



Accelerating the Pace of Improvement: High Reliability in Healthcare

ASQ Kansas City 1301

March 21, 2008

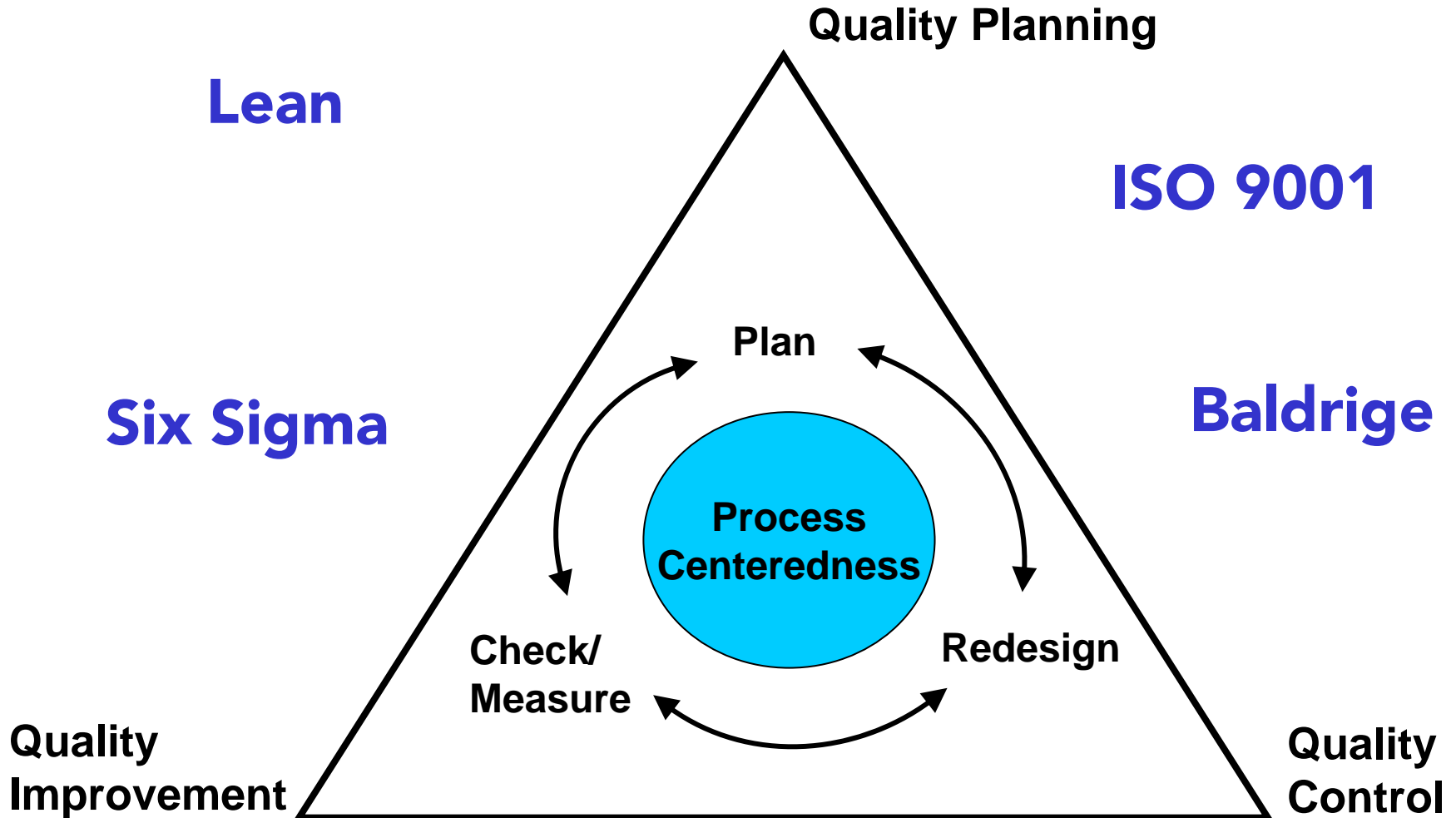
Becki Kanjirathinkal, MS, RN, CPHQ, CMQ/OE, CPHRM

CNA HealthPro

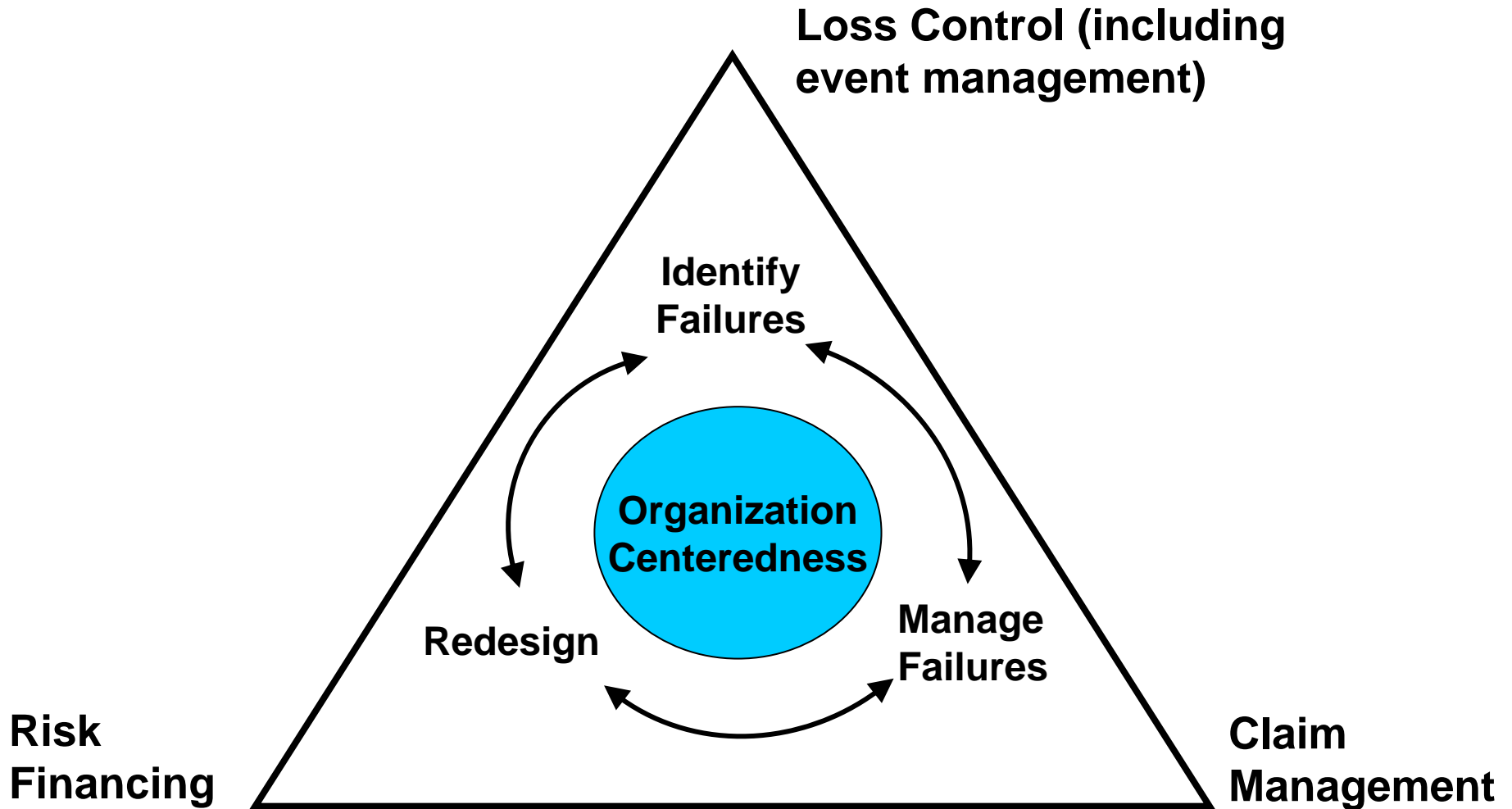
Objectives

- **Explore the impact of complexity theory and systems thinking on healthcare processes**
- **Identify key components of a high reliability culture**
- **Gain a better understanding of the importance of patient safety science in supporting quality improvement and patient safety within healthcare**

Quality Management



Risk Management



No Guarantees

Even with High Compliance in Quality and Risk Management Best Practices

- **Mistakes can still happen**
- **Patients can still be harmed**
- **Avoidable deaths can still occur**
- **Lawsuits can still be filed**
- **Criminal charges can still be filed**

Thumb Wrestling

Standard Operating Procedure (SOP)

1. Choose an opponent for thumb wrestling
2. Mutually agree on whether to use right or left hand
3. Have opponents face one another
4. Hook the four fingers of right (or left hand) with the same four fingers on opponents hand so that the thumbs are pointing towards the ceiling
5. Together, repeat the following, "One, two, three, four, I declare a thumb war"
6. Try to pin your opponent's thumb down using only your thumb, while dodging your opponents attempts to do the same
7. The goal is for you to win this competition as many times as you can in 15 seconds
8. Winning means pinning your opponent's thumb

