Practical Tools for the Patient Safety Officer:
Crafting Cultural Issues and Understanding Trigger Tools

Frances A. Griffin, RRT, MPA
Director, Patient Safety
Institute for Healthcare Improvement

"Unsafe acts are like mosquitoes. You can try to swat them one at a time, but there will always be others to take their place. The only effective remedy is to drain the swamps in which they breed."

James Reason

Culture

♦**A set of values, attitudes and beliefs that governs behavior.**

Culture is Context:

Human performance does not take place in a vacuum – rather, it takes place in an environment engendered and maintained by:

- ◆ **Management**

- ◆ **Governmental Regulators**

- ◆ **Front line personnel**

From J. Bryan Sexton, PhD

Examples of Setting Culture

- **Organization vs. department / unit**
  - *What do leaders talk about?*
- **Teams**
  - *Who is considered a member?*
- **Orientation**
  - *What do new staff hear?*
- **On-going education**
  - *How much and on what topics?*

Errors & Adverse Events

◆ **How are they handled?**

- ◆ *System issue or individual blame?*
- ◆ *What is discussed and shared?*

◆ **How do staff PERCEIVE they are handled?**

Impact of Culture

♦**Turnover**

♦**Reporting**

♦**Practice**

♦**Service**

♦**Satisfaction**

COST

A Safety Conscious Culture

- **Reporting**
  - **Events, errors, unsafe conditions**
- **Education**
  - **All staff, new and on-going**
- **Design**
  - **Incorporation of human factors**
- **Leadership**
  - **Driving Force**

Education & Training: Key Questions

- ◆ **How many hours/year/employee?**
- ◆ **How much is on patient safety?**
- ◆ **What is the focus?**
- ◆ **Does it include:**
  - ◆ **Human factors awareness?**
  - ◆ **Teamwork or CRM?**
  - ◆ **Assertiveness or SBAR?**

Orientation

♦ **Orientation**

  ◆ *Differences between formal & informal*

  ◆ *Peer pressure*

  ◆ *Impact on turnover*

Designing Systems for Safety

- **Prevention**
  - *Design to prevent errors*
- **Detection**
  - *Make errors visible when they occur*
- **Mitigation**
  - *Reduce the harm when errors and adverse events are not prevented or detected*

Designing for Safety

◆ **Reduce complexity**

◆ **Optimize information processing**

◆ **Automate wisely**

◆ **Use constraints**

◆ **Mitigate the unwanted side effects of change**

Thomas W. Nolan

High Reliability Organizations

Organizations that operate under very trying conditions all the time and yet manage to have fewer than their fair share of accidents

"Managing the Unexpected"

Karl E. Weick & Kathleen M. Sutcliffe

"To the currently controversial question of how many people die each year from medical errors, the answers range as high as the equivalent of two fully loaded 747s crashing with no survivors, each day of the year. Hospitals aren't even considered high reliability organizations."

