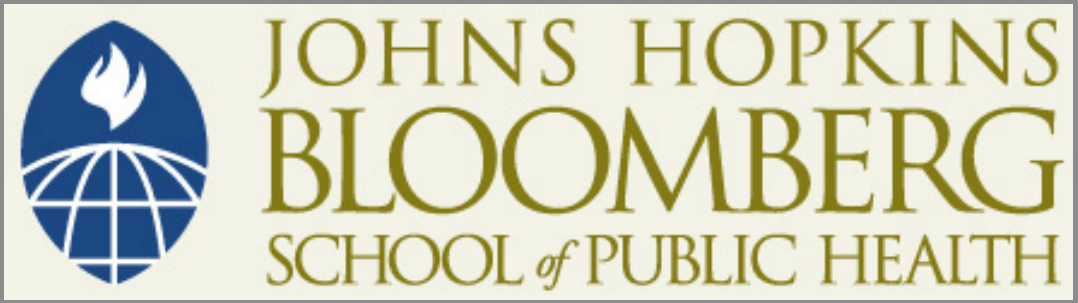


JOHNS HOPKINS
BLOOMBERG
SCHOOL of PUBLIC HEALTH

Safety and Medicine

Peter Pronovost, MD, PhD
Johns Hopkins University

The Problem Is Large

- In U.S. health care system
  - 44,000–98,000 deaths
  - $50 billion in total costs
- Similar results in Australia and the U.K.

RAND Study Confirms Continued Quality Gap

Condition	Percentage of Recommended Care Received
Low back pain	68.5
Coronary artery disease	68.0
Hypertension	64.7
Depression	57.7
Orthopedic conditions	57.2
Colorectal cancer	53.9
Asthma	53.5
Benign prostatic hyperplasia	53.0
Hyperlipidemia	48.6
Diabetes mellitus	45.4
Headaches	45.2
Urinary tract infection	40.7
Hip fracture	22.8
Alcohol dependence	10.5

Source: McGlynn et al. (2003). *New England Journal of Medicine,* 348, 26, 2635–2645.

Preventable Deaths

- 172,263 preventable deaths in the ICU from failing to use five interventions

Care process	% not receiving	Preventable deaths
ICU physician	77%	134,640
Sepsis drug	89%	10,311
Steroids in sepsis	50%	9,500
Glucose control	75%	12,347
Low tidal volume in ARDS	70%	5,465

Source: Pronovost. (2004).

How can this happen?