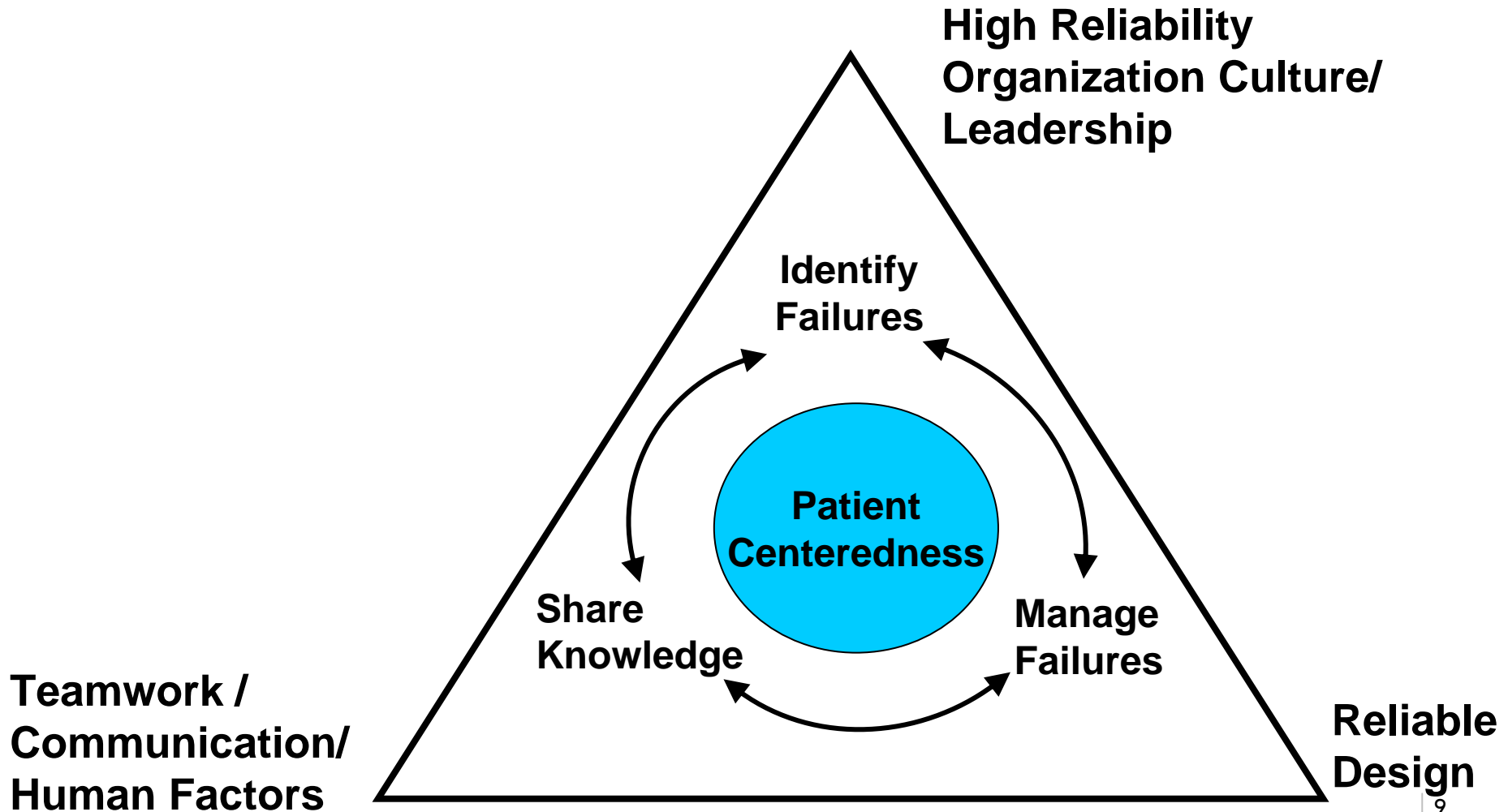
What happened?

- **How many points did you get?**
- **What were the assumptions you brought into this game?**
- **How did your assumptions affect your behavior?**

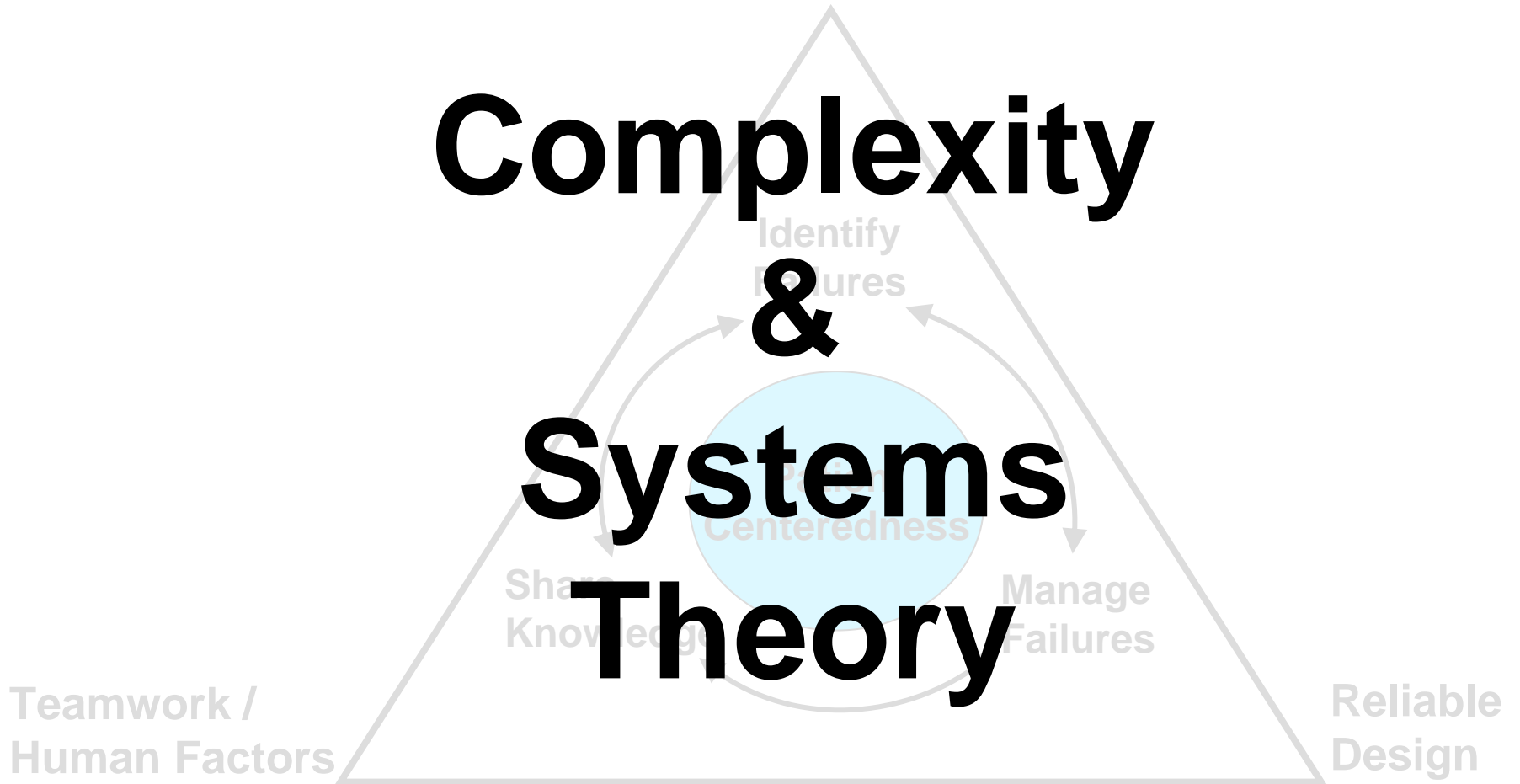
Factors Influencing Performance

- **Our mental models**
 - The images, assumptions, and stories we carry in our minds of ourselves, other people, institutions, and every aspect of the world that shape our decisions and responses
- **Human factors/cognition**
- **“Work culture” influences**
- **Unpredictable nature (complexity) of our systems**

Patient Safety



Patient Safety



Complexity Theory

Simple

Following a Recipe

The recipe is essential

Recipes are tested to assure easy replication of success

No particular expertise is required (cooking skill can improve the success rate)

Recipes produce standardized, predictable results every time

Complicated

Sending a Rocket to the Moon

Formulae are critical and necessary

Sending one rocket increases assurance of future success

High levels of expertise in a variety of fields are necessary for success

Rockets are similar, and there is a high degree of outcome predictability

Complex

Raising a Child

Formulae have a limited application

Raising one child provides experience but no assurance of future success

Expertise can contribute but is neither necessary nor sufficient to assure success

Every child is a unique individual with unpredictable "outcomes"

Patient Safety

**High Reliability
Organization
Culture/
Leadership**

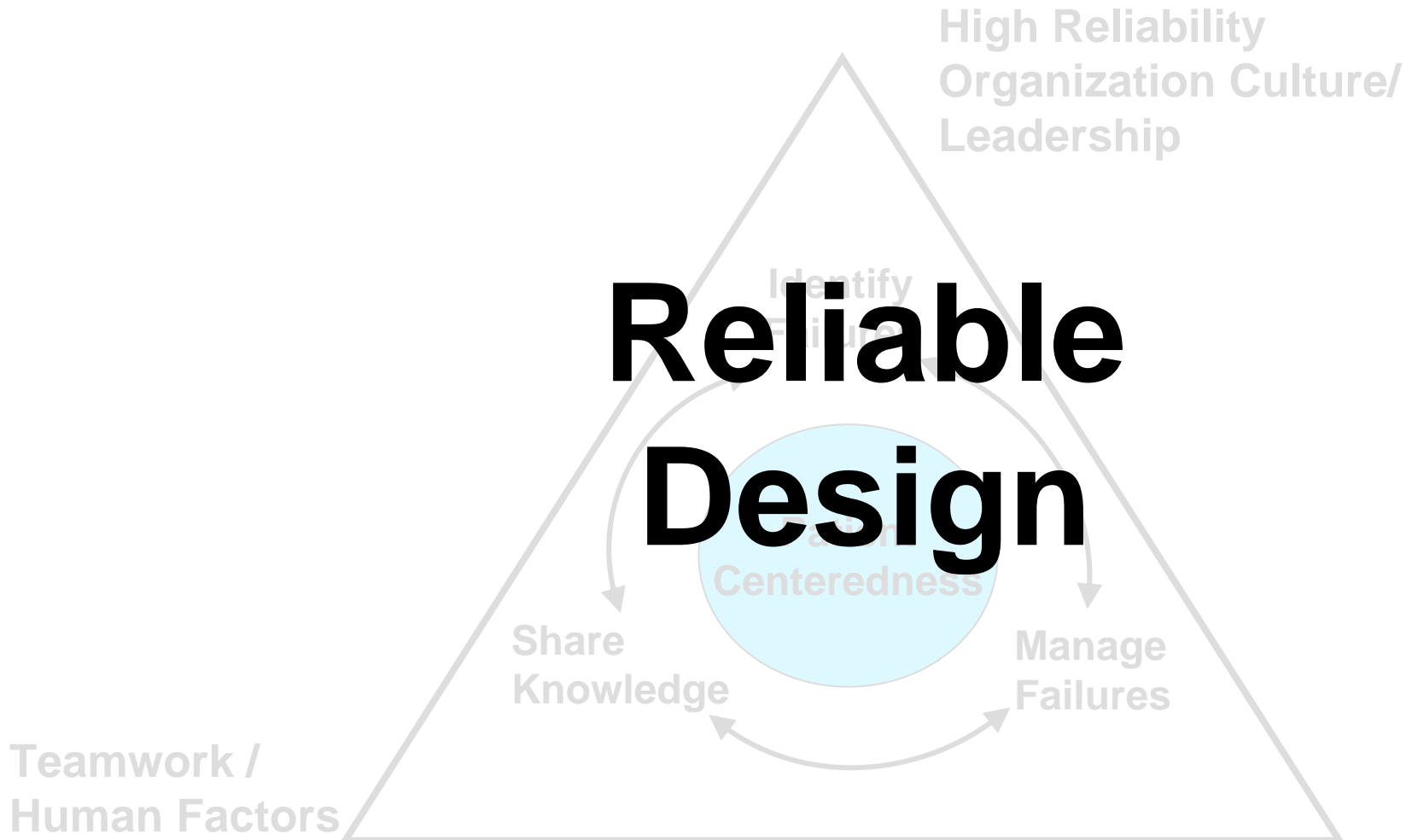
Teamwork /
Human Factors

Reliable
Design

Highly Reliable Organizations

- **Preoccupation with failure**
- **Reluctance to simplify**
- **Sensitivity to operations**
- **Commitment to resilience**
- **Deference to expertise**