Managing the Unexpected

Weick & Sutcliffe
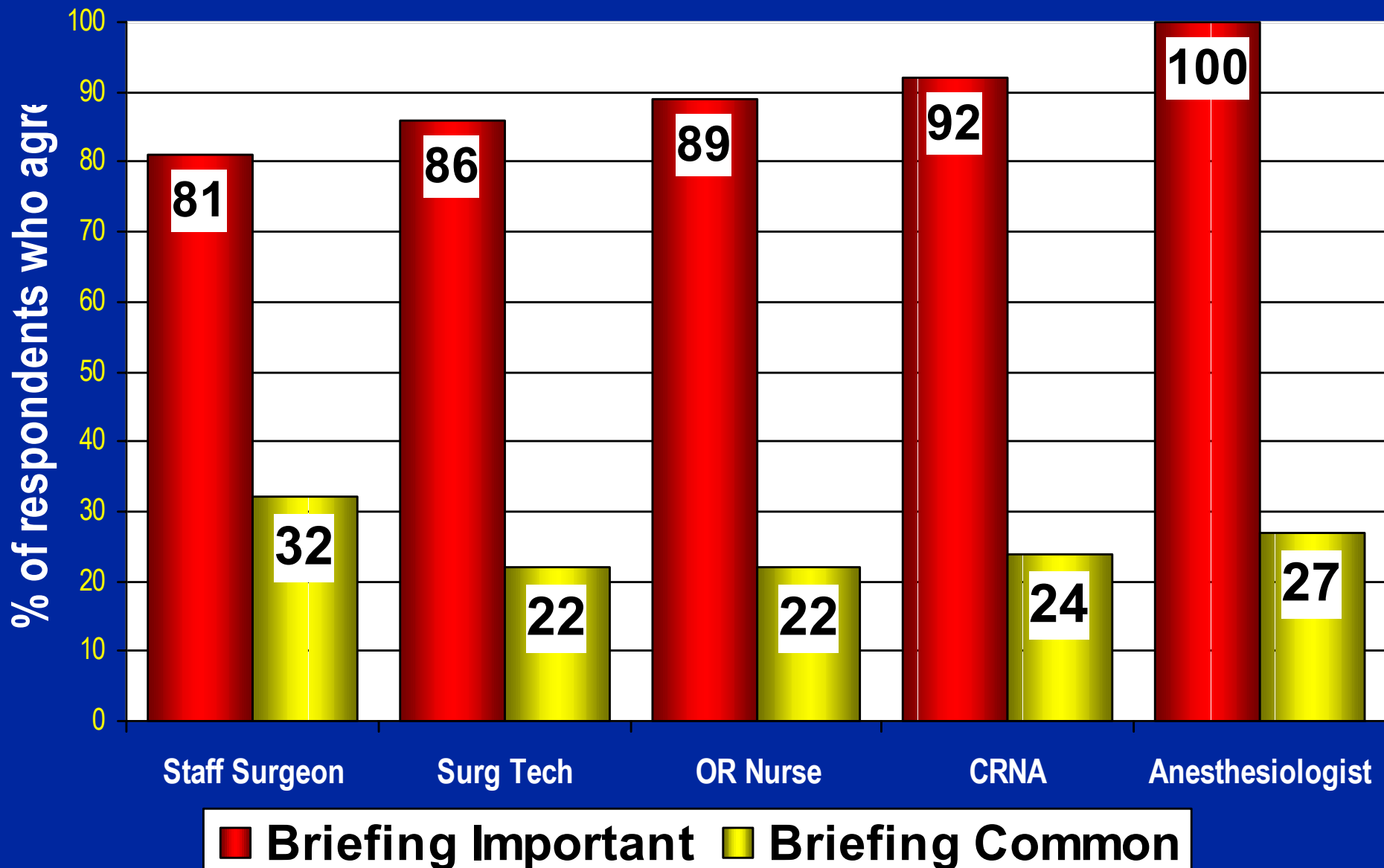
Interventions to Improve Culture:

- ◆ **Safety Briefings**
- ◆ **Leadership WalkRounds**
- ◆ **Human Factors Awareness Training**
- ◆ **SBAR Assertiveness Training**
- ◆ **Crew Resource Management**

