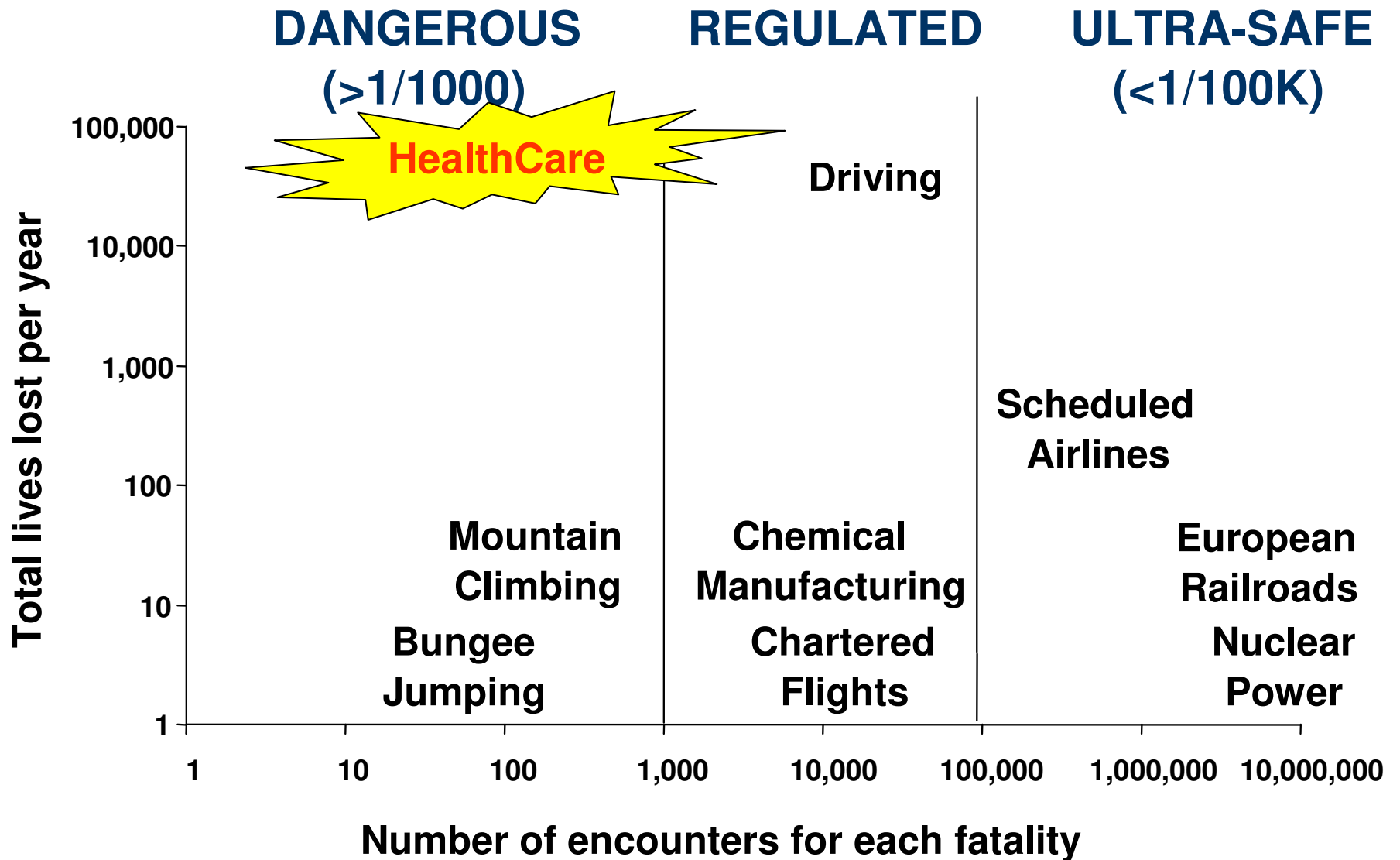


The Systems Approach

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

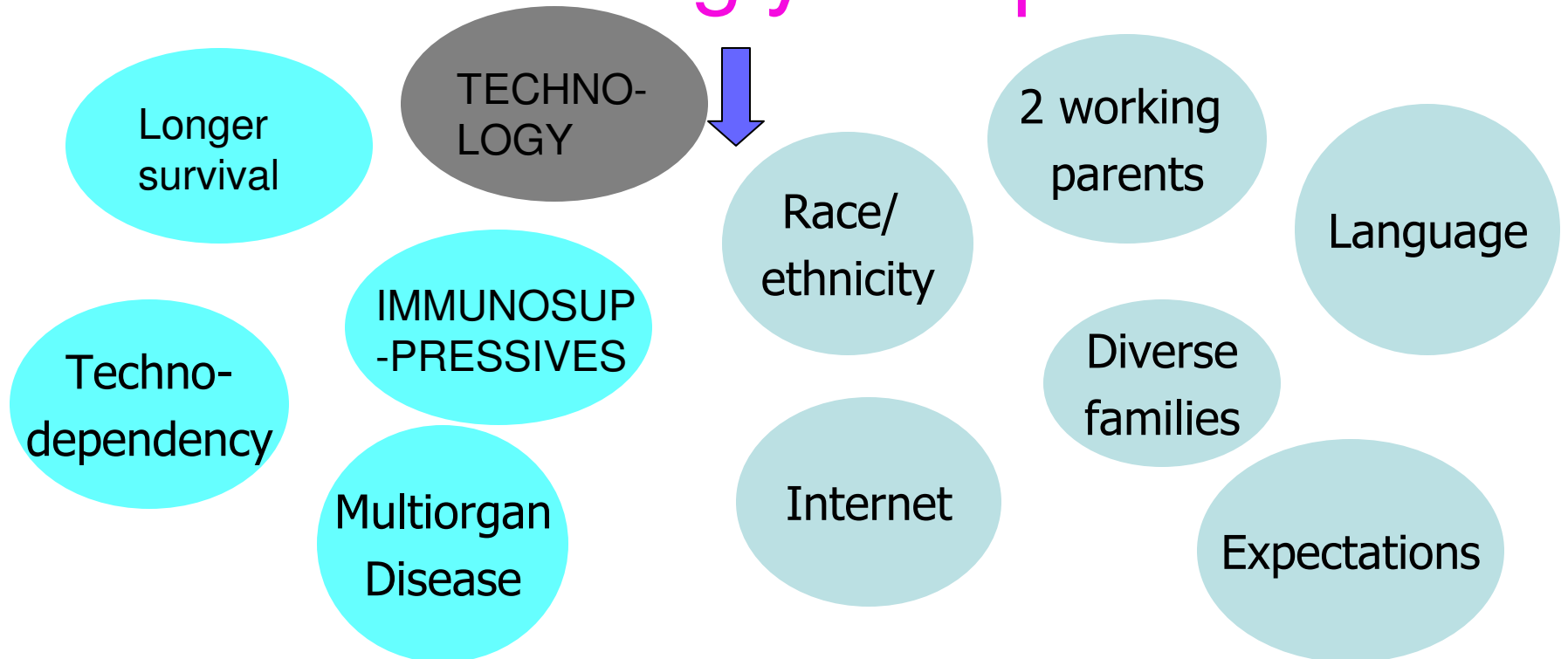