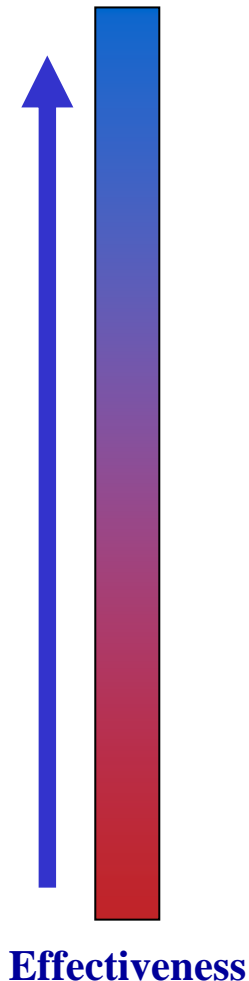
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Reliable Design

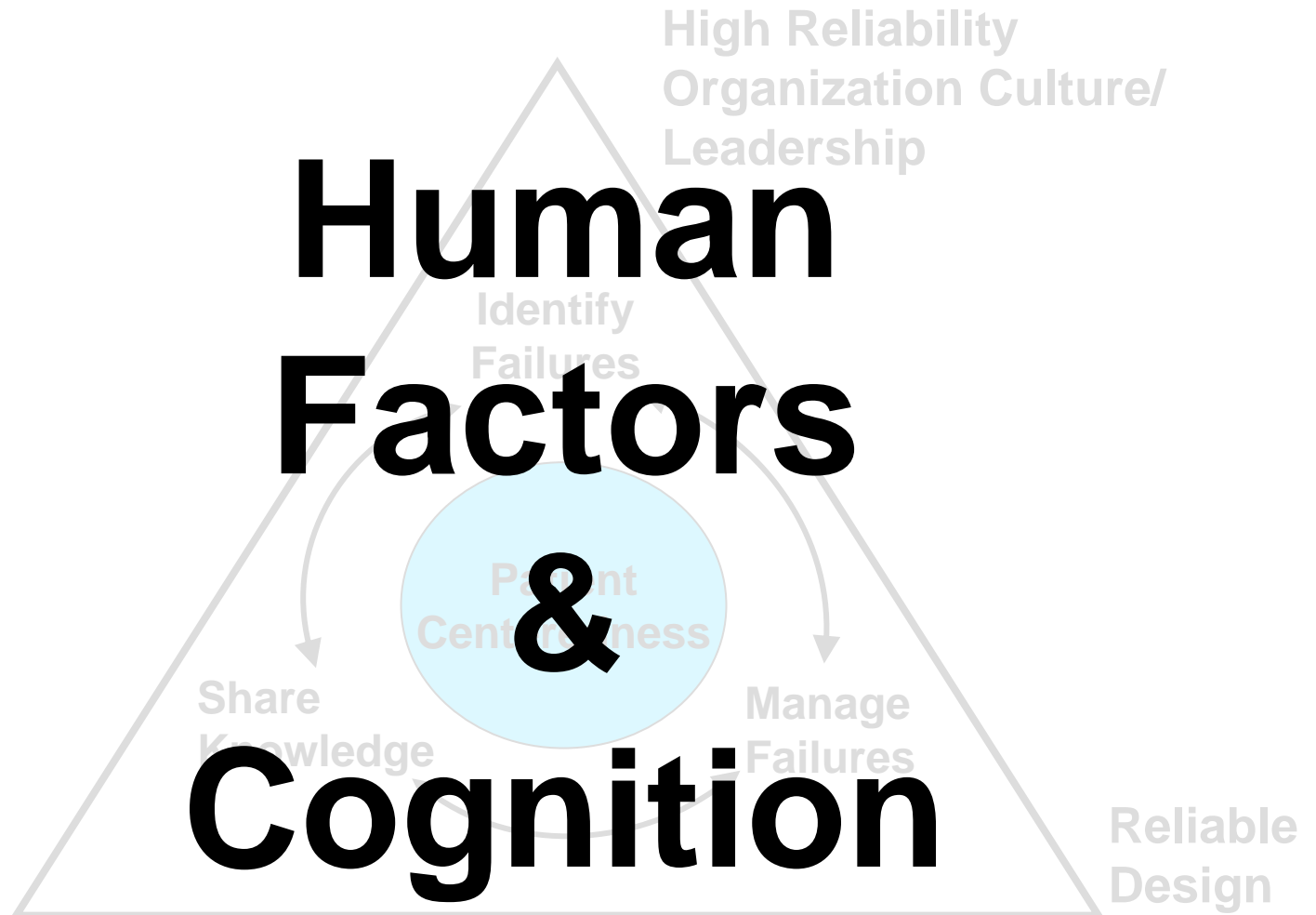
- **Adopt evidence based medicine**
 - Proven Effective Care vs. Preference Sensitive Care
- **Simplify and standardize where appropriate to eliminate unnecessary variability**
- **Build in redundancy**
- **Use continuous improvement techniques**
 - Lean
 - Six Sigma
 - Mistake proofing
- **Address environmental factors**

Safety Barrier/Control Effectiveness



- **Physical Barriers**
 - Locked Door
- **Functional Barriers**
 - Forcing function and constraints
 - Automation and computerization
- **Symbolic Barriers**
 - Signage, tape on floor
 - Checklist
- **Immaterial Barriers**
 - Education and information
 - Drug protocols and standard order forms
 - Independent double check systems and other redundancies
 - Rules and policies

Patient Safety



Limitations of Cognitive Functioning

- **Limited memory capacity – 5-7 pieces of information in short term memory**
- **Negative effects of stress – error rates**
 - Tunnel vision
- **Negative influence of fatigue and other physiological factors**
- **Limited ability to multitask – cell phones and driving**

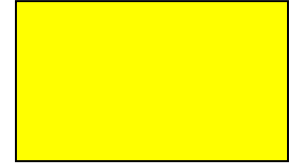
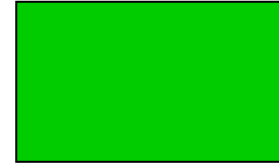
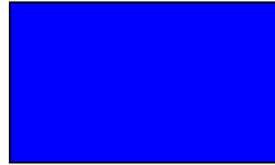
Stroop Effect

Instructions

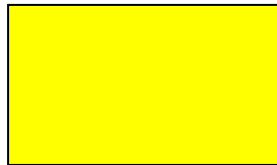
- **Starting with Row 1, state the color of each box as fast as you can. Repeat for Rows 2 and 3**

Stroop Effect

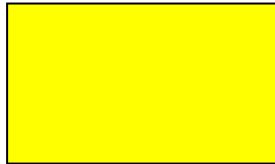
Row 1



Row 2



Row 3



Stroop Effect

Instructions

- **Starting with Row 1, state the color of the text as fast as you can. Repeat for Rows 2 and 3**

Stroop Effect

Row 1 **Red** **Blue** **Green** **Yellow**

Row 2 **Yellow** **Green** **Blue** **Red**

Row 3 **Green** **Red** **Yellow** **Blue**

Stroop Effect

Instructions

- **Again, starting with Row 1, state the color of the text as fast as you can. Repeat for Rows 2 and 3**

Stroop Effect

Row 1 **Red** **Blue** **Green** **Yellow**

Row 2 **Yellow** **Green** **Blue** **Red**

Row 3 **Green** **Red** **Yellow** **Blue**

Addressing Human Factors

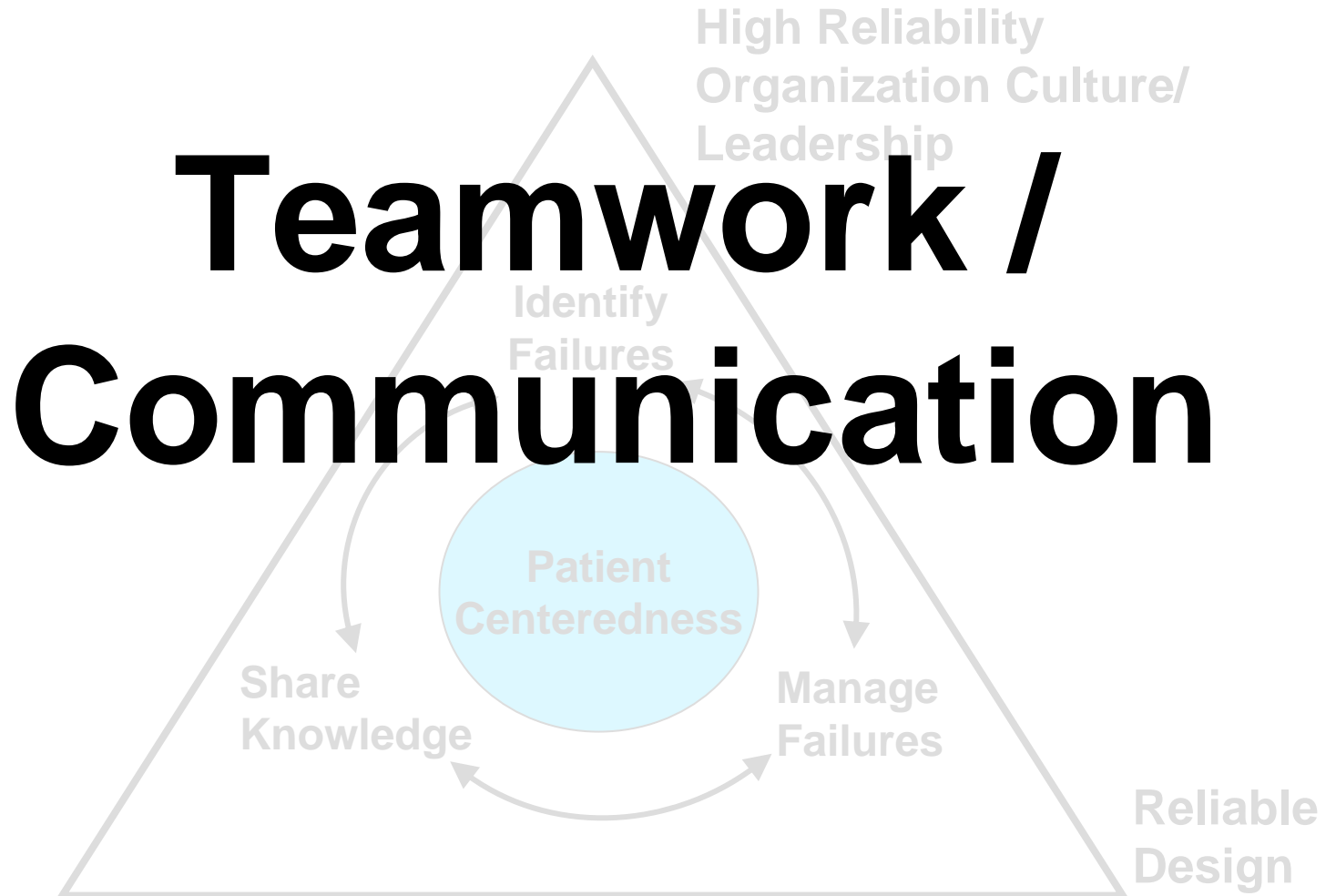
- **Warnings and labels**
- **Training – particularly simulation training**
- **Checklists**
- **Self checks**
- **Simplification, standardization, where appropriate**
- **Forcing functions**
- **Physical environment changes (e.g. lighting, use of space)**

