]
Protocol enforcement	95% Reduction in central venous line infections†
	92% Reduction in central venous line infections‡
Rapid response teams	Cardiac arrests decreased by 15%[32]
Reconciling medication practices	90% Reduction in medication errors[33]
Reconciling and standardizing medication practices	60% Reduction in adverse drug events over 12 mo (from 7.6 per 1000 doses to 3.1 per 1000 doses)[33]
	64% Reduction in adverse drug events in 20 mo (from 3.8 per 1000 doses to 1.39 per 1000 doses)[4]
Standardized insulin dosing	Hypoglycemic episodes decreased 63% (from 2.95% of patients to 1.1%)[34]
	90% Reduction in cardiac surgical wound infections (from 3.9% of patients to 0.4%)§
Standardized warfarin dosing	Out-of-range international normalized ratio decreased by 60% (from 25% of tests to 10%)[33]
Team training in labor and delivery	50% Reduction in adverse outcomes in preterm deliveries‖
Trigger tool and automation	Adverse drug events reduced by 75% between 2001 and 2003[35]
Ventilator bundle protocol	Ventilator-associated pneumonias decreased by 62%*

*J Whittington, written communication, March 2005.
†P. Pronovost, Johns Hopkins Hospital, written communication, January 2005.
‡R. Shannon, written communication, January 2005.
§K. McKinley, Geisinger Clinic, written communication, April 2005.
‖B. Sachs, Beth Israel Deaconess Medical Center, written communication, October 2004.

Translating evidence into practice to prevent central venous catheter-associated bloodstream infections: A systems-based intervention

Erika M. Young, DO,[a] Marie L. Commiskey, BS, CCRN,[b] and Stephen J. Wilson, MD, MPH[a,b]
Indianapolis, Indiana

(Am J Infect Control 2006;34:503-6.)

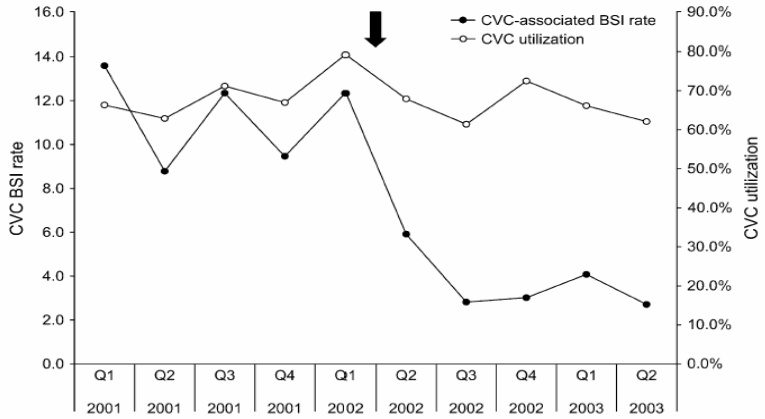


Fig 1. Quarterly central venous catheter (CVC)-associated bloodstream infection (BSI) rate per 1000 CVC-days and CVC utilization before and after the intervention (arrow).

11.3 per 1000 CVC-days to 3.7 per 1000 CVC days ($p < .01$)

ORIGINAL ARTICLE

(*Med Care* 2007;45: 571–578)

Nurse Working Conditions and Patient Safety Outcomes

Patricia W. Stone, PhD, Cathy Mooney-Kane, MPH,† Elaine L. Larson, PhD,**
Teresa Horan, MPH,‡ Laurent G. Glance, MD,§ Jack Zwanziger, PhD,¶ and Andrew W. Dick, PhD†‖

TABLE 3. Adjusted Odds Ratios Indicating the Effects of Nurse Working Conditions on Patient Safety Outcomes

	CLBSI (n = 6385)		CAUTI (n = 6031)		VAP (n = 5462)		30-d Mortality (n = 15846)		Decubitus Ulcer (n = 9554)	
Variable	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Administrative processes: nurse working conditions										
Organizational climate	1.19†	1.05–1.36	0.61†	0.44–0.83	1.03	0.79–1.34	0.97	0.90–1.02	1.06	0.83–1.37
Staffing										
Second quartile	0.97	0.55–1.17	0.79	0.50–1.25	0.71	0.43–1.19	0.89	0.77–1.02	0.94	0.64–1.39
Third quartile	0.32†	0.15–0.70	0.96	0.44–2.07	0.68	0.39–1.21	0.81†	0.69–0.95	0.69*	0.49–0.98
Fourth quartile	0.57	0.20–1.67	0.86	0.37–1.98	0.21†	0.08–0.53	0.89	0.76–1.05	1.01	0.63–1.61
Overtime										
Second quartile	0.67	0.24–1.88	2.53†	1.66–3.86	0.76	0.24–2.39	0.99	0.80–1.21	1.39	0.82–2.34
Third quartile	0.69	0.33–1.44	3.54†	1.95–6.40	0.88	0.39–1.95	1.03	0.80–1.32	1.16	0.67–2.03
Fourth quartile	0.33†	0.15–0.72	4.72†	2.21–10.05	1.26	0.53–2.96	1.06	0.91–1.31	1.91*	1.17–3.11
Nurses' wages	0.91	0.73–1.13	1.15	0.96–1.36	1.16	0.91–1.48	0.97	0.90–1.02	0.98	0.83–1.23
Structures of care										
Profit										
Second quartile	0.68	0.25–1.81	1.85*	1.04–3.31	4.47†	2.42–8.27	1.04	0.90–1.21	1.76*	1.21–2.78
Third quartile	0.85	0.31–2.31	1.48	0.58–3.74	1.51	0.55–4.08	0.85	0.67–1.06	0.80	0.44–1.44
Fourth quartile	0.11†	0.04–0.30	1.11	0.56–2.17	2.55†	1.20–5.43	0.85	0.71–1.03	0.81	0.41–1.57
Magnet	0.67	0.30–1.50	0.74	0.23–2.29	1.04	0.23–4.71	0.92	0.73–1.17	1.57	0.93–2.65
Pseudo R^2	0.19‡		0.15‡		0.15‡		0.18‡		0.14‡	