How Hazardous Is Healthcare?



4 D's of Pediatric Risk

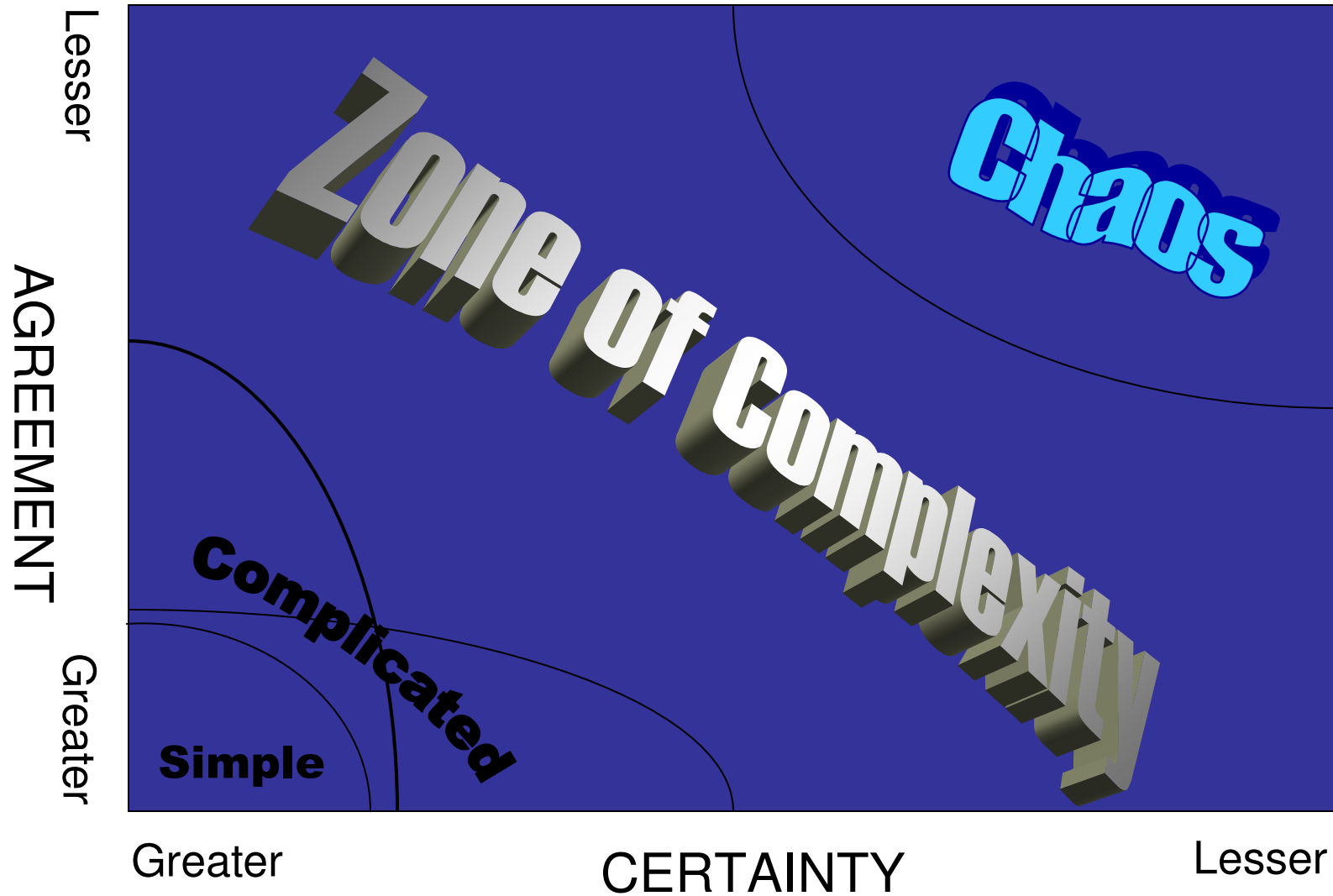
diseases
developmental
dependency
dosing