Need to view the delivery
of health care as a science

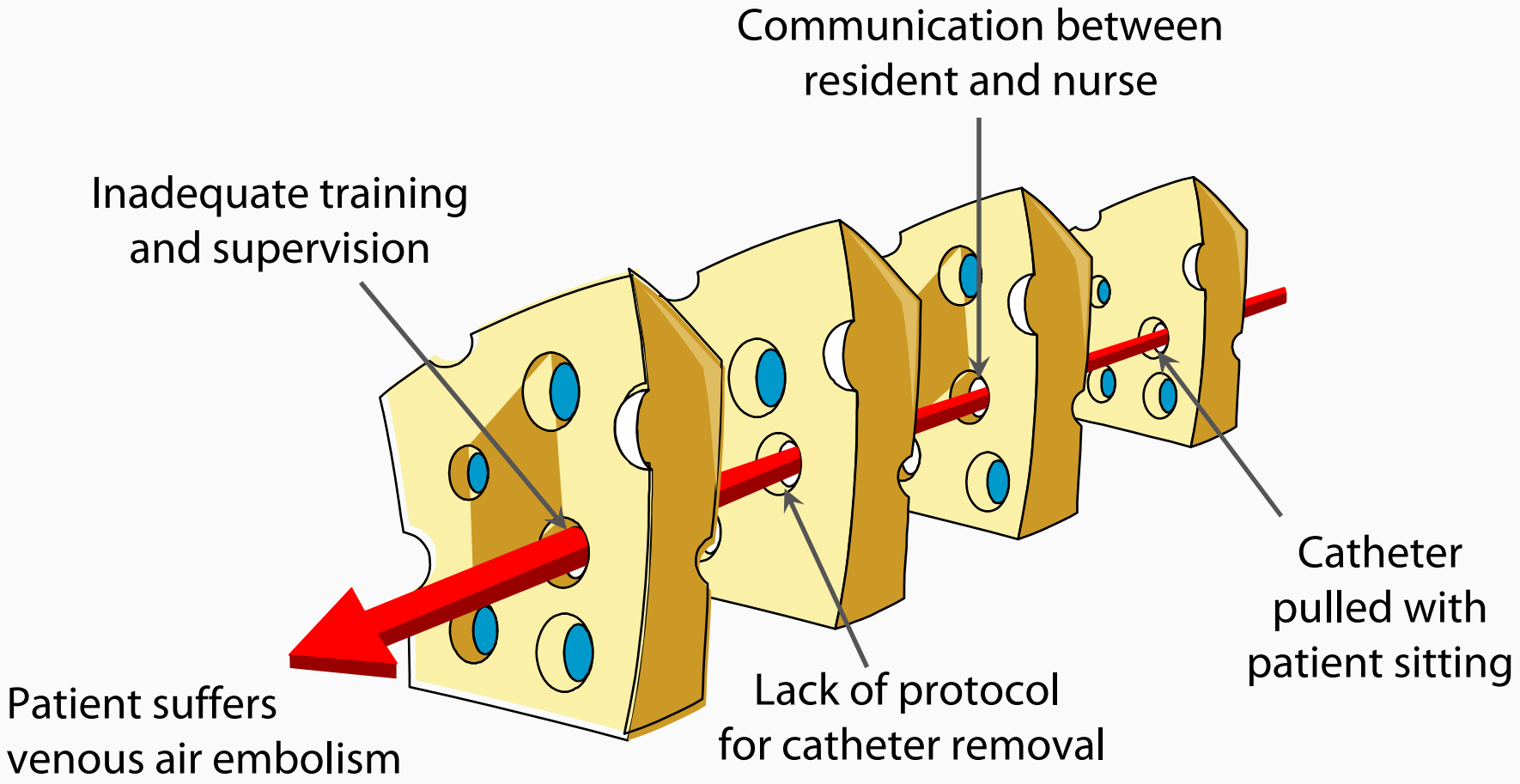
How can we improve?