STARS Self-checking Model

S	Stop
T	Think
A	Act
R	Review

Adapted from Sentara Healthcare

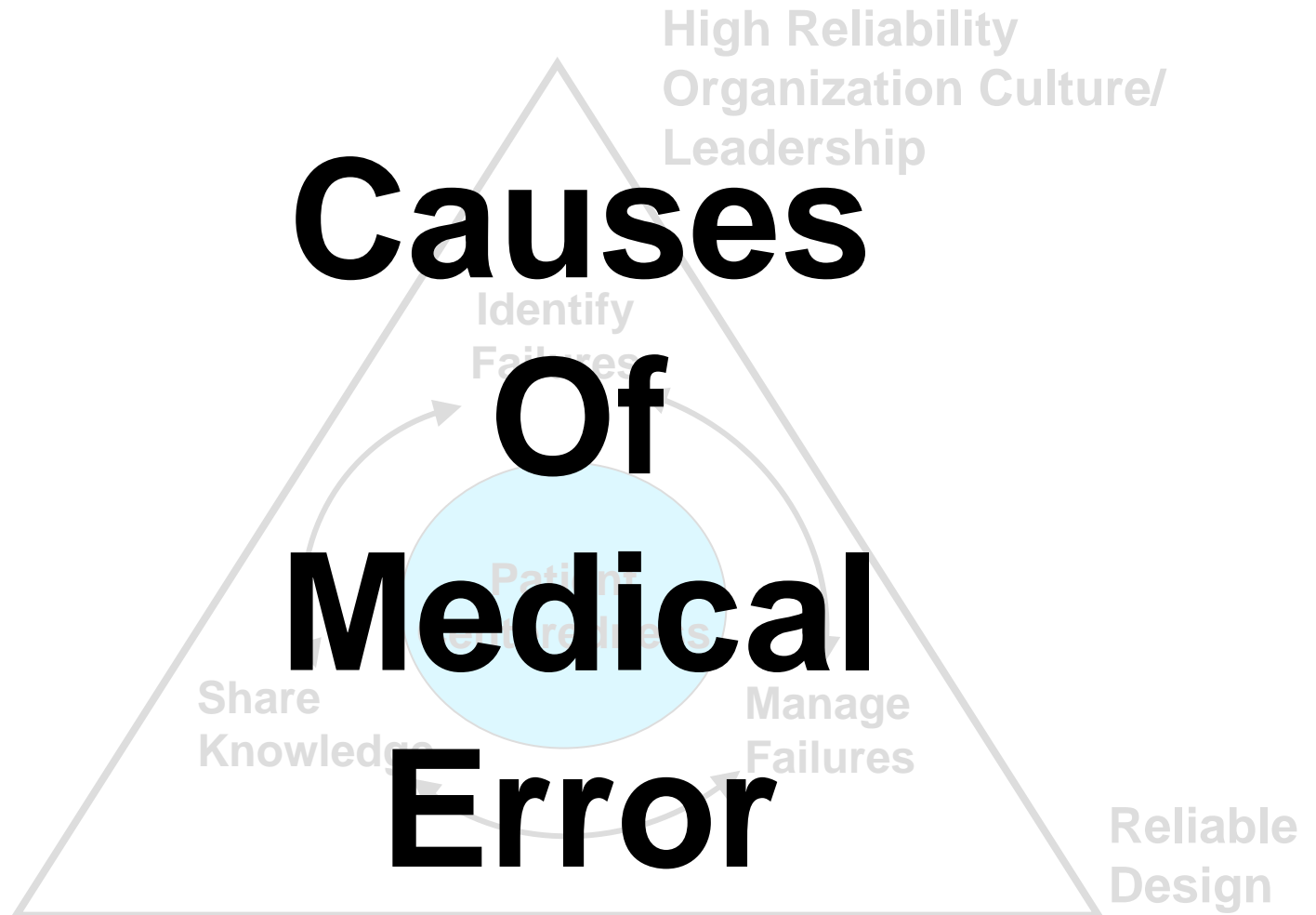
Patient Safety



Teamwork

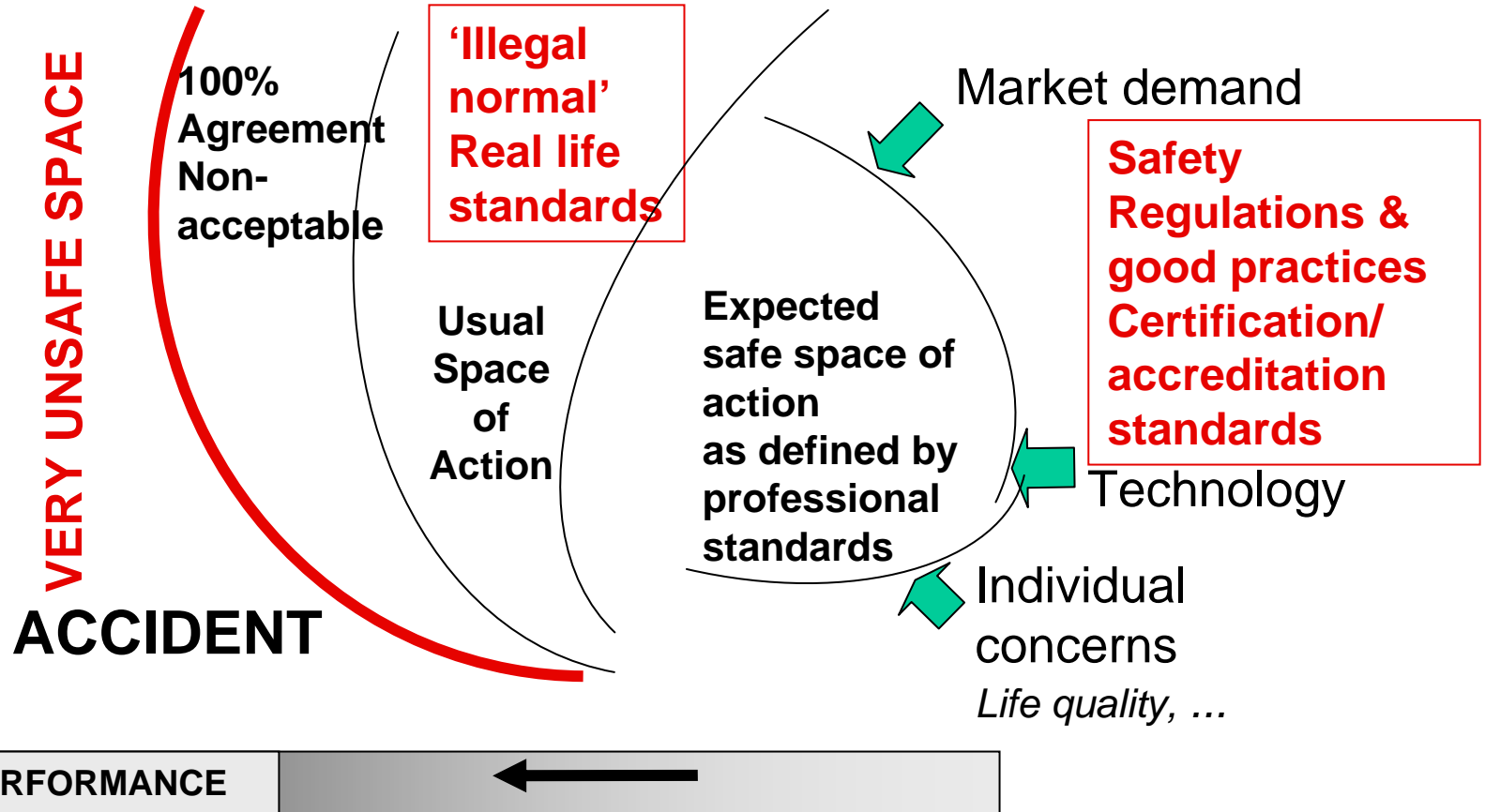
- **Team Definition**
- **Behavioral expectations**
 - Situational Awareness
- **Effective Communication techniques**
 - Critical language
 - Assertion
 - Structured communication (SBAR)
 - Read back, teach back
- **Improving Team Skills**
 - Briefings
 - Debriefings
 - Safety Drills