Increasingly complex

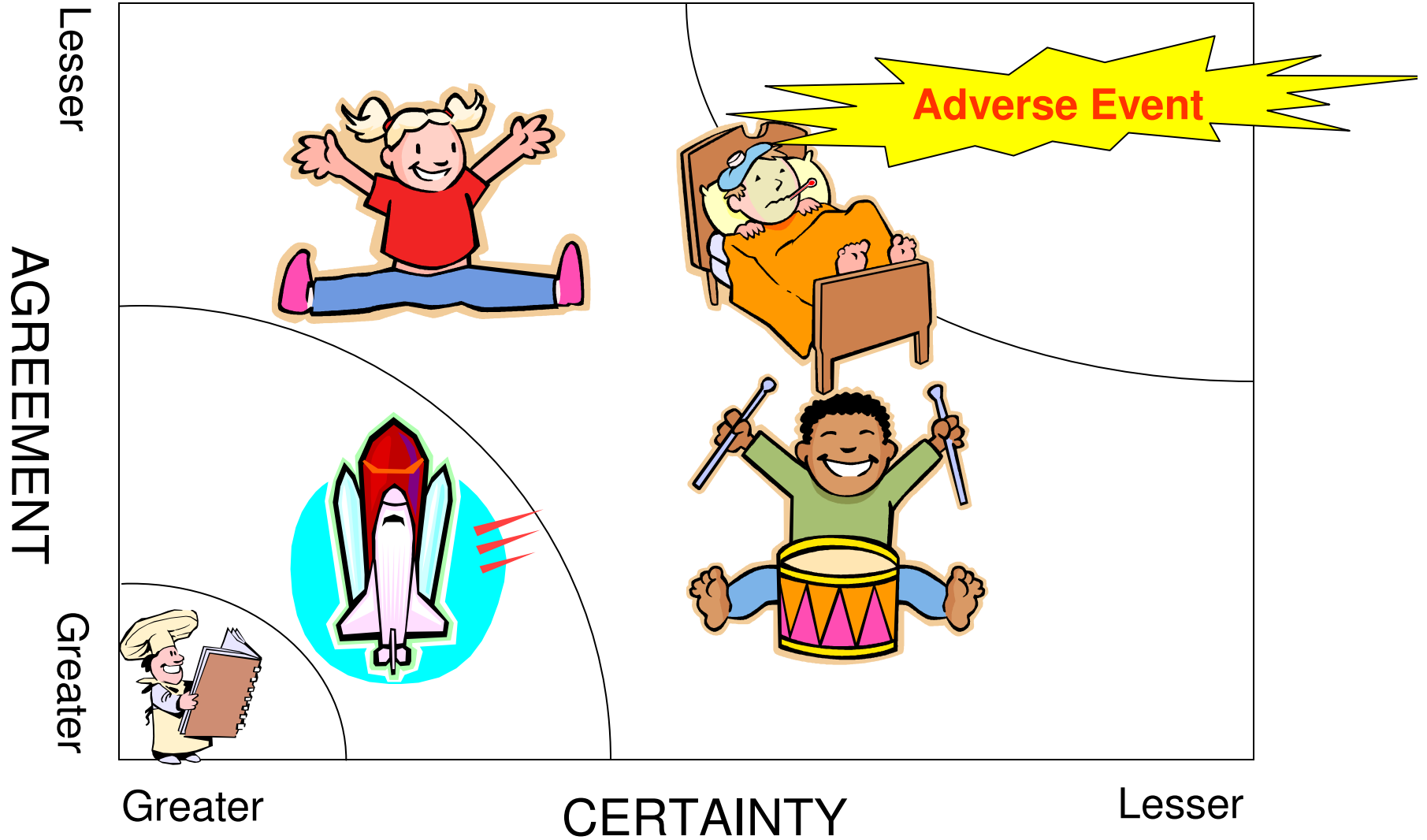


COMPLEXITY SCIENCE

Adapted from Stacey, Ralph, Zimmerman



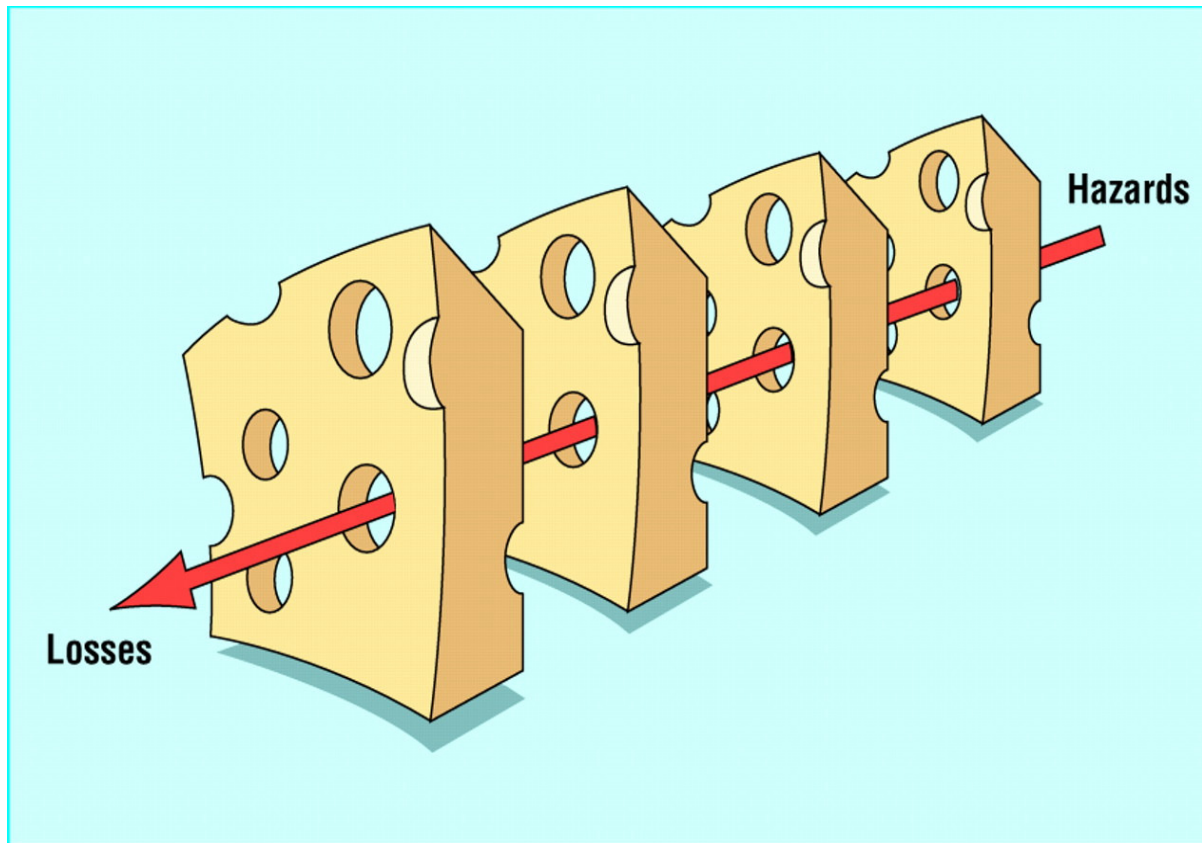
Adapted from Stacey, Ralph, Zimmerman



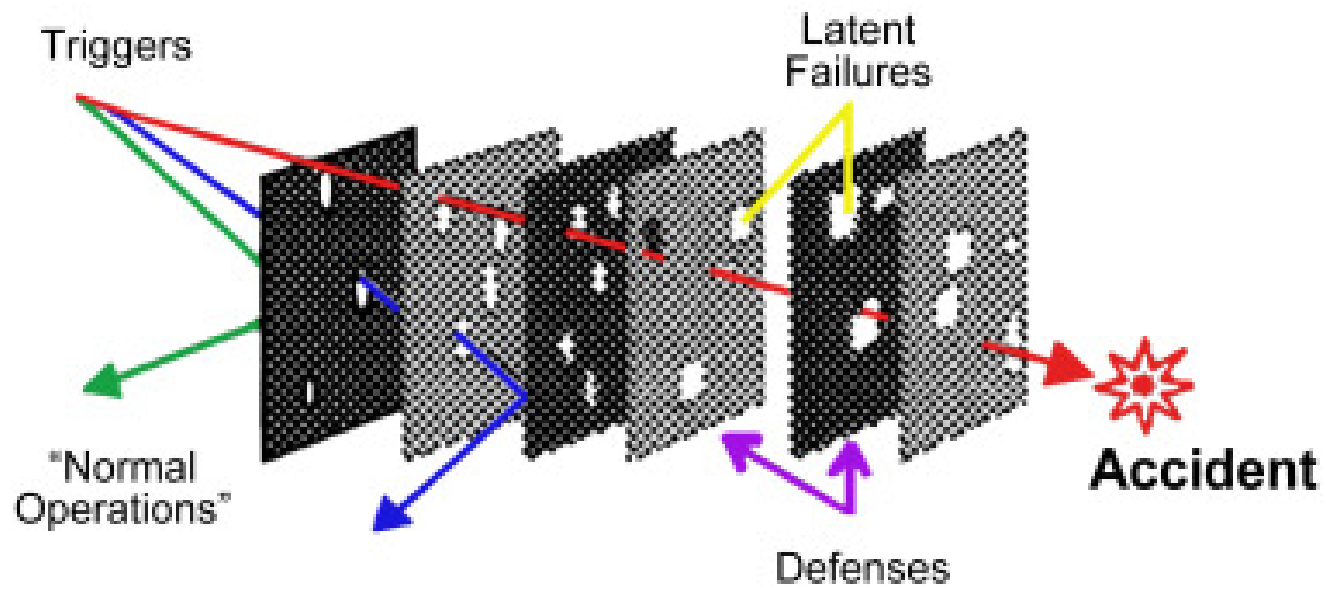
Reason's Swiss Cheese model

- Errors due to human and system factors
- Remedy by changing conditions under which humans work; insert safeguards and barriers
- Swiss Cheese model- if all holes open at same time this leads to an accident
- Healthcare is best served by the system approach for comprehensive management of the person, the team, the workplace and the institution.

