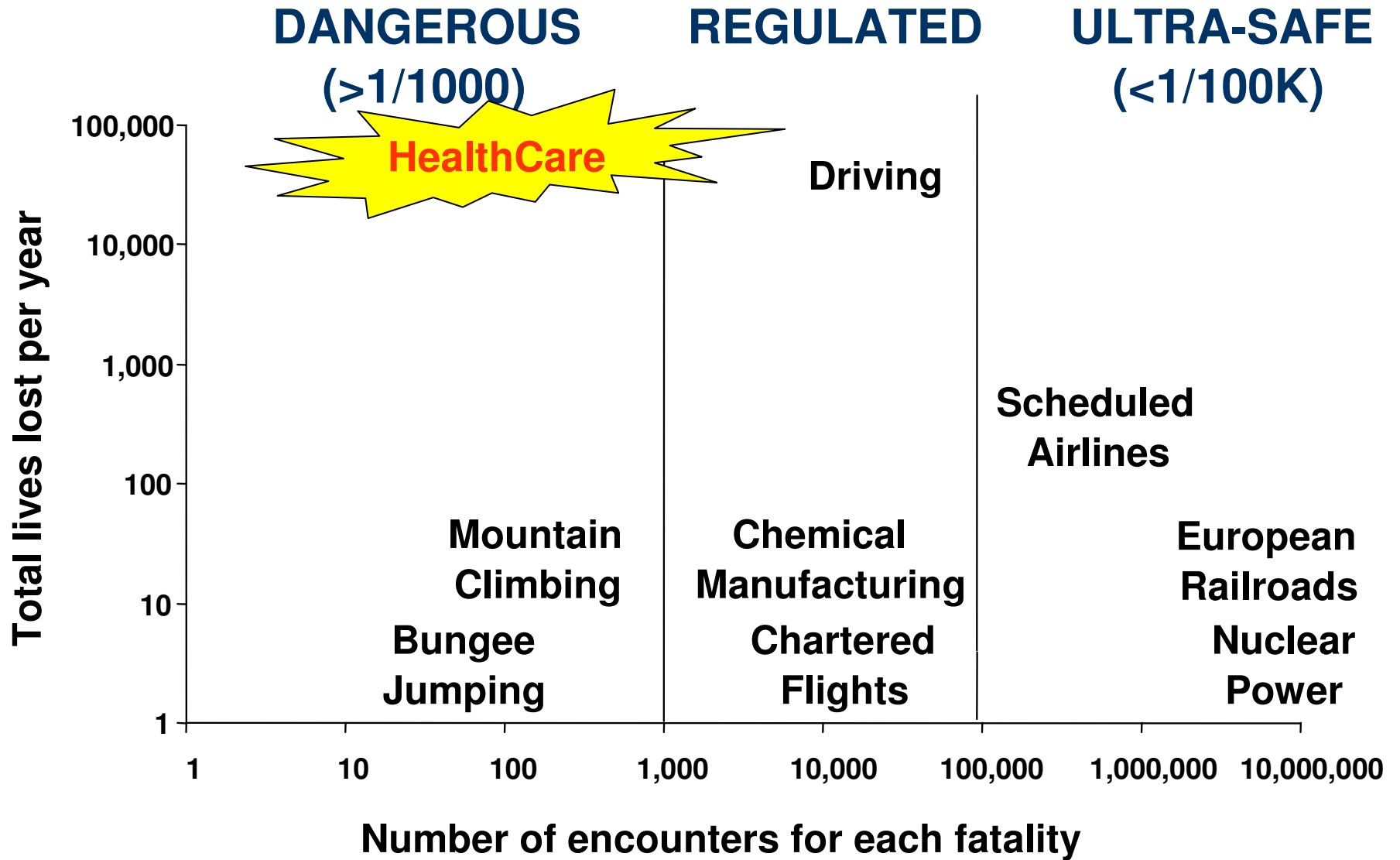


# The Systems Approach

- To understand systems
  - Complex adaptive systems
- To learn about models to analyze error situations
  - Reason's Swiss Cheese model
  - Vincent's organizational model