Measuring Culture:
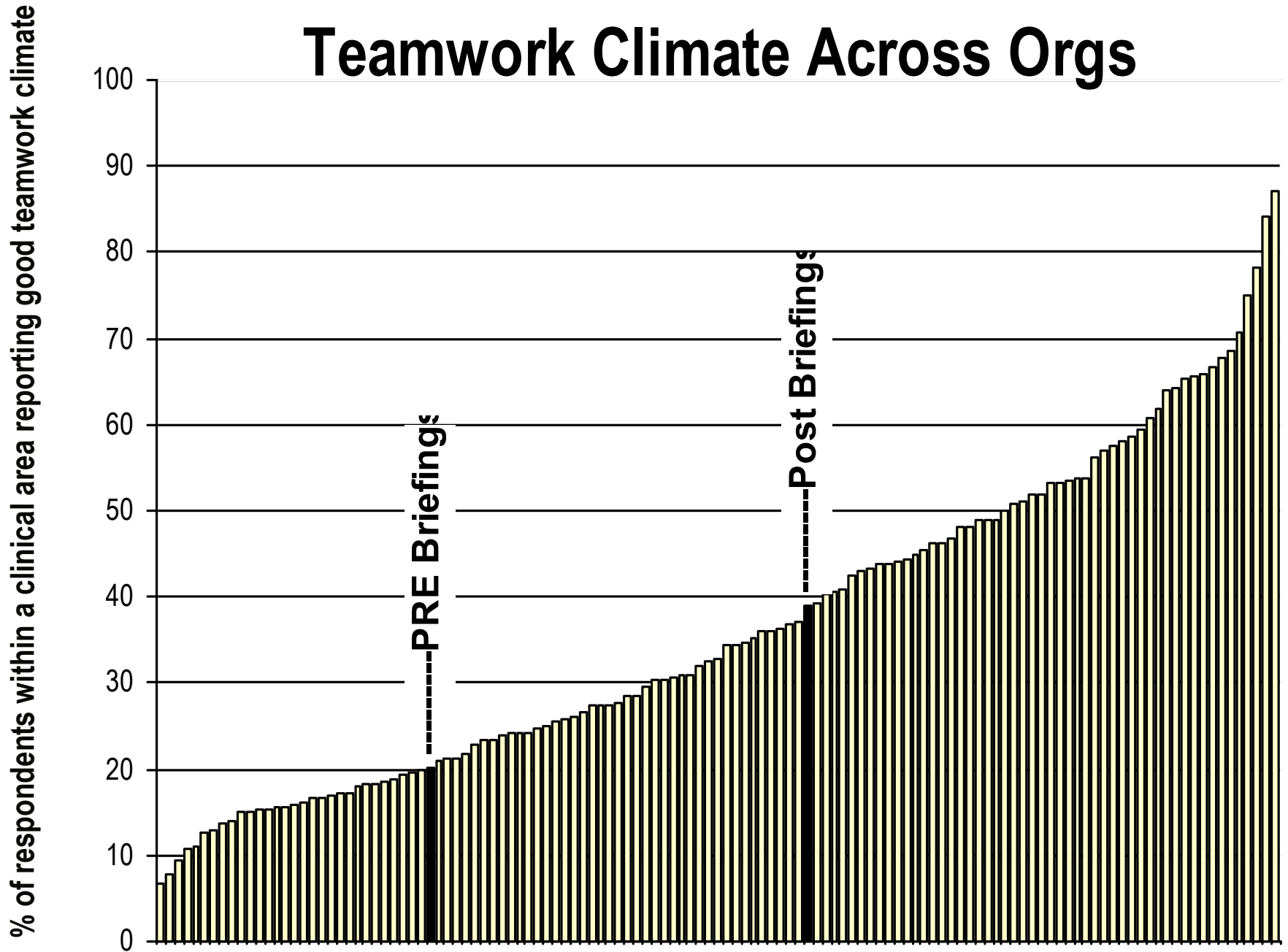# Safety Attitudes Questionnaire

J. Bryan Sexton, Ph.D.
The University of Texas at Center of Excellence