- **Setting and Patients**
  - •15,846 patients in 51 intensive care units in 31 hospitals ; 1095 nurses were surveyed.
- **Results**
  - • Units with higher staffing had lower incidence of CLBSI, ventilator-associated pneumonia, 30-day mortality, and decubiti ulcer (*P* 0.05).
  - • Increased overtime was associated with higher rates of catheter-associated urinary tract infections and decubiti ulcers.
  - • Slightly lower rates of CLBSI (*P* 0.05).
- **•Conclusions**
  - • Nurse working conditions were associated with all outcomes measured.
  - • Improving working conditions will most likely promote patient safety.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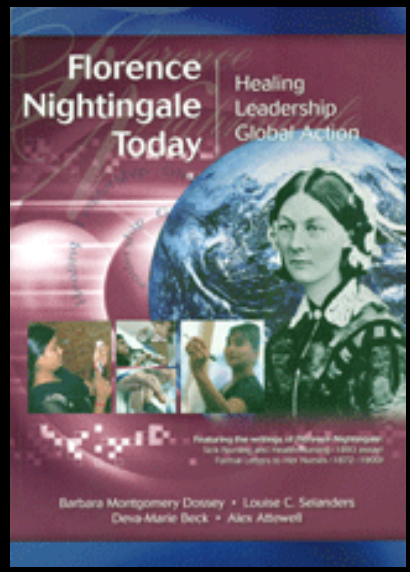
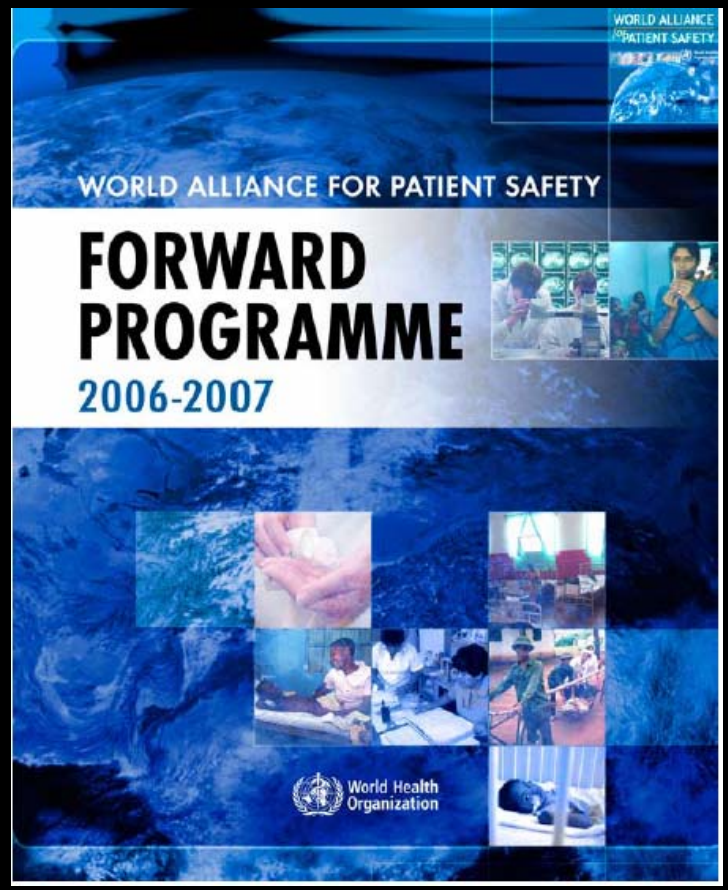
creating a healthy world together


Florence Nightingale Today
Healing
Leadership
Global Action
Barbara Montgomery Dossey • Louise C. Selanders
Dena-Marie Beck • Alex Attinwell


Florence Nightingale

Adverse Events: The error of our ways

1. *The global Patient safety challenge:*
   - *Clean Care is Safer Care.*
   - *Safe Surgery Saves Lives.*
2. *Patients for Patient safety .*
3. *Reporting and Learning.*
4. *Taxonomy for Patient safety.*
5. *Research for Patient safety.*
6. *Safety solutions.*
7. *Safety in action.*
8. *Technology for Patient safety.*
9. *Care of acutely ill Patients.*
10. *Patient safety knowledge at your fingertips.*



Adverse Events: The error of our ways

Establishing Aims for the 21st-Century Health Care System

- *Safe*—avoiding injuries to patients from the care that is intended to help them.
- *Effective*—providing services based on scientific knowledge to all who could benefit and refraining from providing services to those not likely to benefit (avoiding under use and overuse, respectively).
- *Patient-centered*—providing care that is respectful of and responsive to individual patient preferences, needs, and values and ensuring that patient values guide all clinical decisions.

Adverse Events: The error of our ways

Establishing Aims for the 21st-Century Health Care System

- *Timely*—reducing waits and sometimes harmful delays for both those who receive and those who give care.
- *Efficient*—avoiding waste, including waste of equipment, supplies, ideas, and energy.
- *Equitable*—providing care that does not vary in quality because of personal characteristics such as gender, ethnicity, geographic location, and socioeconomic status.