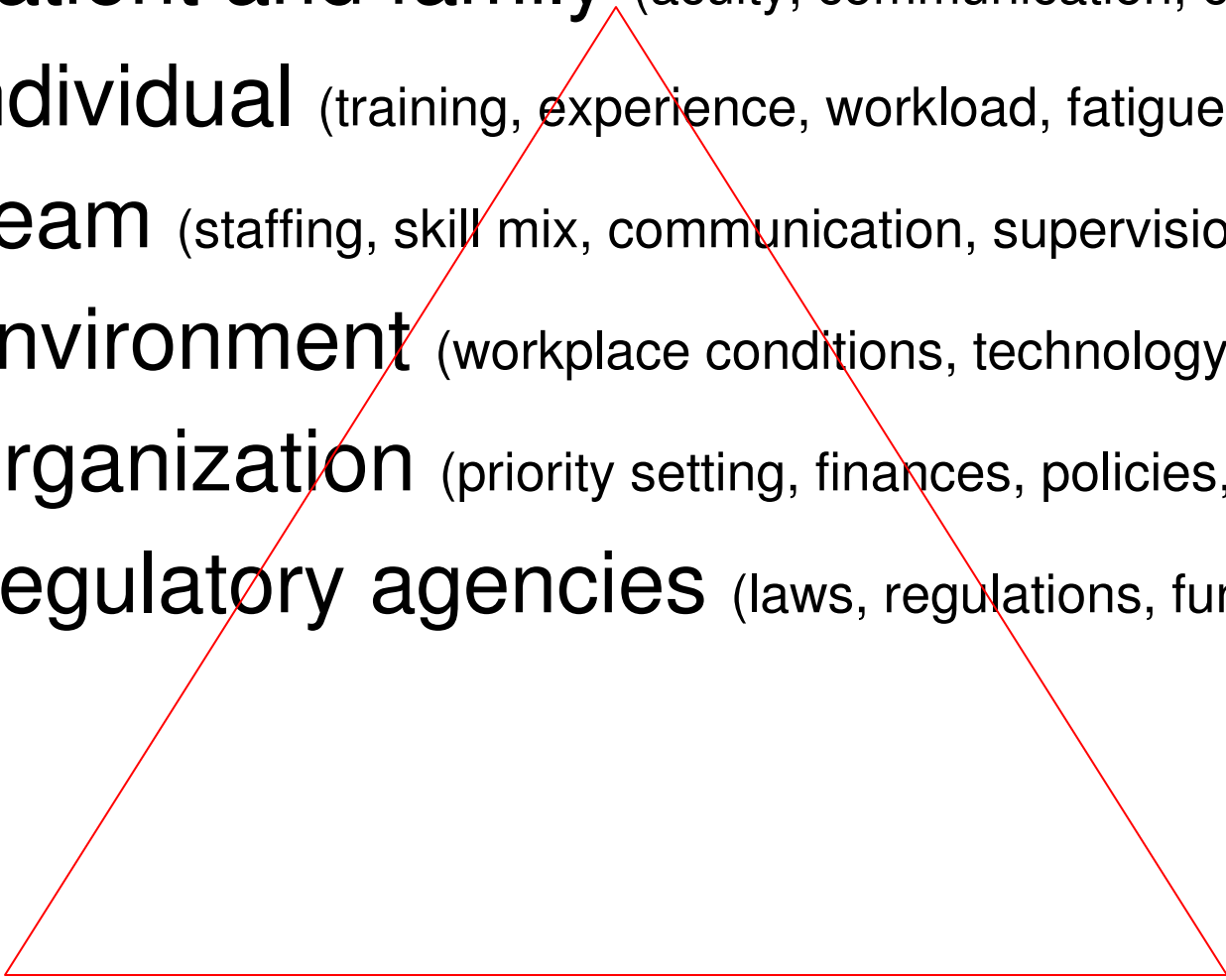
The Swiss Cheese Model



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)
- 

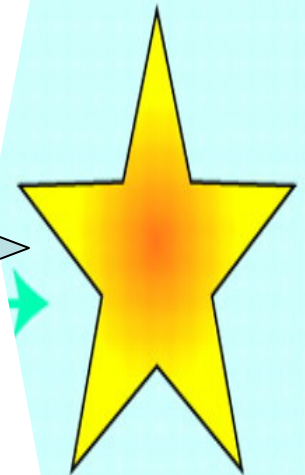
WHY DO ERRORS OCCUR?