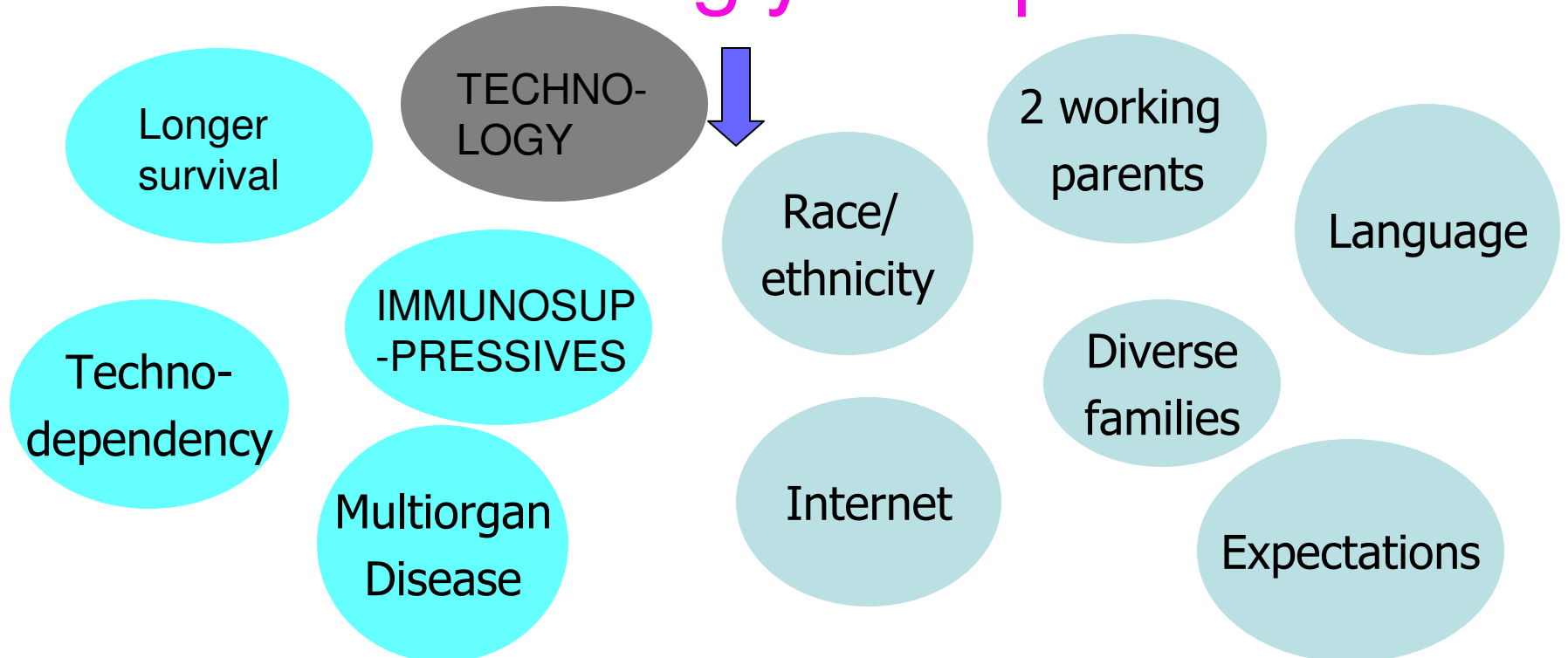
# How Hazardous Is Healthcare?