for Patient Safety and Practice
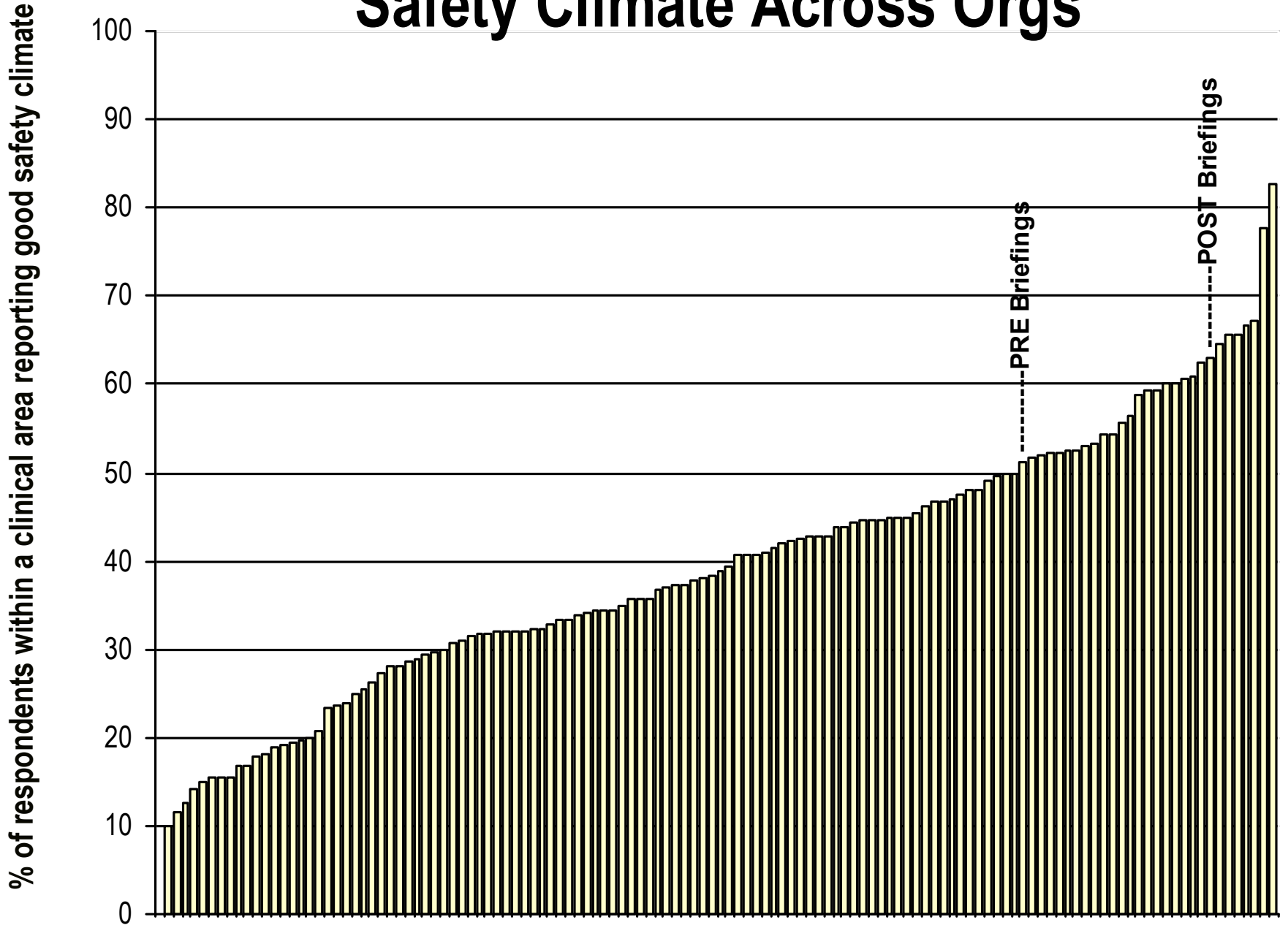
OR personnel report that briefings are important for patient safety, but not common:

% of respondents who agree

	Staff Surgeon	Surg Tech	OR Nurse	CRNA	Anesthesiologist
Briefing Important	81	86	89	92	100
Briefing Common	32	22	22	24	27

■ Briefing Important ■ Briefing Common

Teamwork Climate Across Orgs

% of respondents within a clinical area reporting good teamwork climate

PRE Briefings

Post Briefings

Safety Climate Across Orgs

Y-axis: % of respondents within a clinical area reporting good safety climate

Y-axis values: 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100

PRE Briefings

POST Briefings

Improvements after a Cultural Change

◆**INCREASE: Nurse input is well received in the OR**

◆**INCREASE: I know the first and last names of all the personnel that I worked with during my last shift**

◆**INCREASE: All OR personnel take responsibility for pt safety**

◆**INCREASE: Pt safety is constantly reinforced as the priority in the OR**

◆**INCREASE: Staffing levels are sufficient to handled the number of patients**

◆**INCREASE: Personnel speak up if they perceive a problem with pt care**

◆**DECREASE: High workload is common in the ORs here**

Target: Safety Climate

- ♦ **Peter Pronovost, M.D., Ph.D., et al. at Johns Hopkins**
- ♦ **Administered Safety Climate Scale before and after the intervention**
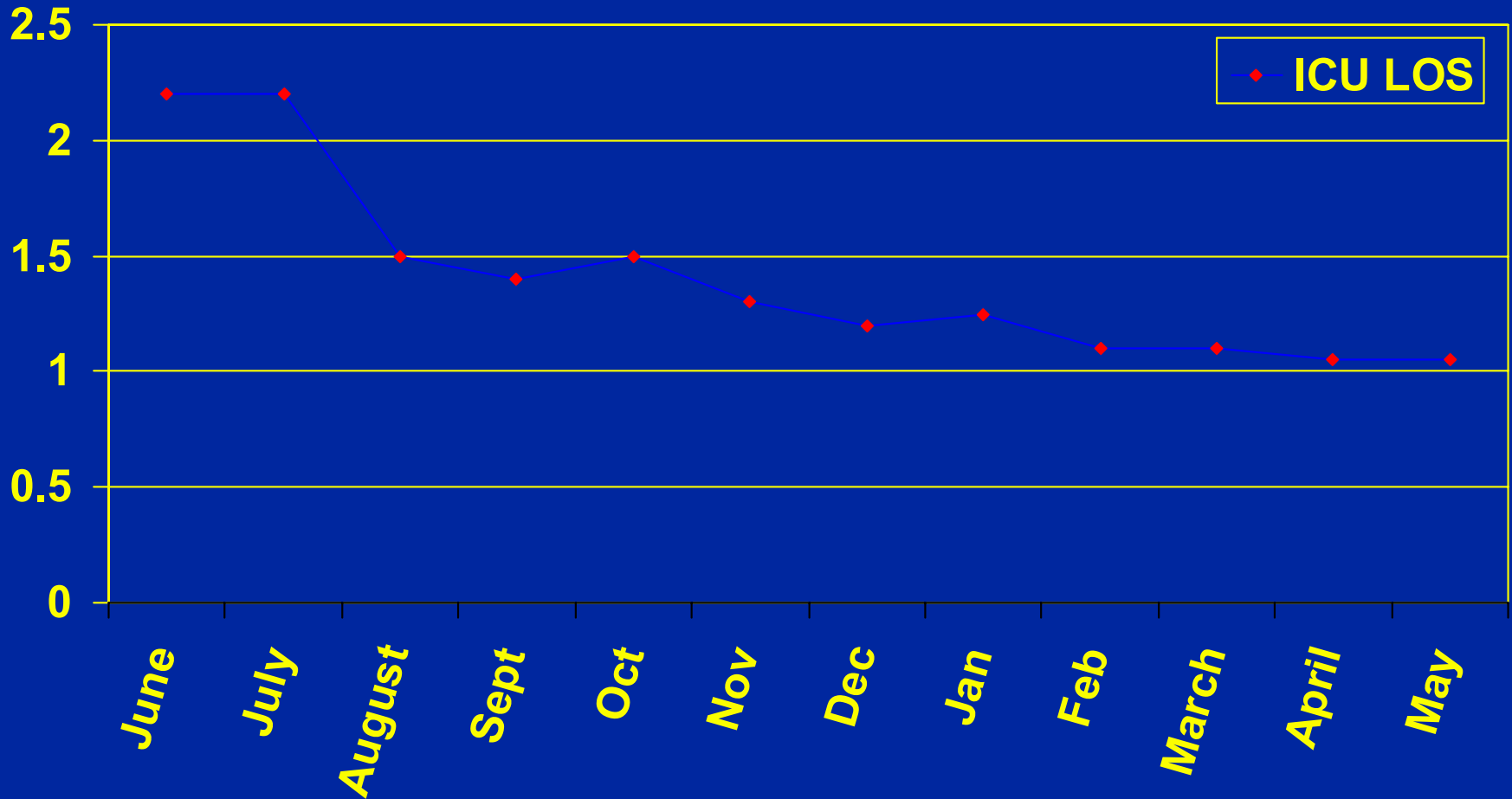- ♦ **Post intervention:**
  - ♦ **Marked improvement in Safety Climate at each ICU**
  - ♦ **Reduced number of medication errors**
  - ♦ **Reduced LOS by 50%**

Key Points

- **Leadership Driven**
  - *Must be visible*
- **Slow to change**
  - *Avoid "flavor of the month"*
- **Fundamental to all safety**
  - *Other initiatives will have limited success*
- **Lessons from other industries**
  - *Aviation, nuclear power, etc.*

Understanding Triggers

Why use Triggers?

- **Traditional reporting of errors, incidents or events**
  - **voluntary**
  - **not reliable**
    - **estimated at 10-20% of actual**
  - **often involves violations of the 5 Rs**
  - **includes errors that do not reach patient**

In Search of Harm

- **Why is harm not reported?**
  - **"known risk" or complication**
  - **"cost of doing business"**
- **Indicators**
  - **Interventions**
  - **Reversal agents**
  - **Lab values**

Background

- ◆ **Computerized triggers for ADE's**
  - ◆ **Brent James**
- ◆ **ADE review identifying 14 triggers**
  - ◆ **Samuel Henz**
- ◆ **Idealized Design of the Medication System – IHI & Premier**
  - ◆ **modifications and testing**

Preventability and Harm

- ◆ **Every system is designed to produce the outcomes it gets**
- ◆ **We have systems of care designed to produce certain levels of harm**
- ◆ **These levels of harm have become acceptable as a property of the system**
- ◆ **All harm is theoretically preventable**

Definition of ADE
NCC MERP Index

A Circumstances or events - capacity to cause error

B Error occurred - did not reach the patient

C Error reached patient, no harm

D Monitoring or intervention , no harm

E Temporary harm, intervention required

F Temporary harm , initial or prolonged hospitalization

G Permanent patient harm

H Life sustaining intervention required

I Death

Trigger Tool Advantages

- Measures total harm

- Moves from error but does not exclude error

- Easy with sampling over time

- Measures accumulated efforts at patient safety

Adverse Medication Events
New vs. Old

- Concentrates less on errors
- Looks at all unintended results
- Makes measurement easier
- Concentrates on harm and those errors that cause harm