The system is a set of parts interacting to achieve a goal

Every system is perfectly designed to achieve the results it gets

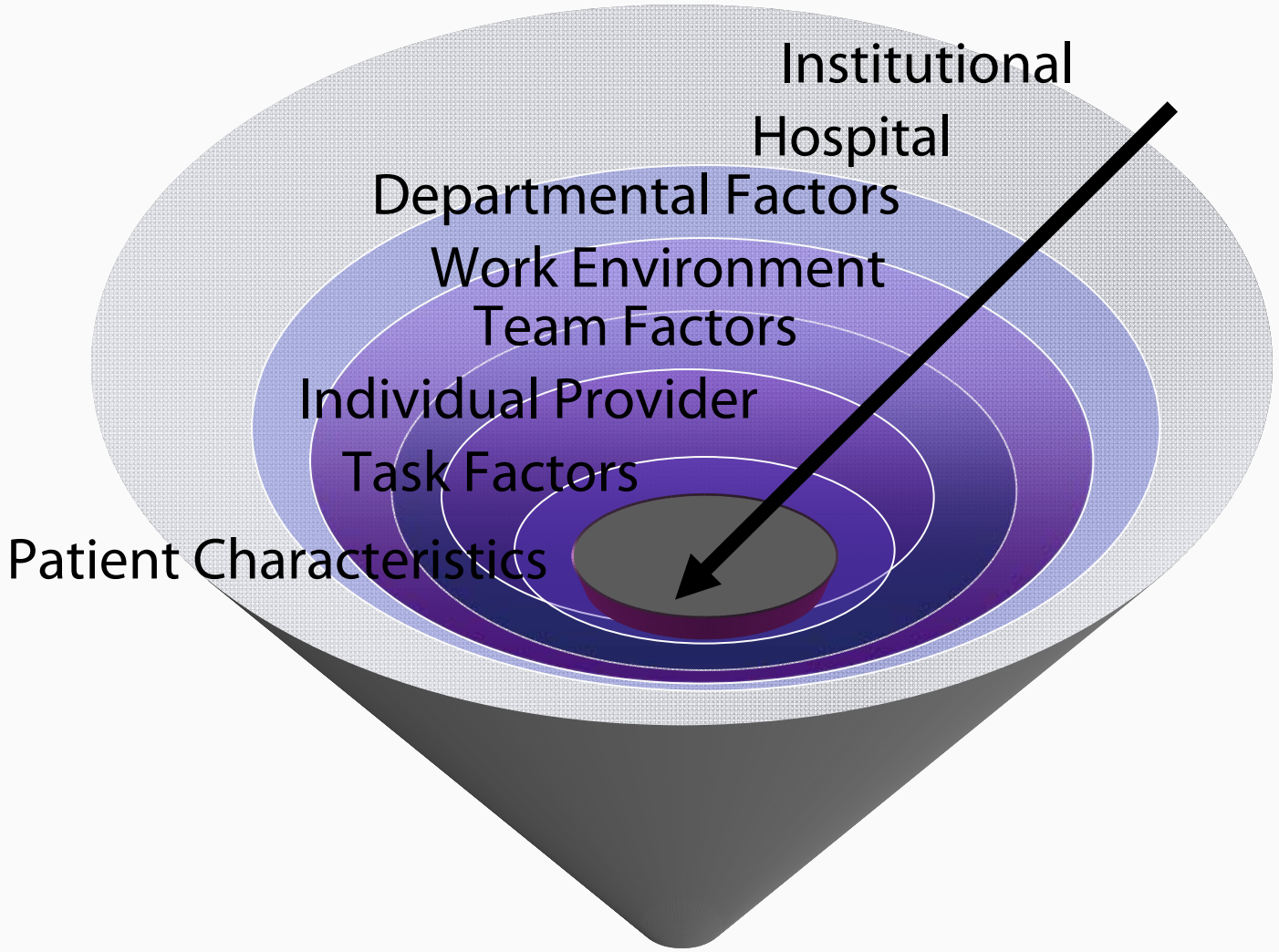
Caregivers are not to blame

System Failure Leading to Error



Source: Pronovost. (2004). *Annals of Internal Medicine.*