D
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D

SHARP END

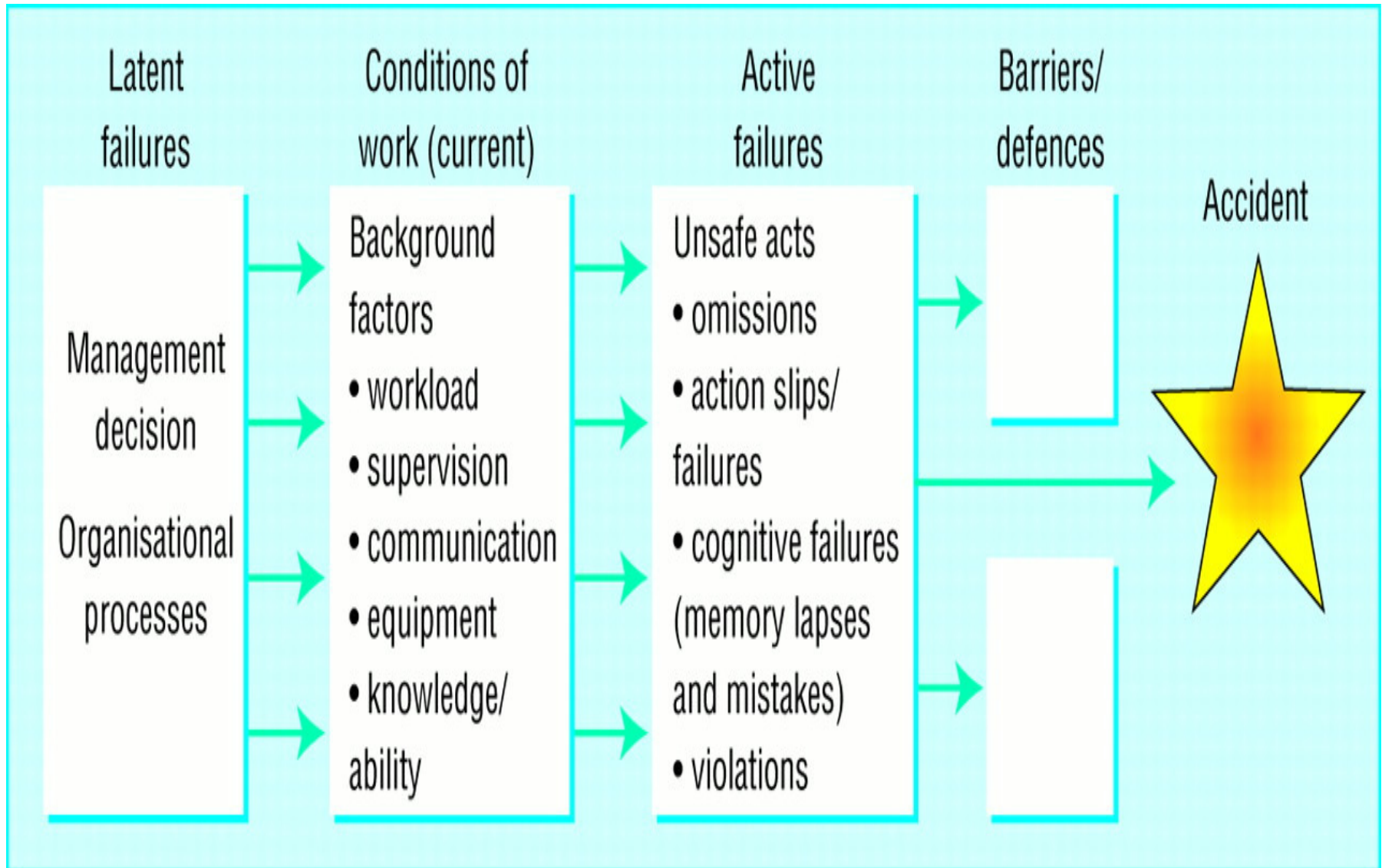
Accident



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



Vincent's organizational model

- Developed from Reason's model
- Focuses on human component within complex sociotechnical systems
- Combined organizational issues with human factors

Vincent's organizational model

Identified the following factors that influence clinical practice:

- Institutional context
 - Economic and regulatory
 - Clinical negligence scheme
- Organizational and management factors
 - Financial resources and constraints
 - Organizational structure
 - Policy standards and goals
 - Safety culture and priorities

Vincent's organizational model

- Work environment
 - Staffing levels and skills mix
 - Workload and shift patterns
 - Design, availability and maintenance of equipment