- Errors are the focus of discussion
- Tends to focus only on those results felt to be related to error
- Requires judgement
- Human responsible for most of the errors

Chart Review Triggers for ADE

- Diphenhydramine
- Vitamin K
- Romazicon
- Anitemetics
- Naloxone
- Antidiarrheals
- Kayexalate
- Serum glucose <50
- C. difficile positive
- PTT > 100 seconds

- INR >6
- WBC <3,000
- Platelet <50,000
- Digoxin level > 2
- Rising serum creatinine
- Oversedation / fall / lethargy / hypotension
- Rash
- Abrupt medication stop
- Transfer to higher level of care

Types of System Failures

- ◆ **Discrete Defect/Error**
- ◆ **Poor Therapeutic Control**
- ◆ **Information Retrieval and Processing**
- ◆ **Predictable Risks including rare extreme exacerbations of a known risk**
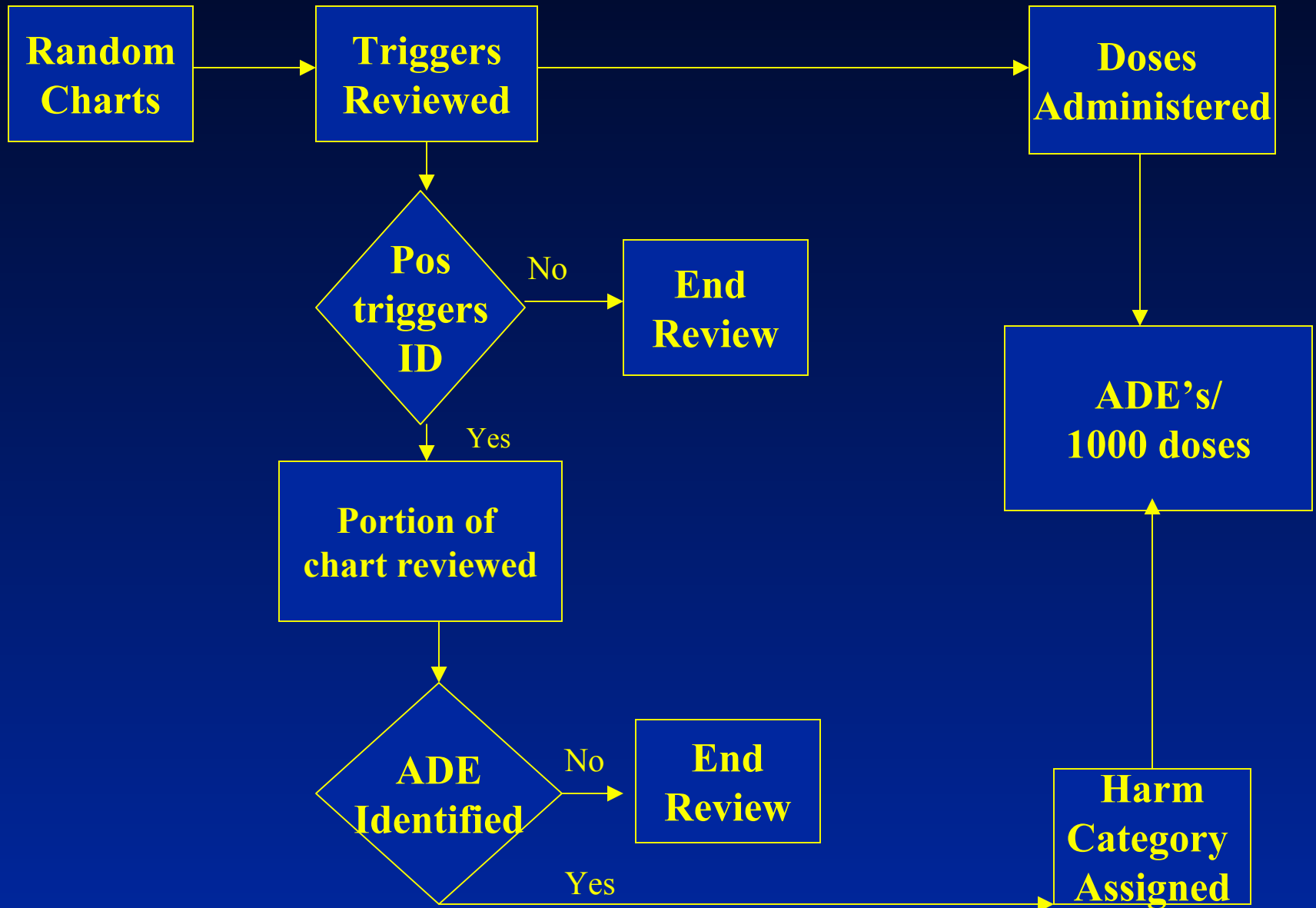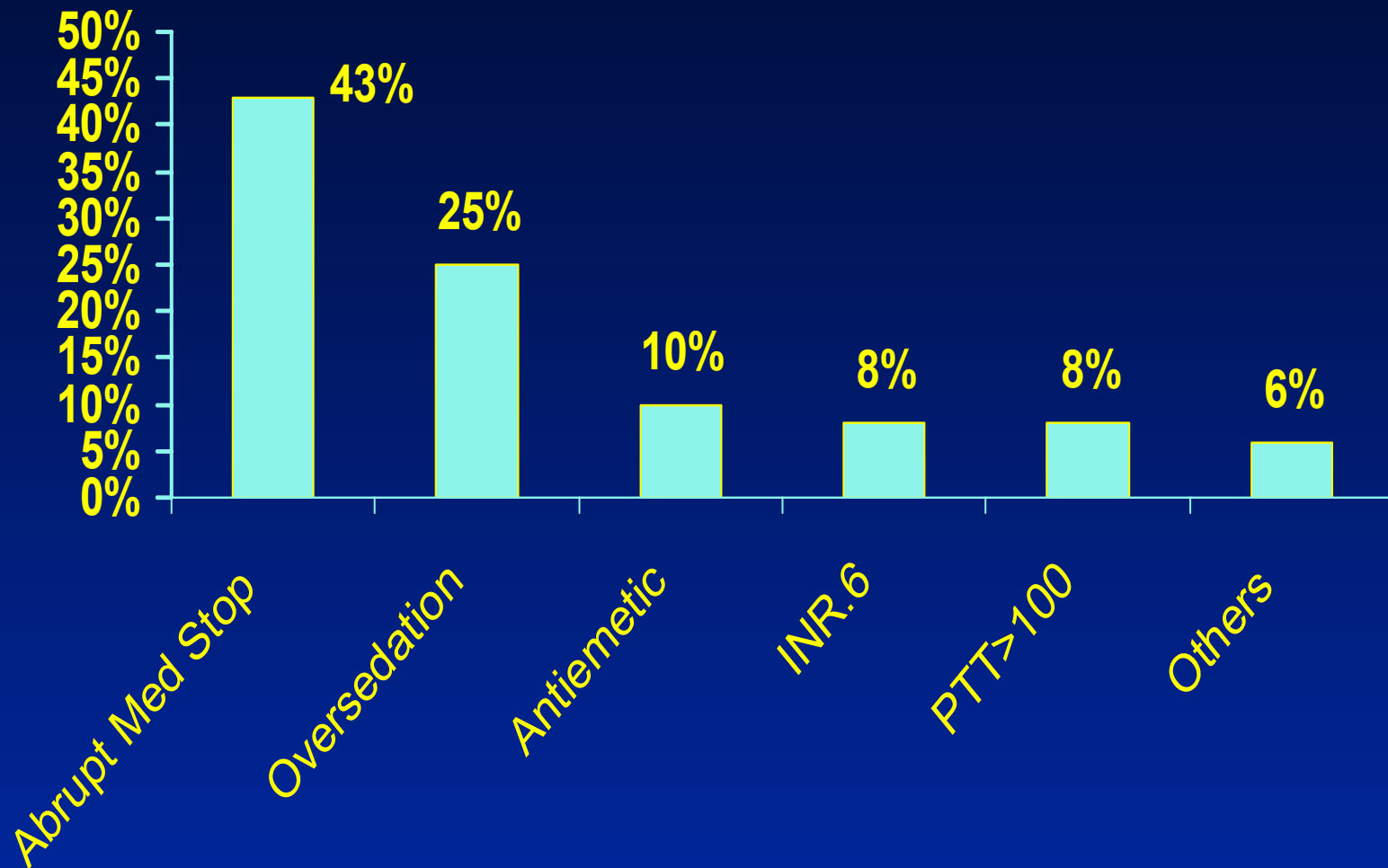
Determination of Harm

◆**Was this preventable?**

◆**Is this the result of not doing things right the first time?**

◆**Would I want this to happen to me?**

Multi-center Trigger Review

- ♦ **2837 charts reviewed using trigger tool**
- ♦ **86 institutions**
- ♦ **720 ADEs found on reviews**
- ♦ **268,796 medications doses administered**
- ♦ **ADE's/1000 doses = 2.67**
- ♦ **Admissions with ADE's = 24.9%**