System Factors Impact Safety



Medication Error Waiting to Happen

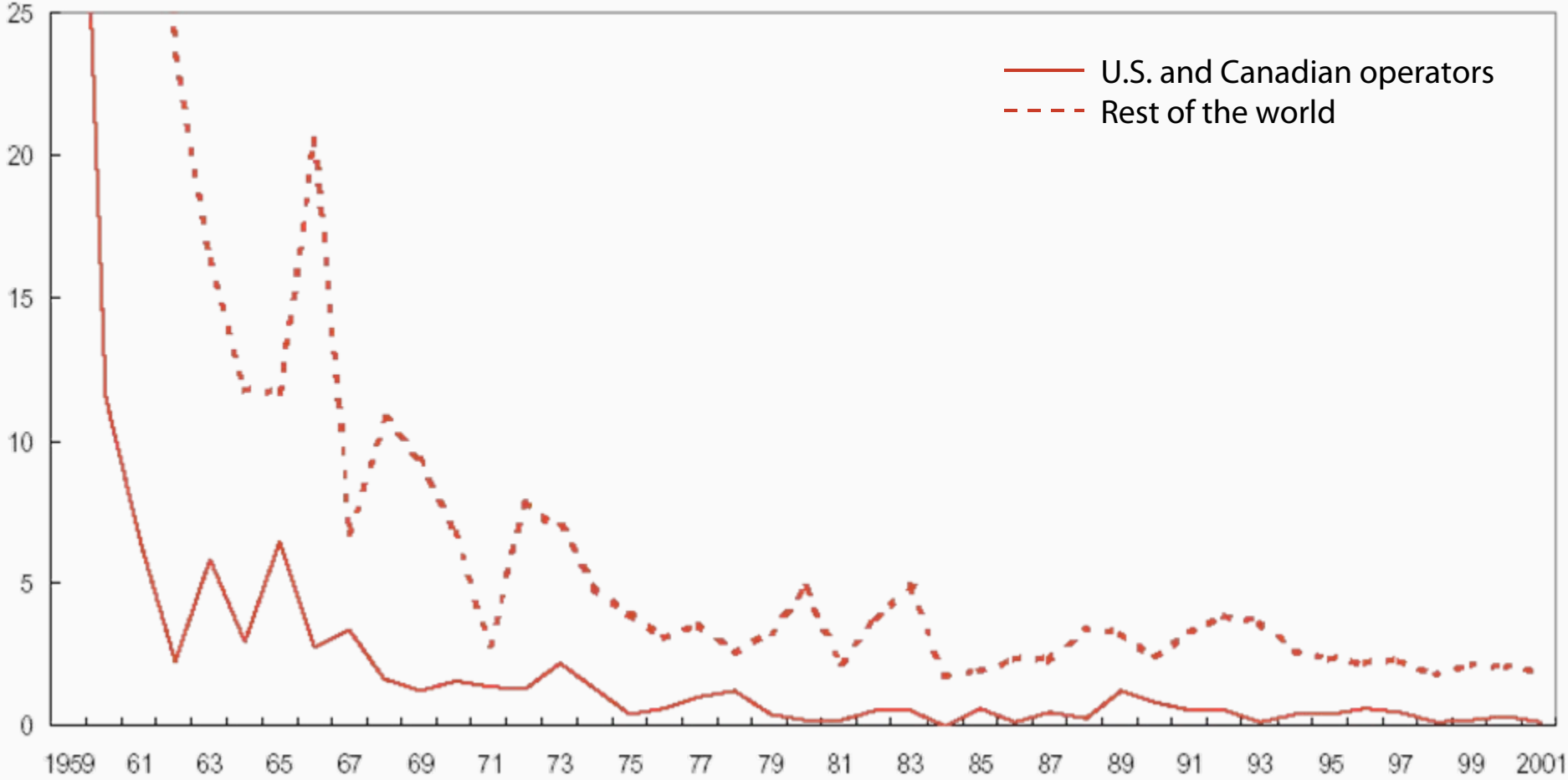
- Esmolol HCl (Brevibloc) distributed in dilute form and concentrated form
- Similar packaging for both, resulting in easy confusion and dosing errors (http://www.fda.gov/medbull/mederror.html)