Patient Safety

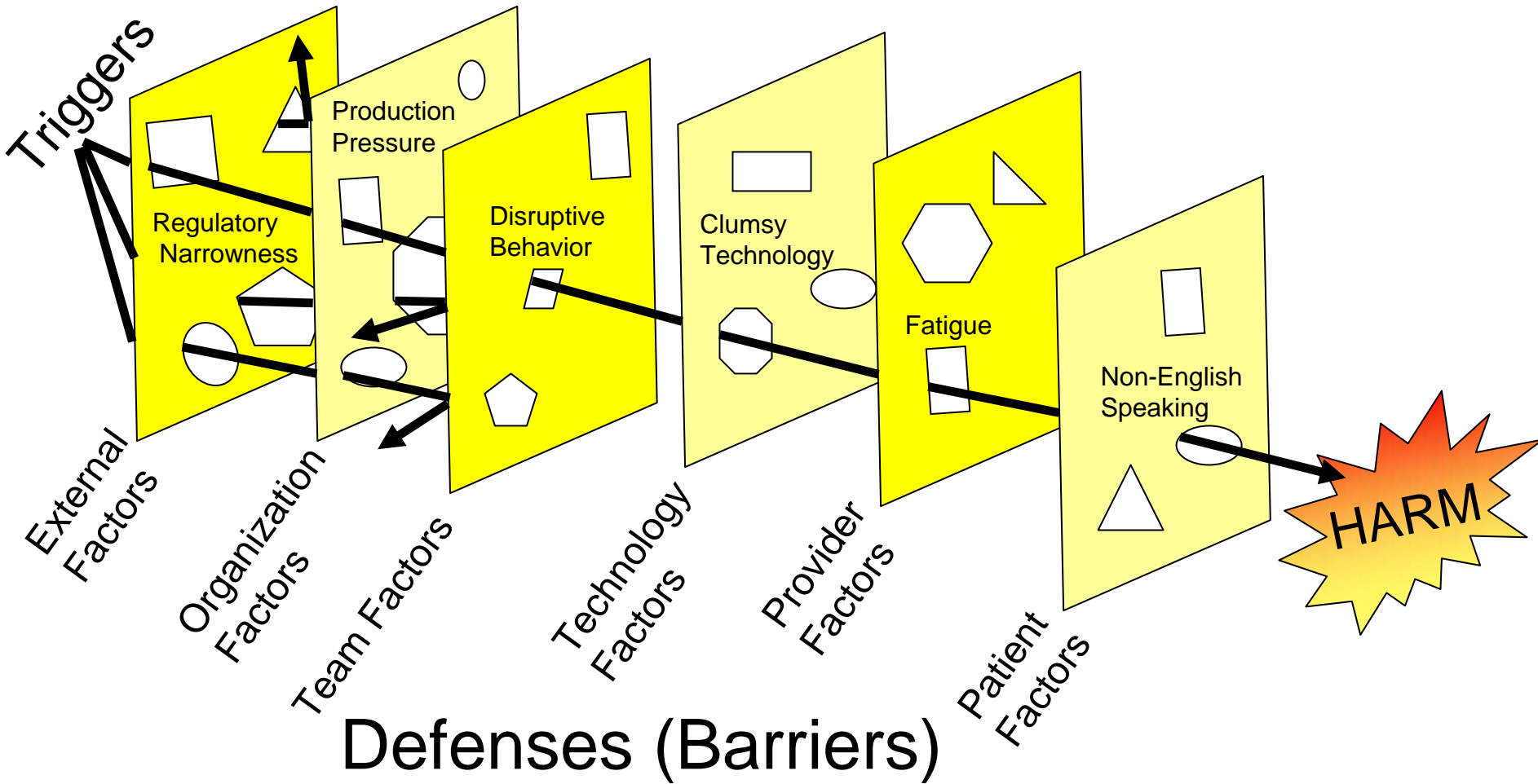


Systemic Migration to Boundaries

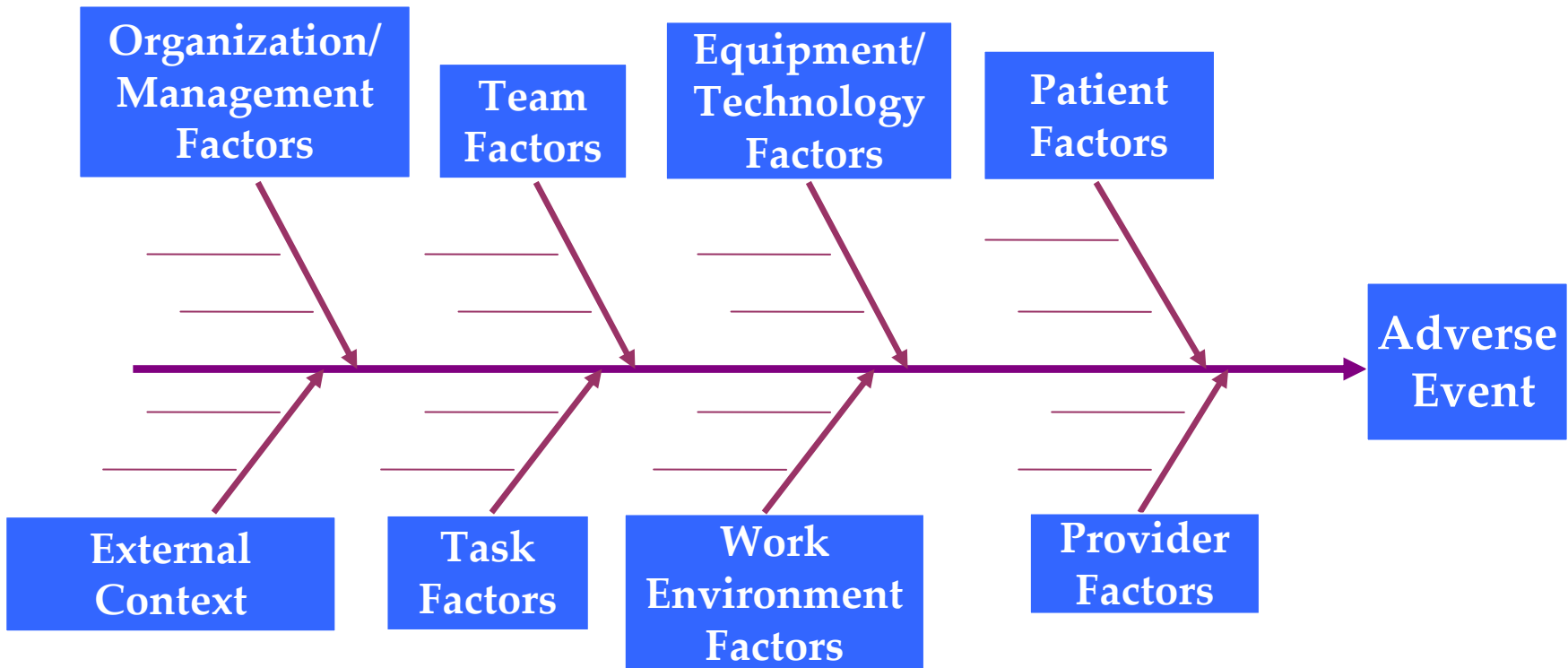
Deviation is normal and leads to systematic migration of boundaries