 - Administrative and managerial support

Vincent's organizational model

- Team factors
 - Verbal communication (between juniors and seniors, professions, specialities, handover)
 - Written communication (legibility, adequate plans, discharge)
 - Supervision and seeking help (responsibility, seeking and giving help as needed, adequate education and training)
 - Team structure (skills mix, balance junior/senior, medical/nursing)

Vincent's organizational model

- Individual (staff) factors
 - Knowledge and skills
 - Motivation
 - Physical and mental health

Vincent's organizational model

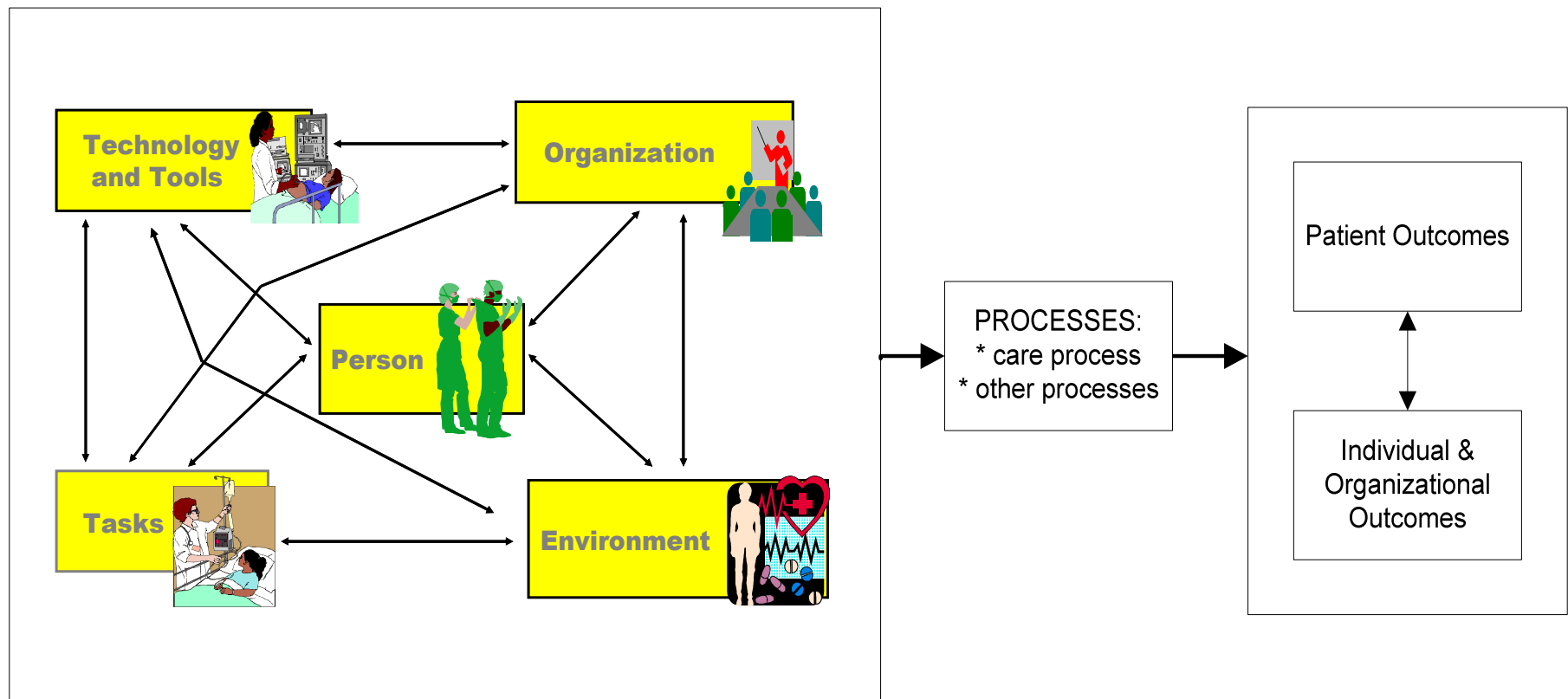
- Task factors
 - Task design and clarity of structure
 - Availability and use of protocols
 - Availability and accuracy of test results
- Patient characteristics
 - Condition- complexity and seriousness
 - Language and communication