Impact of ICU Organization on Performance

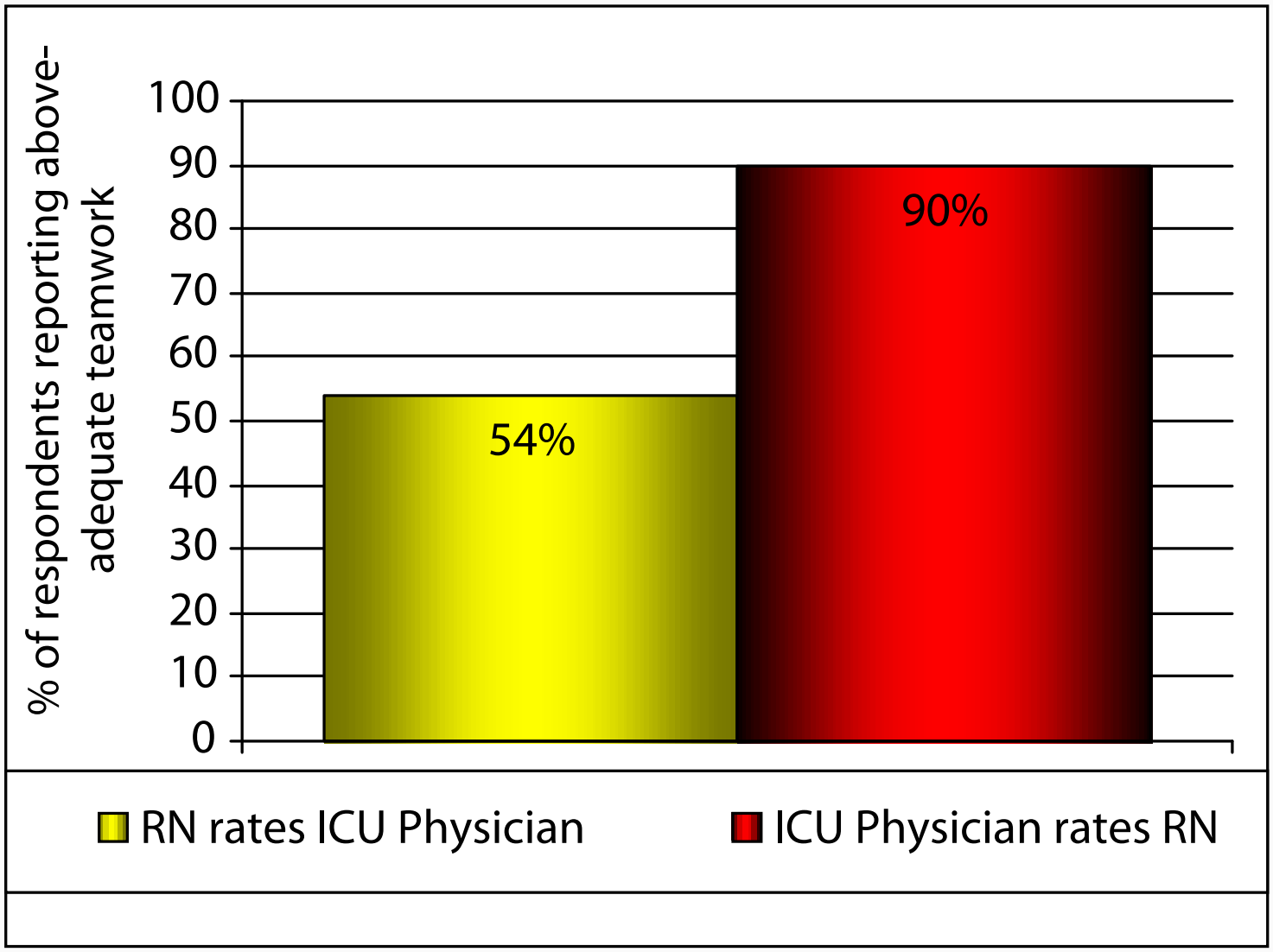
- Physicians
- Nurses
- Pharmacists

Source: Pronovost. (1999). JAMA; Pronovost. (2001) ECP.

Aviation Accidents per Million Departures (1959–2001)



ICU Physicians and ICU RN Collaboration



Source: Intensive Care Unit Safety Reporting System (ICUSRS).

Reliability Contingent upon Culture of Safety

- To improve reliability from 10^{-1} to 10^{-3} **is contingent upon culture of safety**
  - Standardize what is done, when it is done
    - Reduce complexity
  - Create independent checks for key processes
    - How often do we do what we should
  - Learn from defects
    - How often do we learn from defects