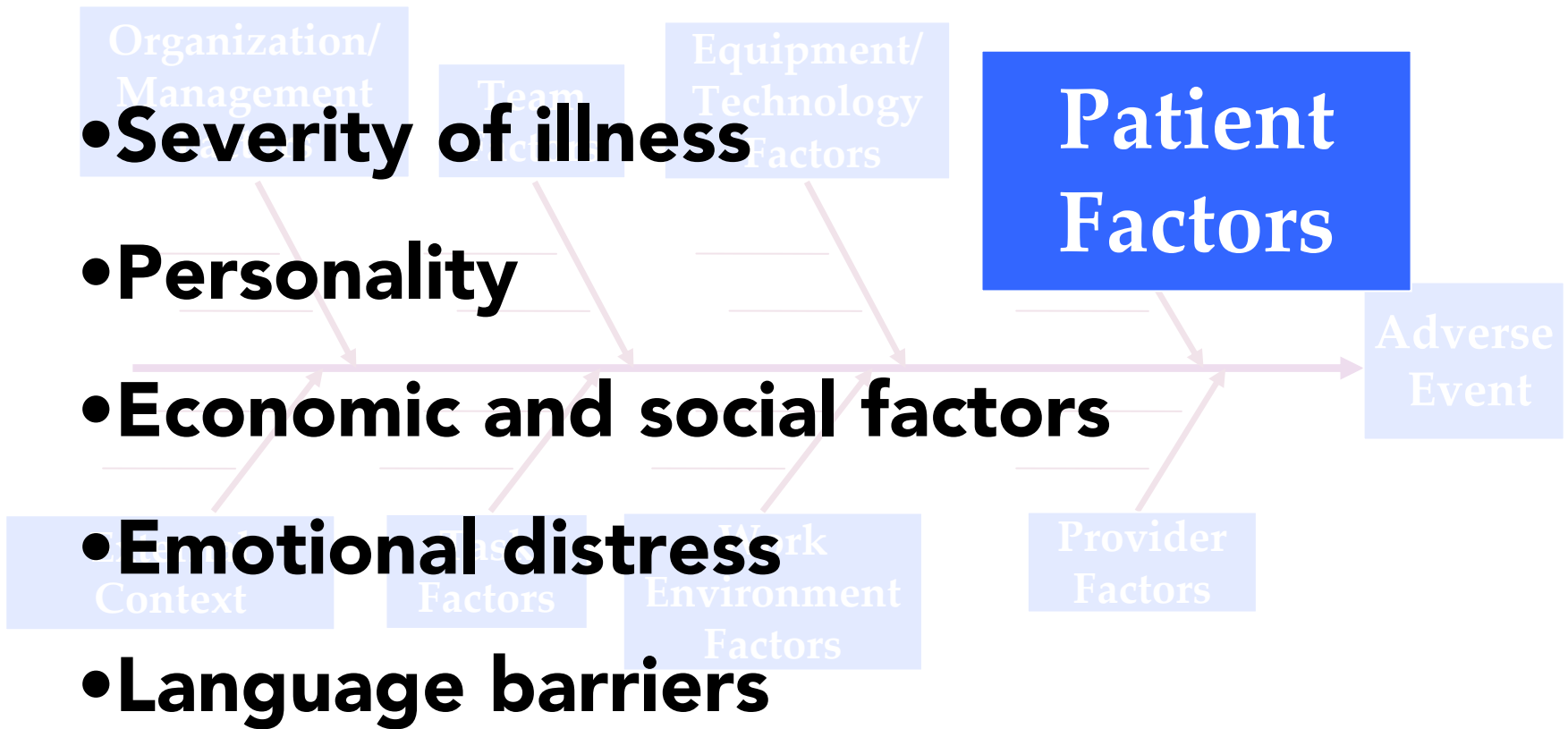
Swiss Cheese Model



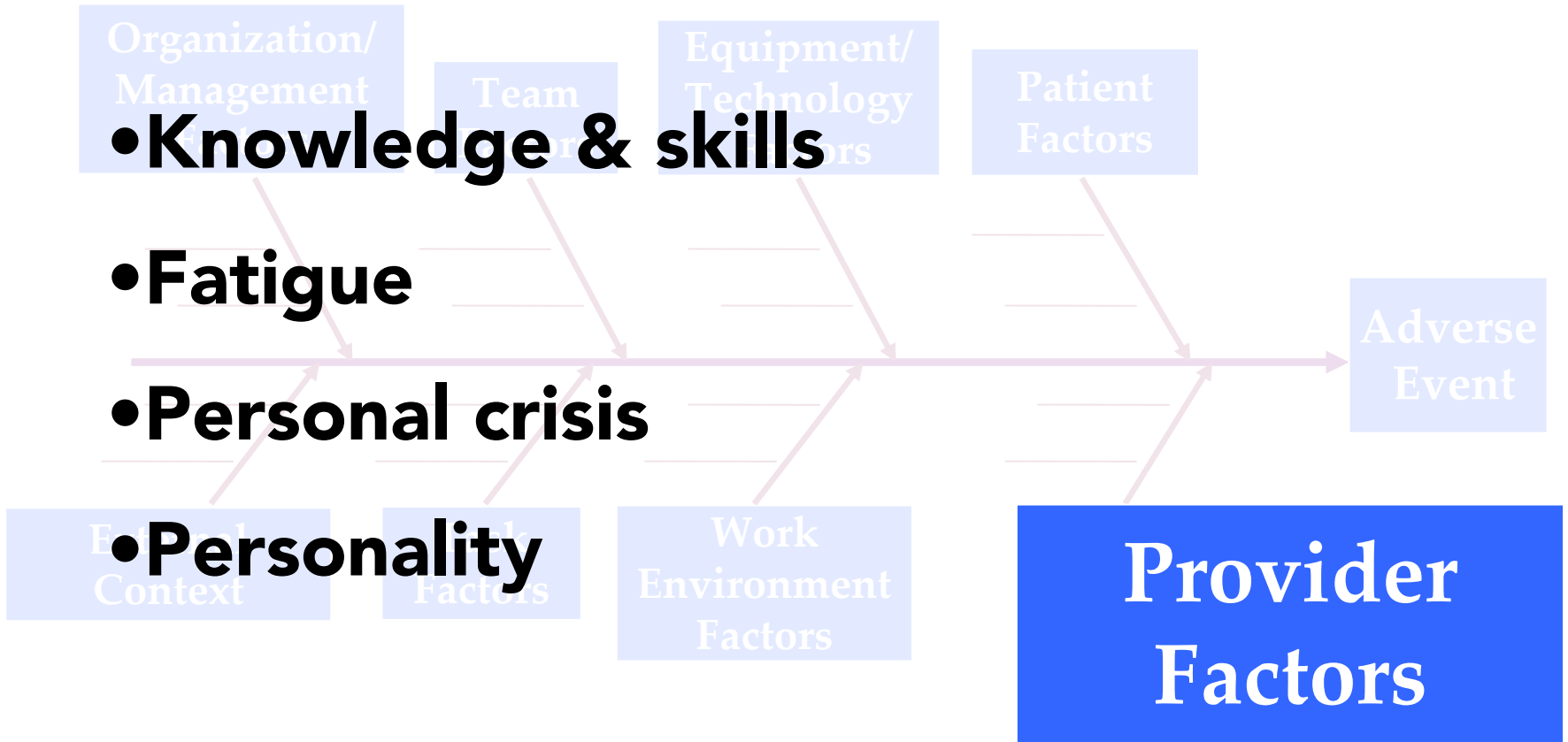
Framework for Causal Factors



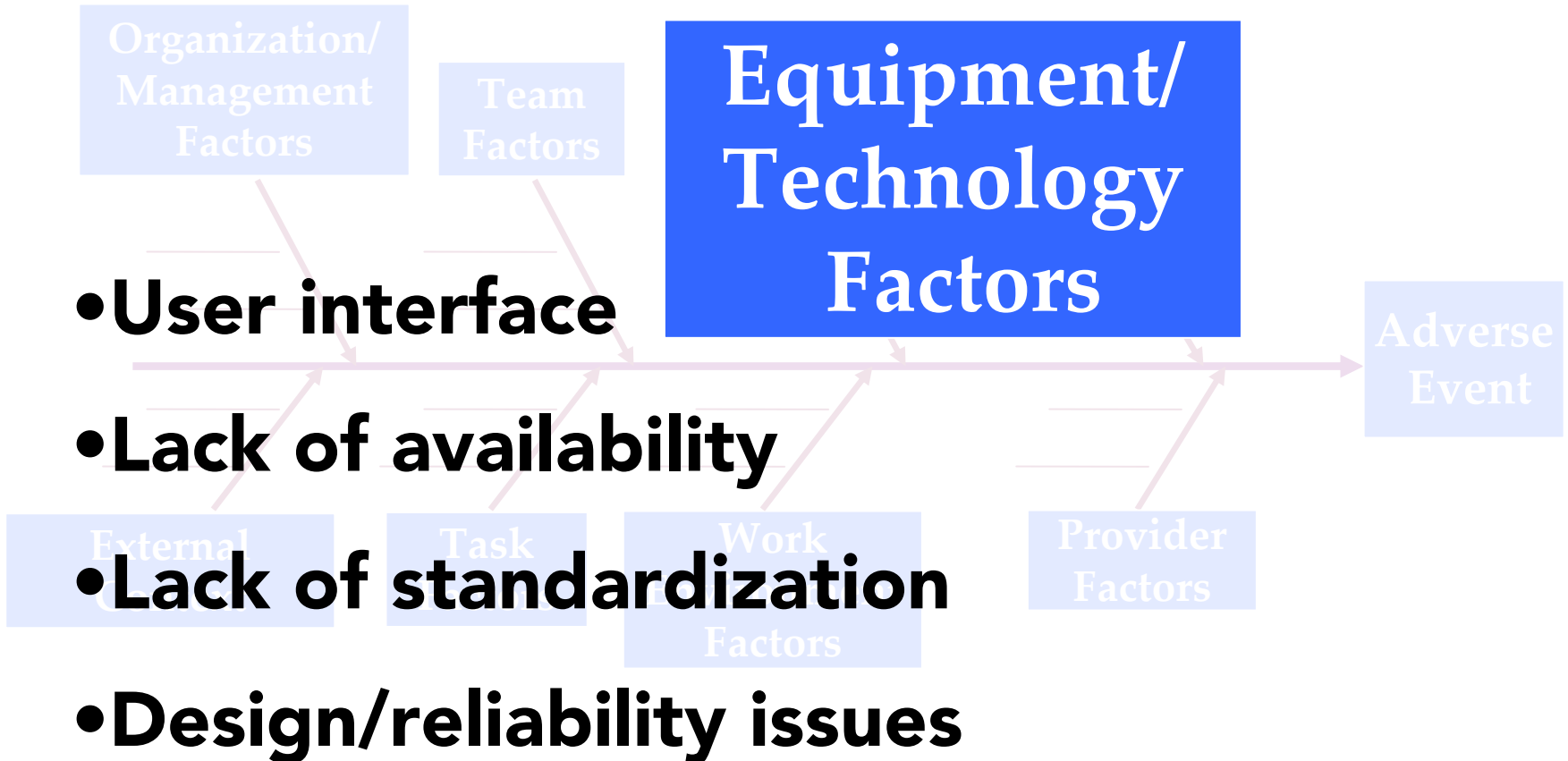
Framework for Causal Factors



Framework for Causal Factors



Framework for Causal Factors



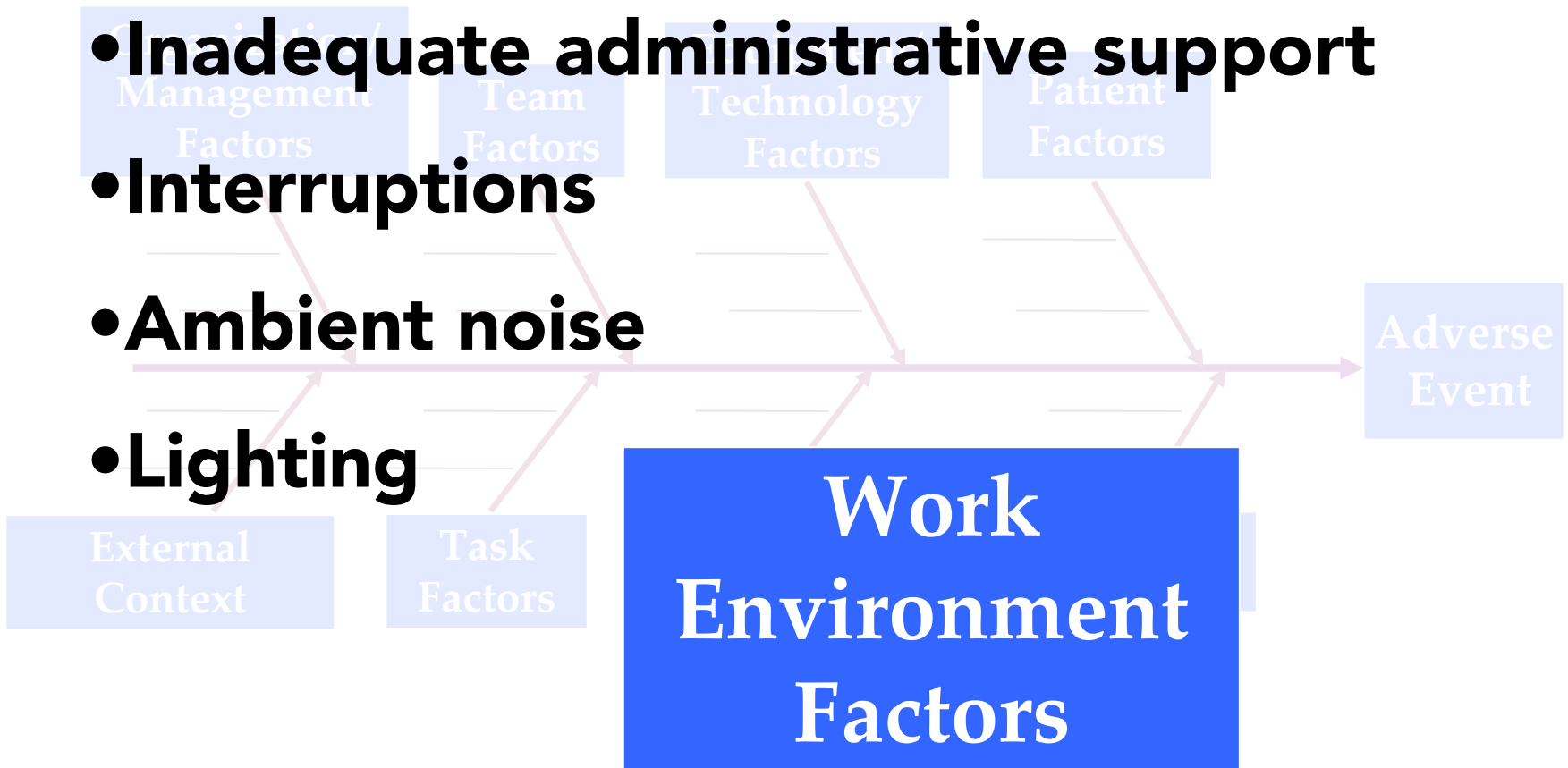
Framework for Causal Factors

- **Inadequate administrative support**

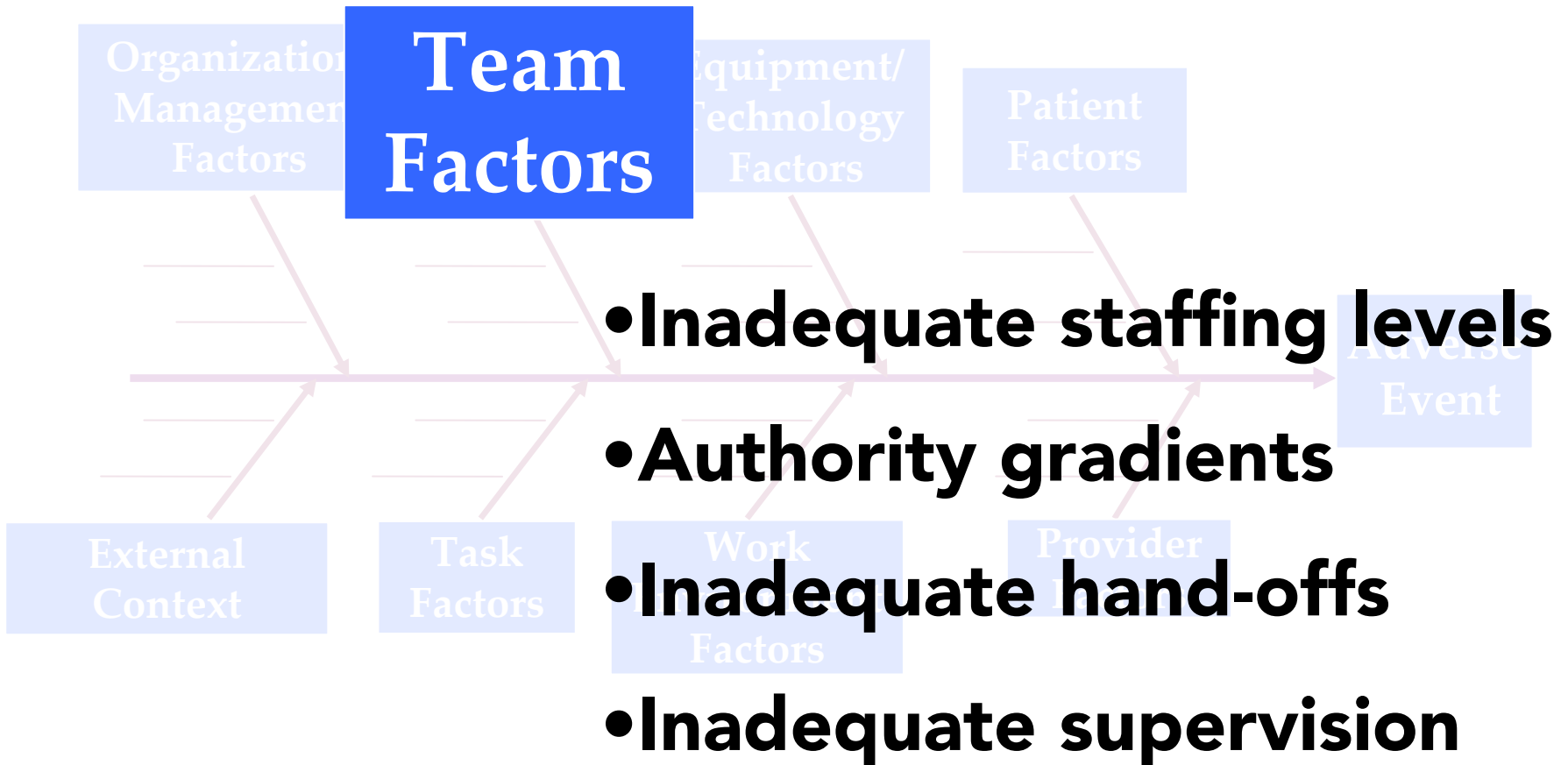