# 4 D's of Pediatric Risk

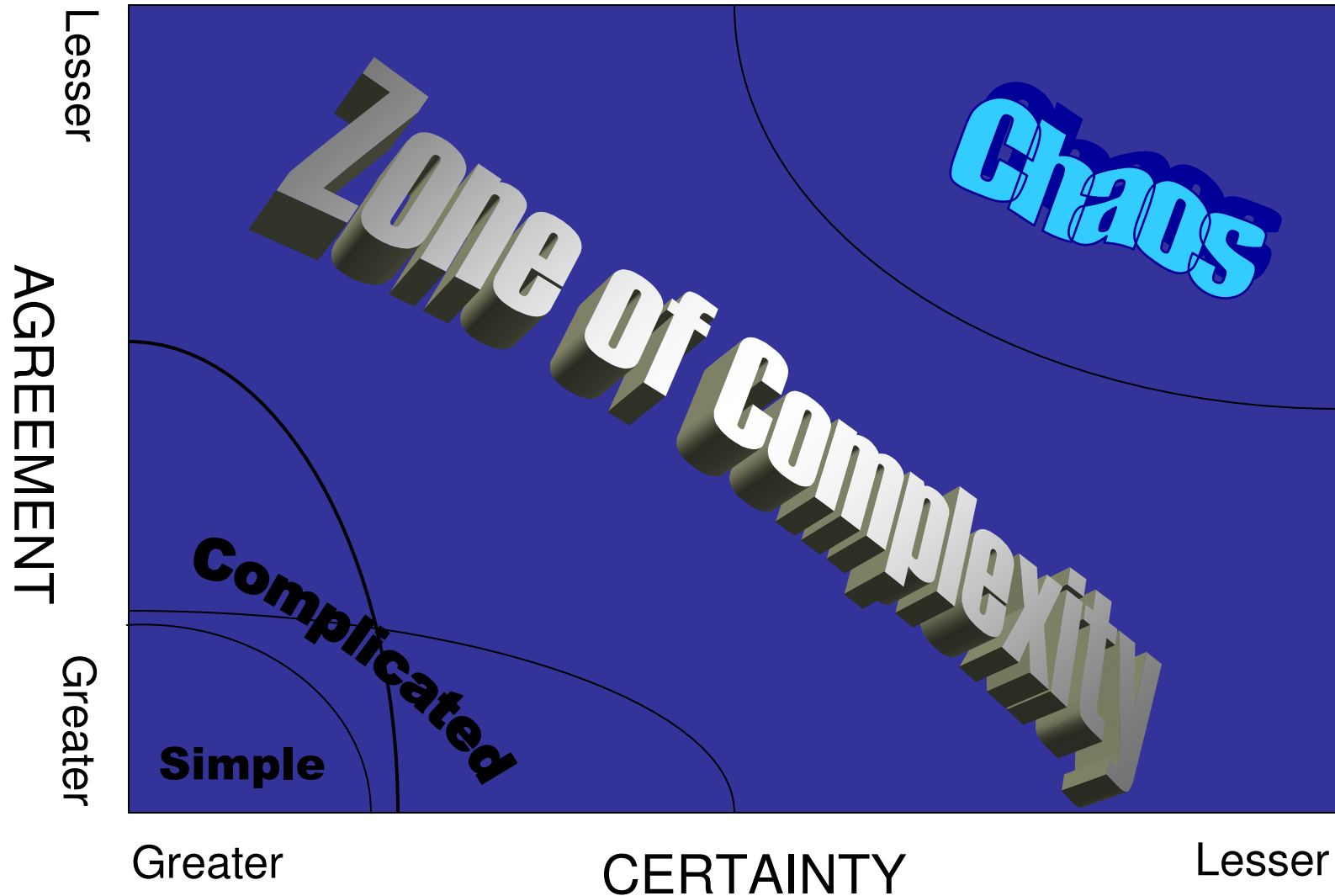
diseases  
developmental  
dependency  
dosing