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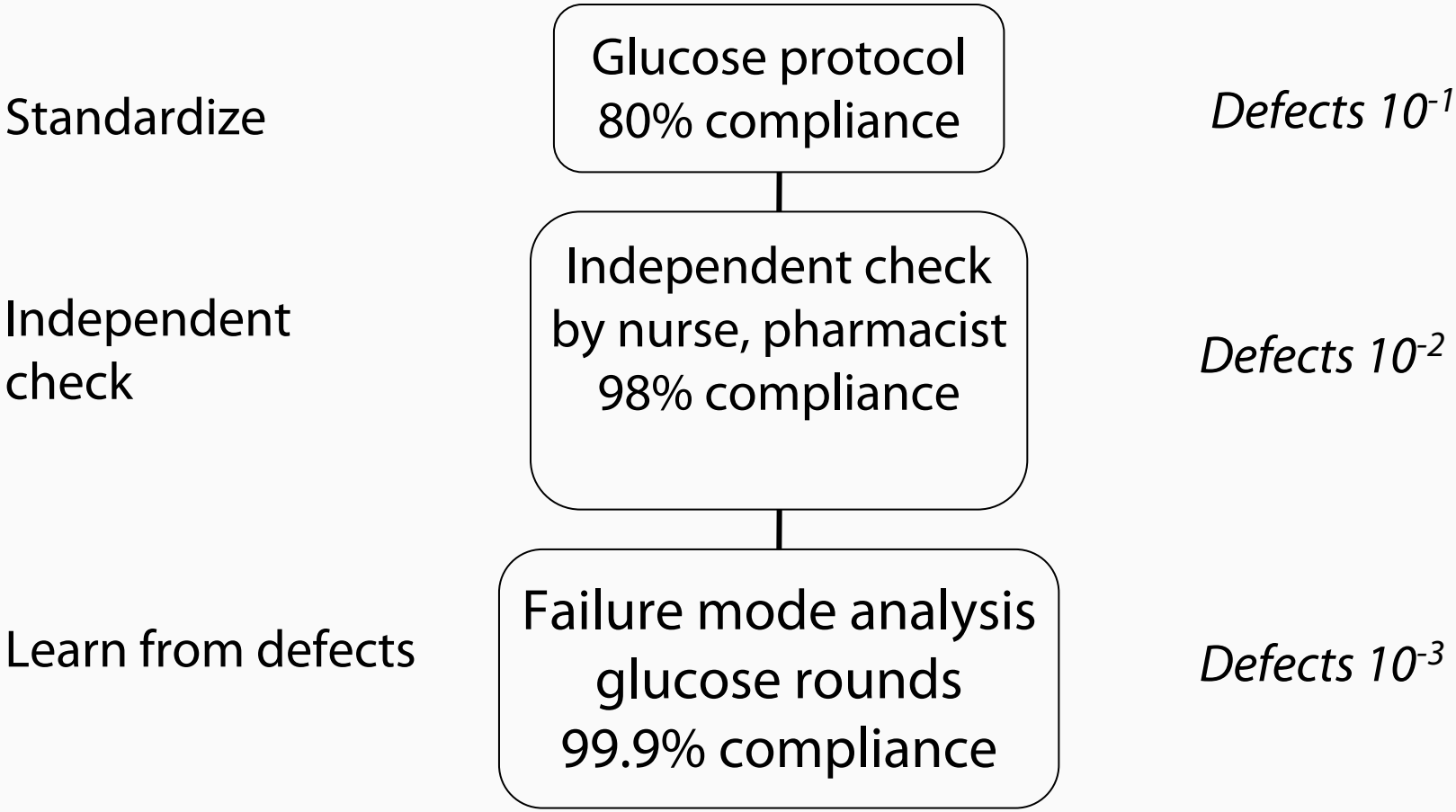
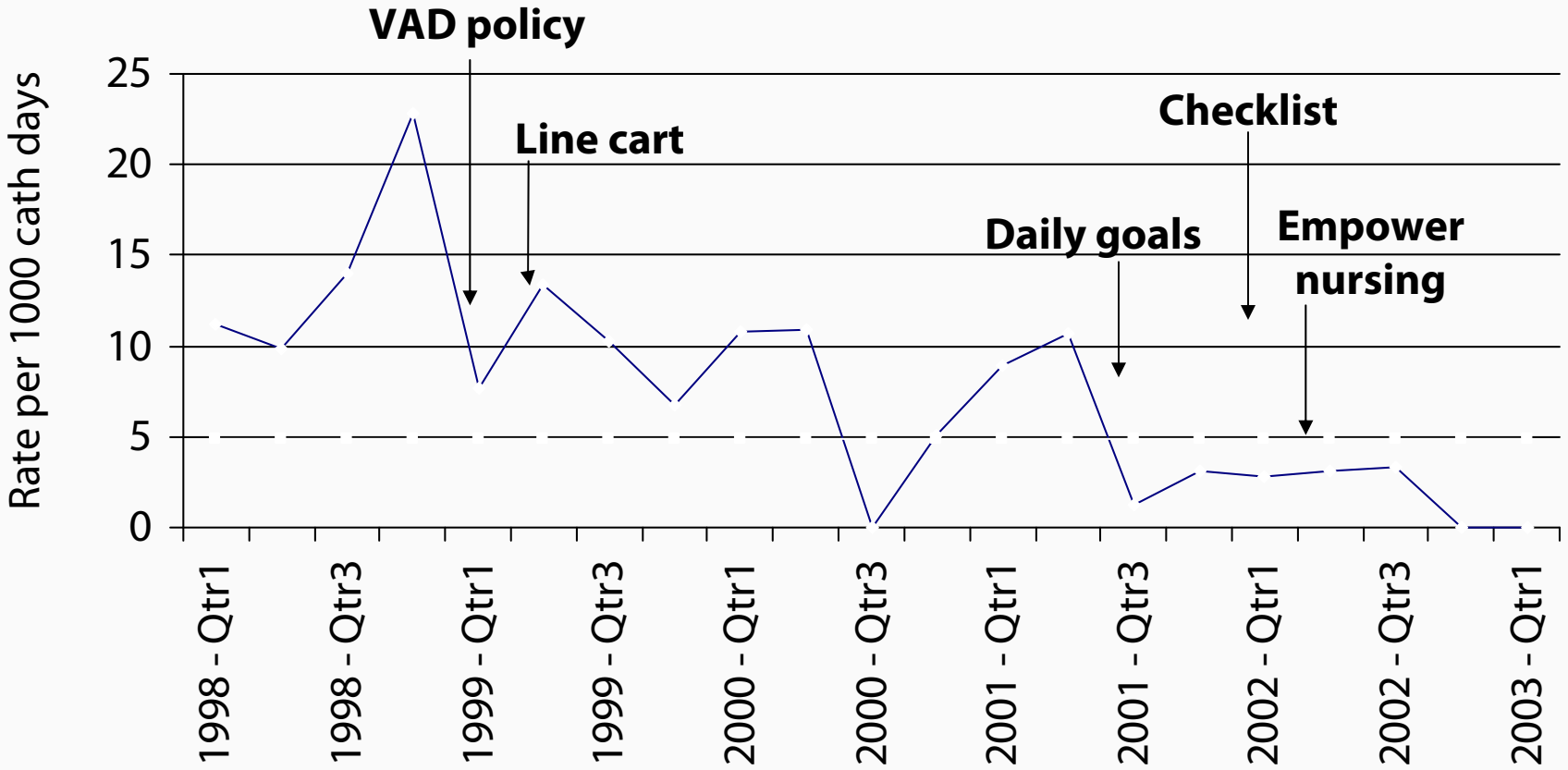
Improving Reliability



CR-BSI Rate


VAD policy
Line cart
Checklist
Daily goals
Empower nursing
Rate per 1000 cath days
25
20
15
10
5
0
1998 - Qtr1
1998 - Qtr3
1999 - Qtr1
1999 - Qtr3
2000 - Qtr1
2000 - Qtr3
2001 - Qtr1
2001 - Qtr3
2002 - Qtr1
2002 - Qtr3
2003 - Qtr1

Summary of Science of Safety

- Accept that we will make mistakes
- Focus on systems rather than blame
- Speak up if you have concerns, listen when others do
- Create clear goals, ask questions early
- Standardize, create independent checks, and learn from mistakes

www.icusrs.org