- **Interruptions**

- **Ambient noise**

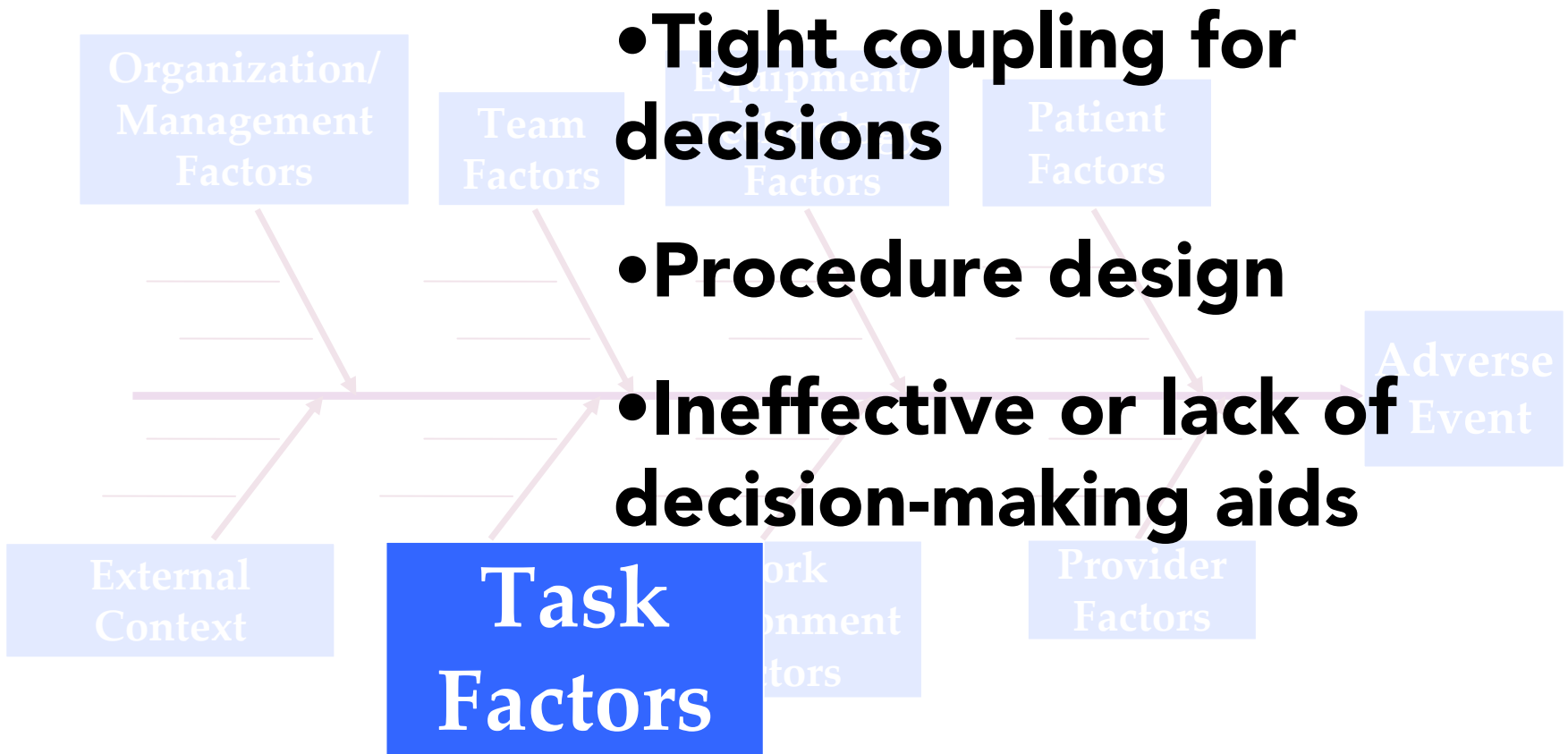
- **Lighting**



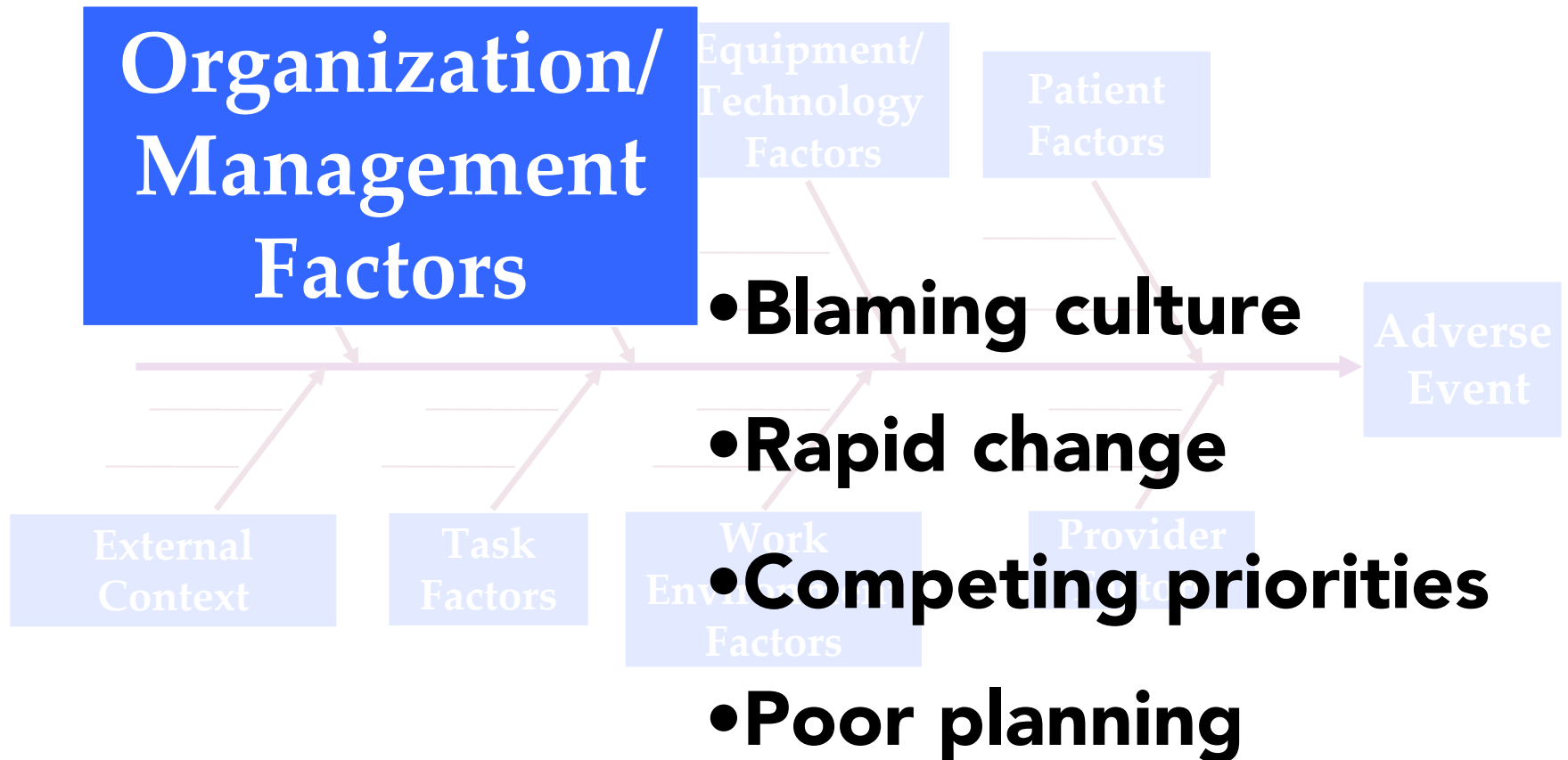
Framework for Causal Factors



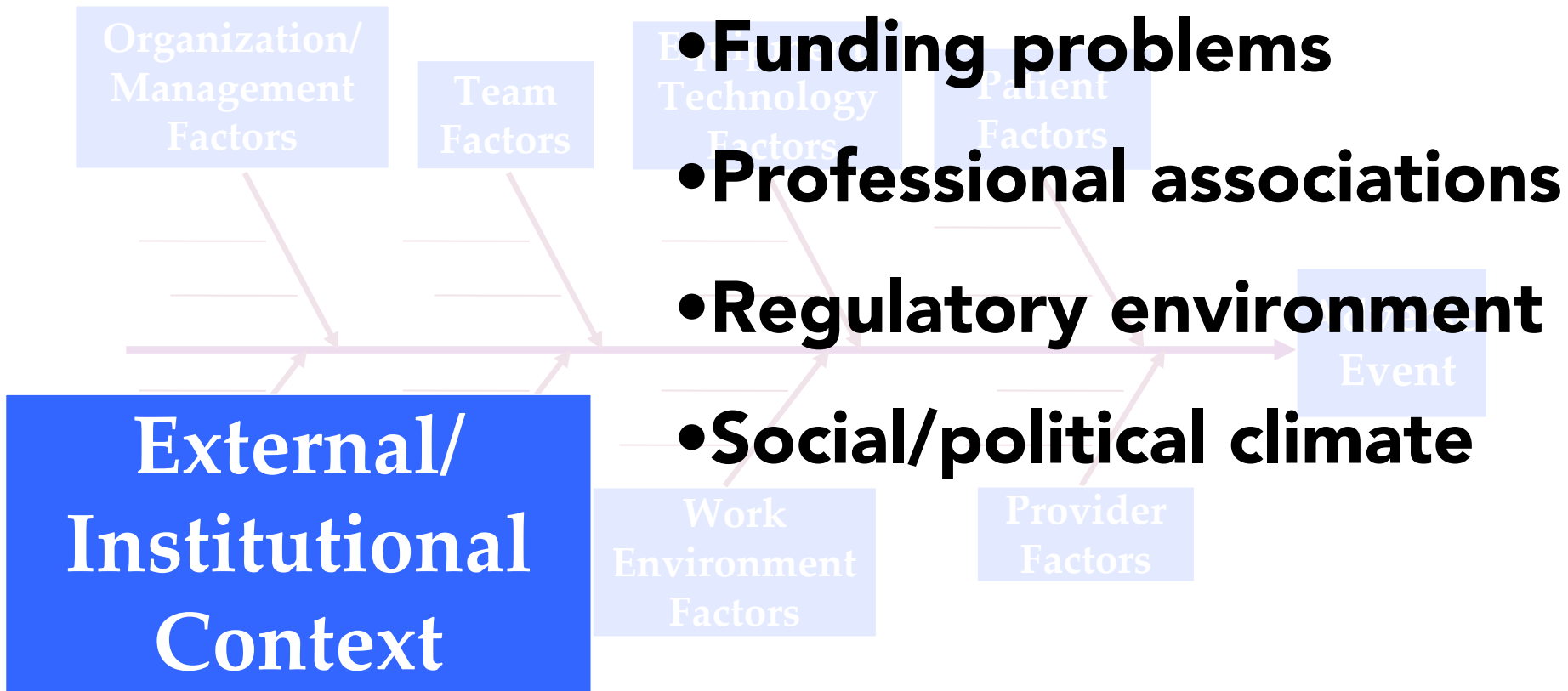
Framework for Causal Factors



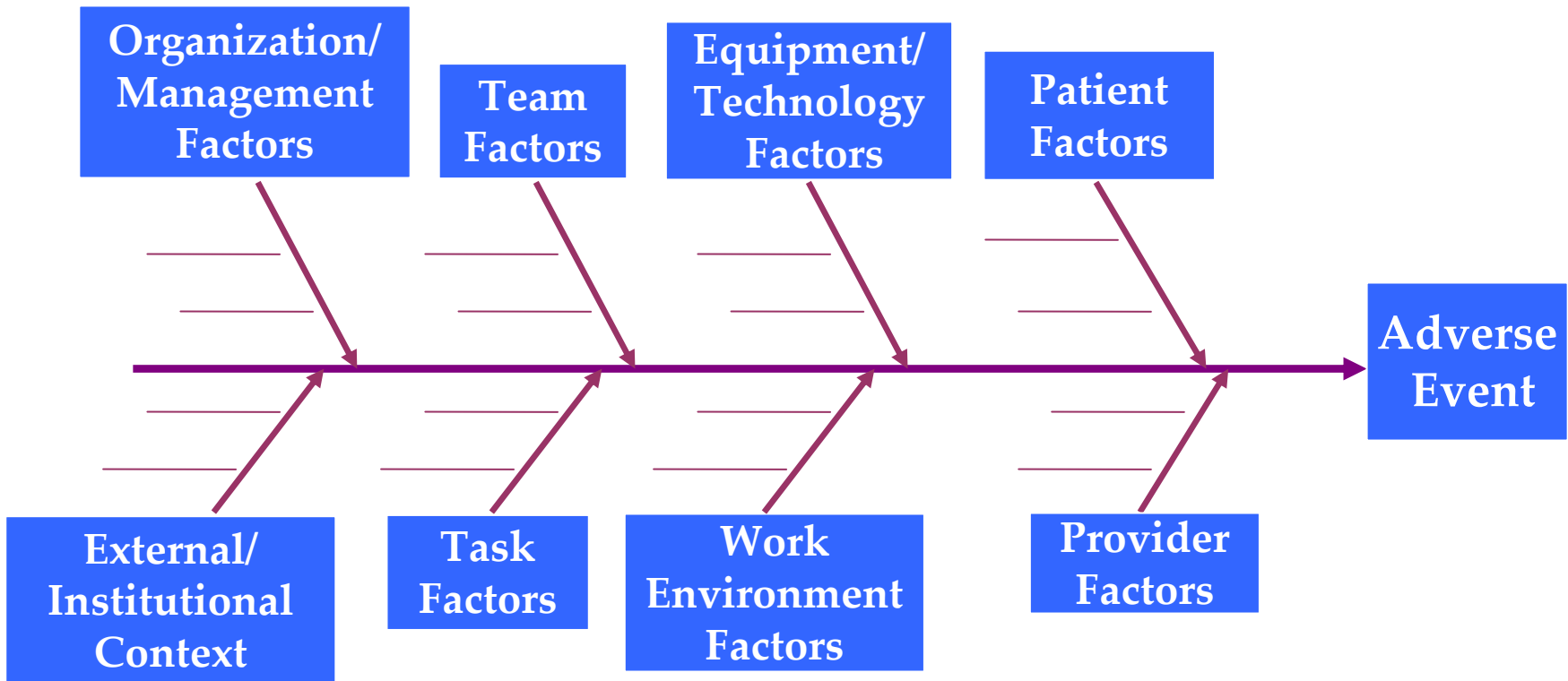
Framework for Causal Factors



Framework for Causal Factors



Framework for Causal Factors

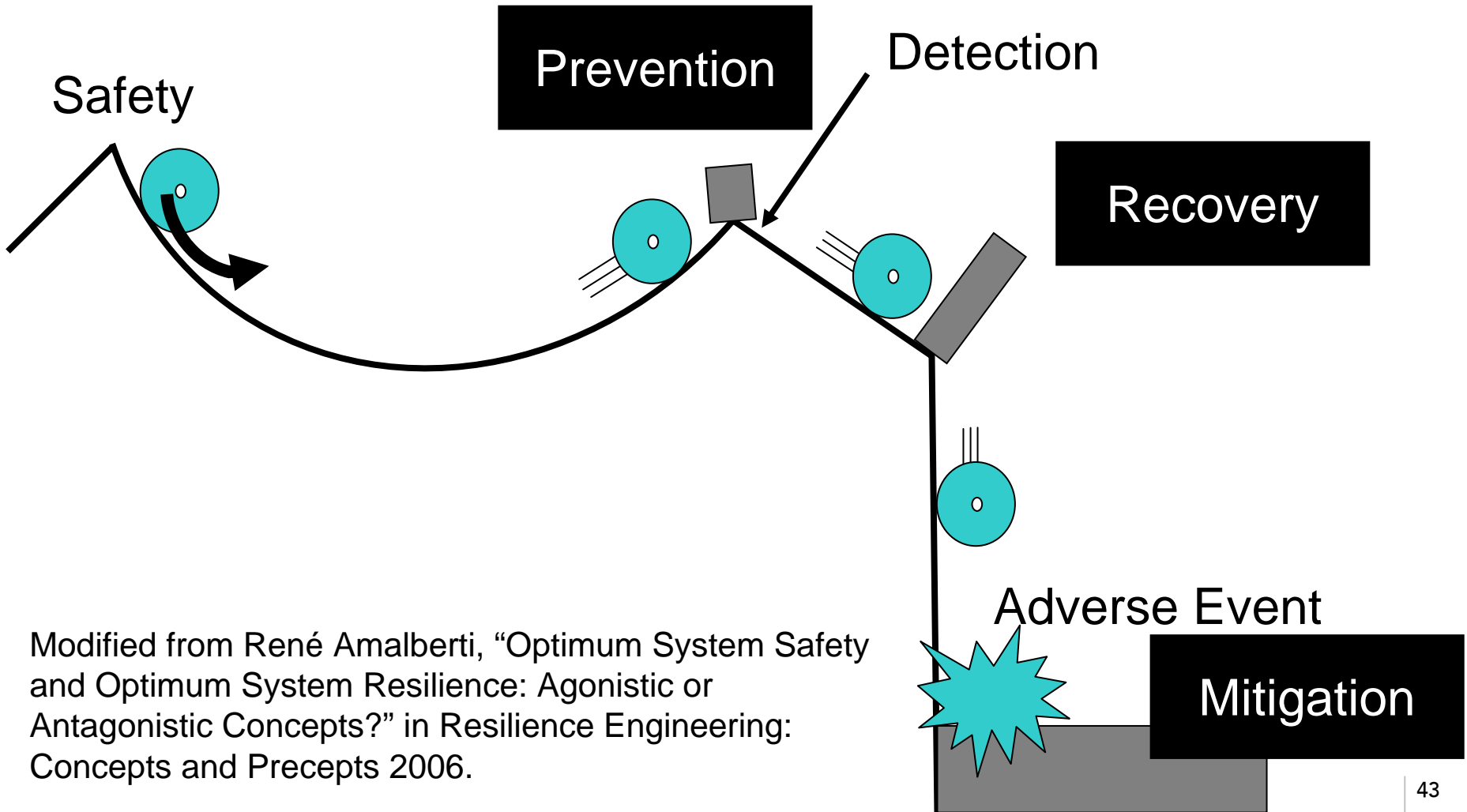


Adapted from Professor Charles Vincent, The London Protocol at <http://www.csru.org.uk/>

Patient Safety



Patient Safety



Modified from René Amalberti, "Optimum System Safety and Optimum System Resilience: Agonistic or Antagonistic Concepts?" in Resilience Engineering: Concepts and Precepts 2006.

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Email address: becki.kanjirathinkal@cna.com