Triggers Identifying ADEs

Triggers in the ICU

Results from
Luther Midelfort

- Positive blood culture
- Abrupt drop in Hg >4gms
- C. difficile positive
- PTT > 100
- INR > 6
- Glucose < 50
- Rising BUN +/or Serum Creatinine to more 2x baseline level
- Radiologic test for emboli or clot
- Benadryl
- Vitamin K
- Flumazenil (Romazicon)
- Naloxone (Narcan)
- Antidiarrheals
- Antiemetics
- Sodium Polystyrene (Kayexelate)
- Code
- Pneumonia onset in unit
- Readmission to ICU
- New onset dialysis
- In unit procedure
- Intubation / reintubation
- Abrupt medication stop
- Oversedation / lethargy / hypotension

Adverse Events/ICU Day

♦ **Average .164 events/ICU Day**

♦ **Range .04-.39 events/ICU Day**

Data Results

♦ **1294 total charts(Admissions) reviewed**

♦ **1450 events documented**

♦ **55% of admissions had adverse events**

♦ **28% of charts had more than 1 event**

♦ **18% related to medications**

♦ **11% coded on "E"codes**

♦ **8.9 day LOS with events**

♦ **4.3 day LOS without events**

Luther Midelfort 2002

Top 10 Triggers

Trigger	# Positive	# With Harm
In Unit Procedure	628	112(17.8%)
Hct Drop	309	201(65%)
Intubation or Reintubation	309	166(54%)
Antiemetics	233	16(6.8%)

Luther Midelfort 2002

Top 10 Triggers

Trigger	# Positive	# With Harm
PE Tests	200	35(17.5%)
Oversedation	184	159(86%)
Nos Pneumonia	158	154(97%)
Rising BUN	154	104(67%)
Pos Bld Culture	121	101(83%)
Med Stop	112	68(61%)

Luther Midelfort 2002

Events Related to Medications

- Antibiotics 10%
- Anticoagulants 24%
- Electrolytes 2%
- Insulin 8%

- Narcotics 12%
- Sedatives 24%
- Other 17%

Consecutive Adverse Events

- 1-Iatrogenic pneumothorax
- 2-Sternal wound infection
- 3-Thrombophlebitis
- 4-Post Surgical bleed
- 5-ICU delirium
- 6-Nosocomial pneumonia
- 7-Theophyline toxiciy/arrythmia
- 8-GI bleed
- 9-Iatrogenic pneumothorax
- 10-ICU delirium
- 11-Fluid overload
- 12-Oversedation
- 13-Urinary obstruction
- 14-ICU delirium
- 15-Rash
- 16-Aspiration pneumonia
- 17-Nausea
- 18-Pulmonary embolus
- 19-Nosocomial pneumonia
- 20-Sternal wound dehiscence
- 21-Dialysis induced hypotension
- 22-Severe hypotension with NTG
- 23-Renal failure post surger
- 24-ICU delirium
- 25-Sternal wound infection

Levels of Harm

- ♦ **60 episodes event contributed to death(4.1%)**
- ♦ **165 episodes event required intervention to save life(11.4%)**
- ♦ **30 episodes event caused permanent harm(2%)**
- ♦ **353 episodes event caused temporary harm requiring hospitalization or prolonged stay(24.3%)**
- ♦ **936 episodes event caused temporary harm requiring intervention(64.5%)**

Musings

- ◆ **NOI affect of events/admission $2739**
- ◆ **1294 charts reviewed with 55% having adverse events**
- ◆ **710 charts had events X $2739**
- ◆ **$2,000,000 affect on combined collaborative NOIs**
- ◆ **Local affect is about $2,000,000/year**

Key Elements

- **Multidisciplinary team**
  - **keep consistent**
- **Review triggers only**
  - **avoid "reading the chart"**
- **Use data for internal comparison**
  - **identify areas for further review**
  - **drill down on specific triggers**

Practical Process

- ♦ **For best results have 2 people review each chart**

- ♦ **Debrief after the 10 chart review**

- ♦ **Reach an agreement on the events**

Considerations

♦ **75% of all events will be picked up by both reviewers**
    (these are the G,H,I harm levels)

♦ **25% of events will be picked up by one or the other reviewer**
    (most often are E and F levels)

♦ **Definitions of harm become more standard with 2 reviewers**

Developing Triggers

- ♦ **Focus on:**
  - ◆ **Type of event, location, population**
- ♦ **List types of harm**
- ♦ **Identify "clues"**
- ♦ **Test with a team review**

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