Increasingly complex

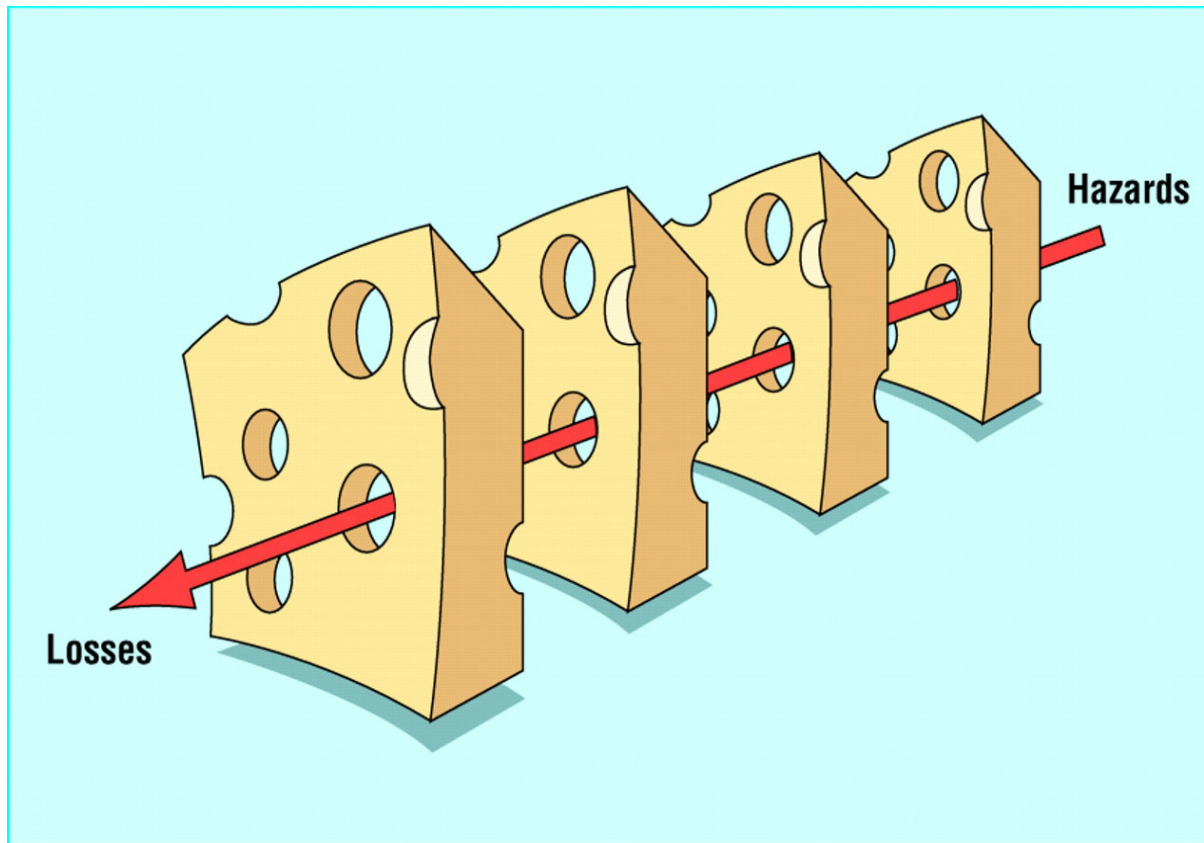


# COMPLEXITY SCIENCE

Adapted from Stacey, Ralph, Zimmerman

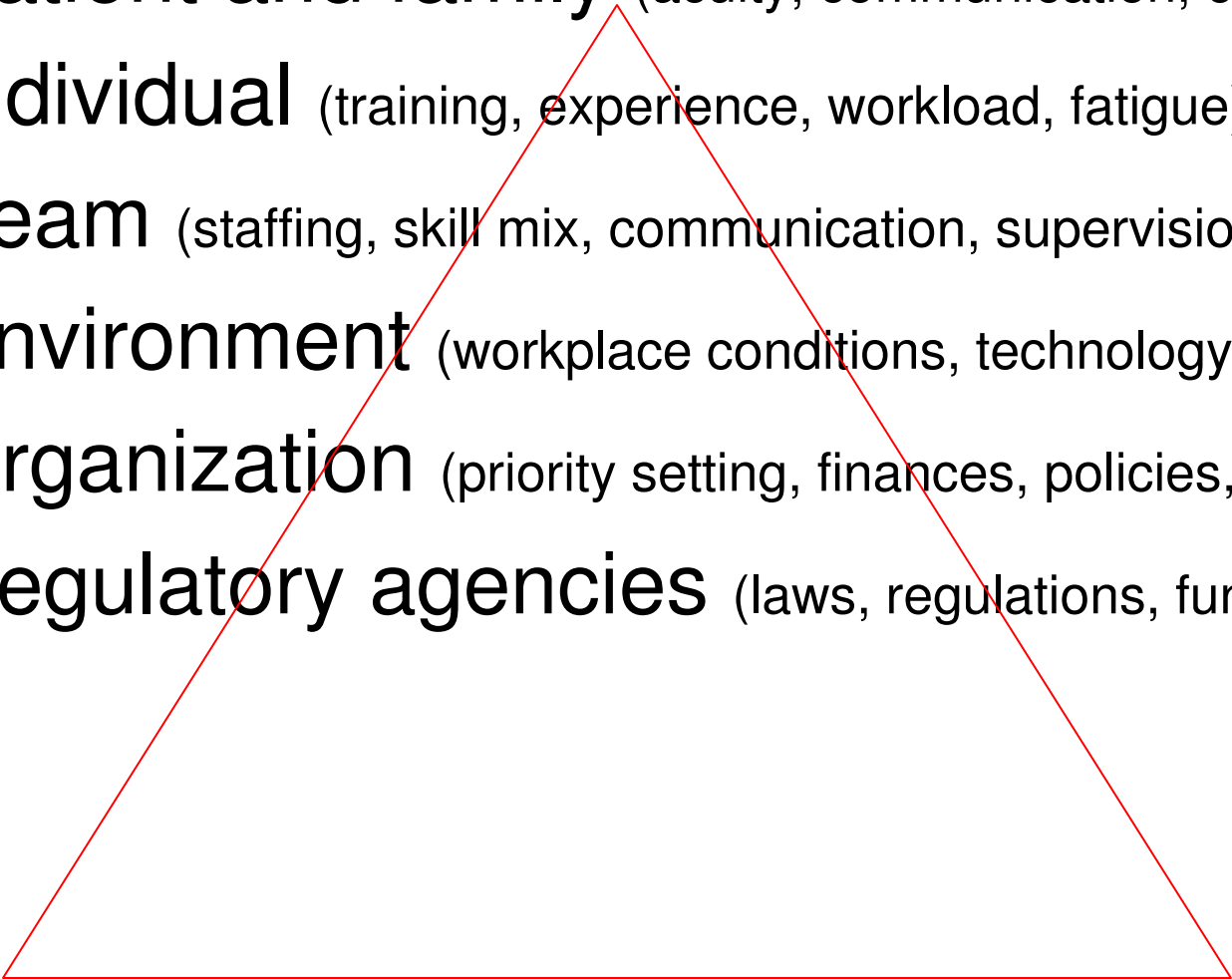


# The Swiss Cheese Model



J. Reason, BMJ 2000;320:768

# The system includes:

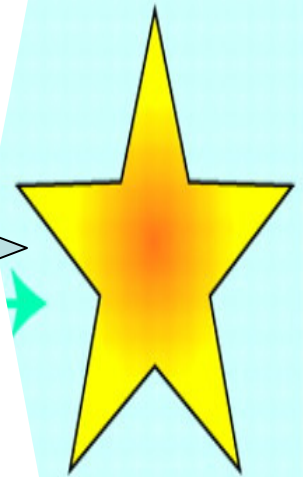
- **Patient and family** (acuity, communication, culture)
  - **Individual** (training, experience, workload, fatigue)
  - **Team** (staffing, skill mix, communication, supervision)
  - **Environment** (workplace conditions, technology)
  - **Organization** (priority setting, finances, policies, culture)
  - **Regulatory agencies** (laws, regulations, funding)
- 