It's the system!

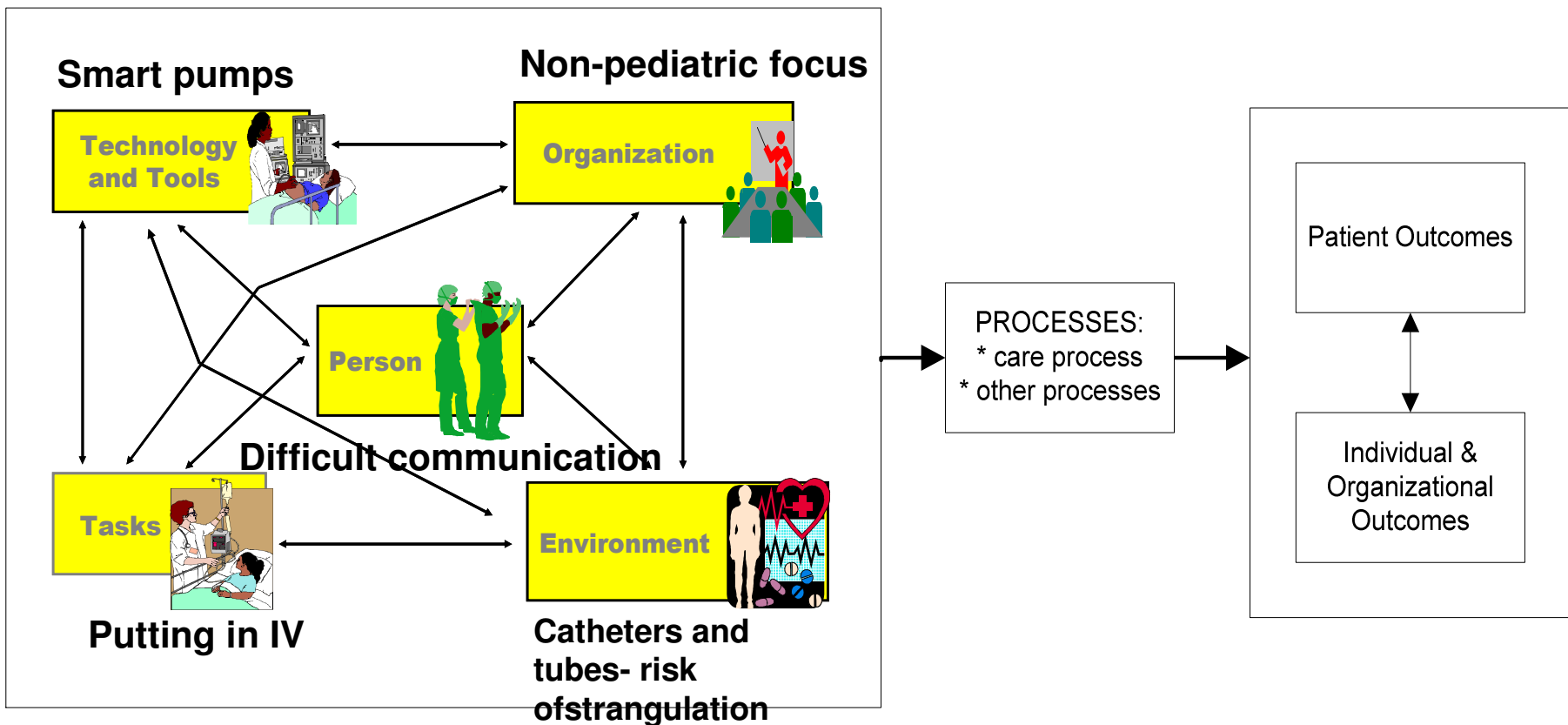
(from UW-Madison Systems Engineering Initiative in Patient Safety)

Gosbee VA

THE SYSTEM IS COMPLEX



IN PEDIATRICS THE SYSTEM IS EVEN MORE 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