# WHY DO ERRORS OCCUR?

D  
U  
L  
L  
  
E  
N  
D

SHARP END

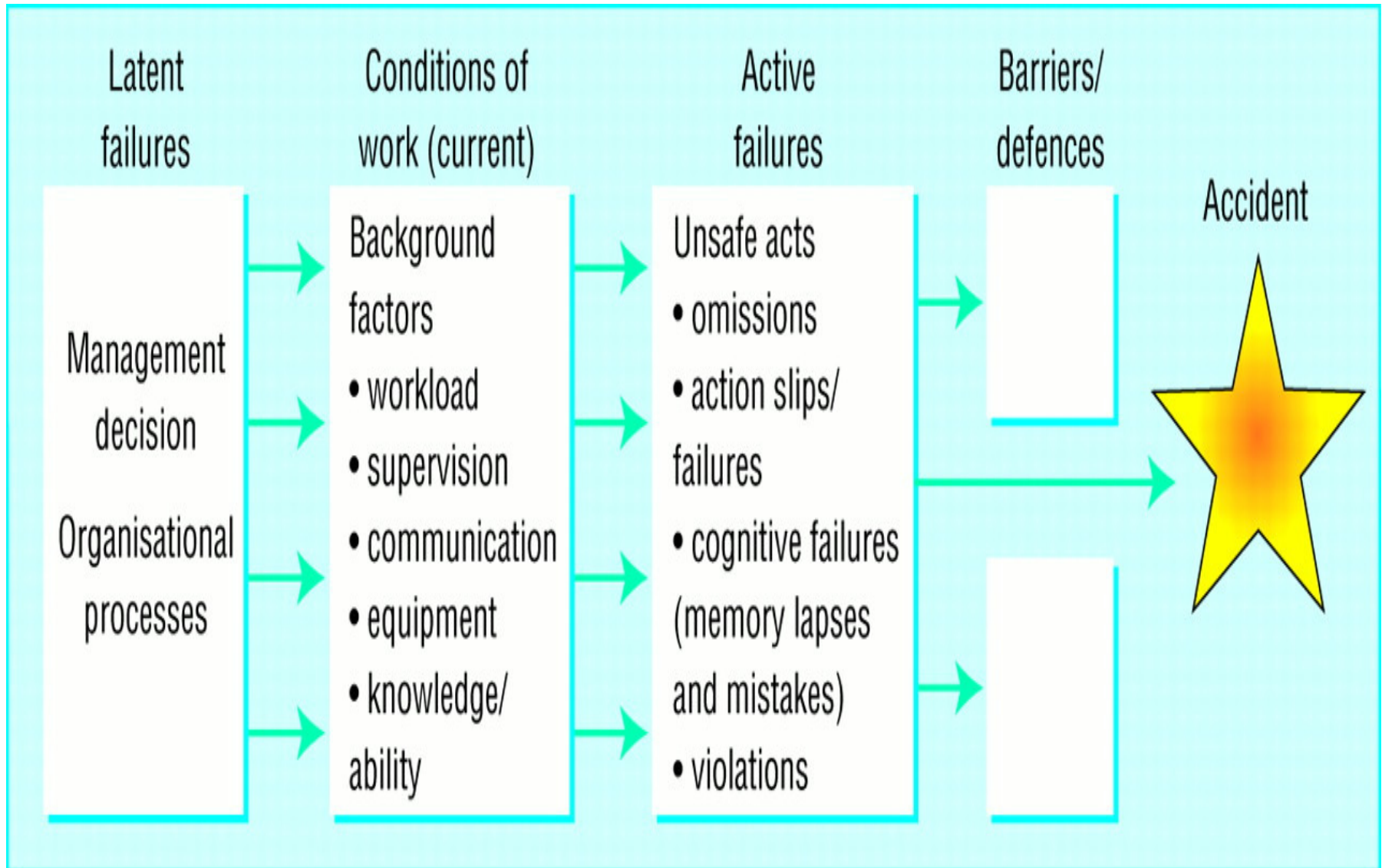
Accident



Slips  
Lapses  
Fatigue



# BLAME THE SYSTEM!!



# The Systems Approach

- Preventable adverse events are caused by interaction between:
  - flaws in the working environment (system)
  - unavoidably imperfect humans

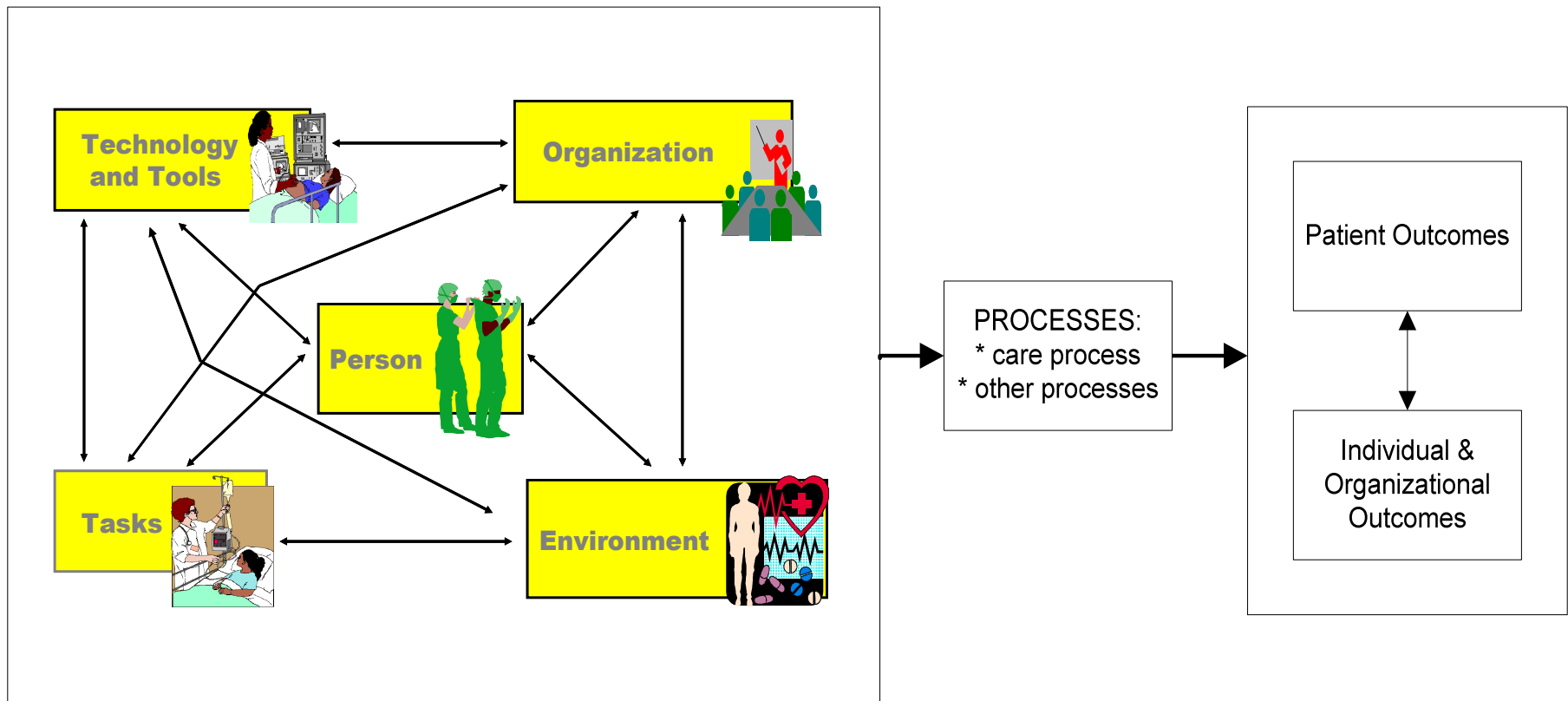


# It's the system!

(from UW-Madison Systems Engineering Initiative in Patient Safety)

Gosbee VA

## THE SYSTEM IS COMPLEX



**Central Venous Catheter**

**Epidural Catheter**



**Gastrostomy Tube**

**Arterial Catheter**

# 30 Pediatric Adverse Events:

Cronin Healthcare Quarterly 2006

	Number	%
Medication	15	50%
Resuscitation	4	13%
Patient ID	4	13%
IV fluids/pumps	2	7%
Child Protection	1	3%
Ventilation	1	3%
Drug tampering	1	3%
Abduction	1	3%
Bulk oxygen	1	3%

# Contributory Factors

