



Winnipeg Regional
Health Authority
Office régional de la
santé de Winnipeg



UNIVERSITY
OF MANITOBA

Why is Paediatrics Different? Challenges and Solutions for Safe Practices

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- Kids are not small adults
- Complexity, Reliability and Standardization
- Are we there yet?
- The need to lead

THE REPORT OF THE
MANITOBA PEDIATRIC
CARDIAC SURGERY INQUEST:

AN INQUIRY INTO TWELVE DEATHS
AT THE WINNIPEG HEALTH
SCIENCES CENTRE IN 1994

ASSOCIATE CHIEF JUSTICE MICHAEL SEGLARE

PROFESSOR OF LAW, UNIVERSITY OF MANITOBA



<http://www.pediatriccardiacinquest.mb.ca/>

**Medication errors account for
half of all significant
occurrences in hospitalized
children**

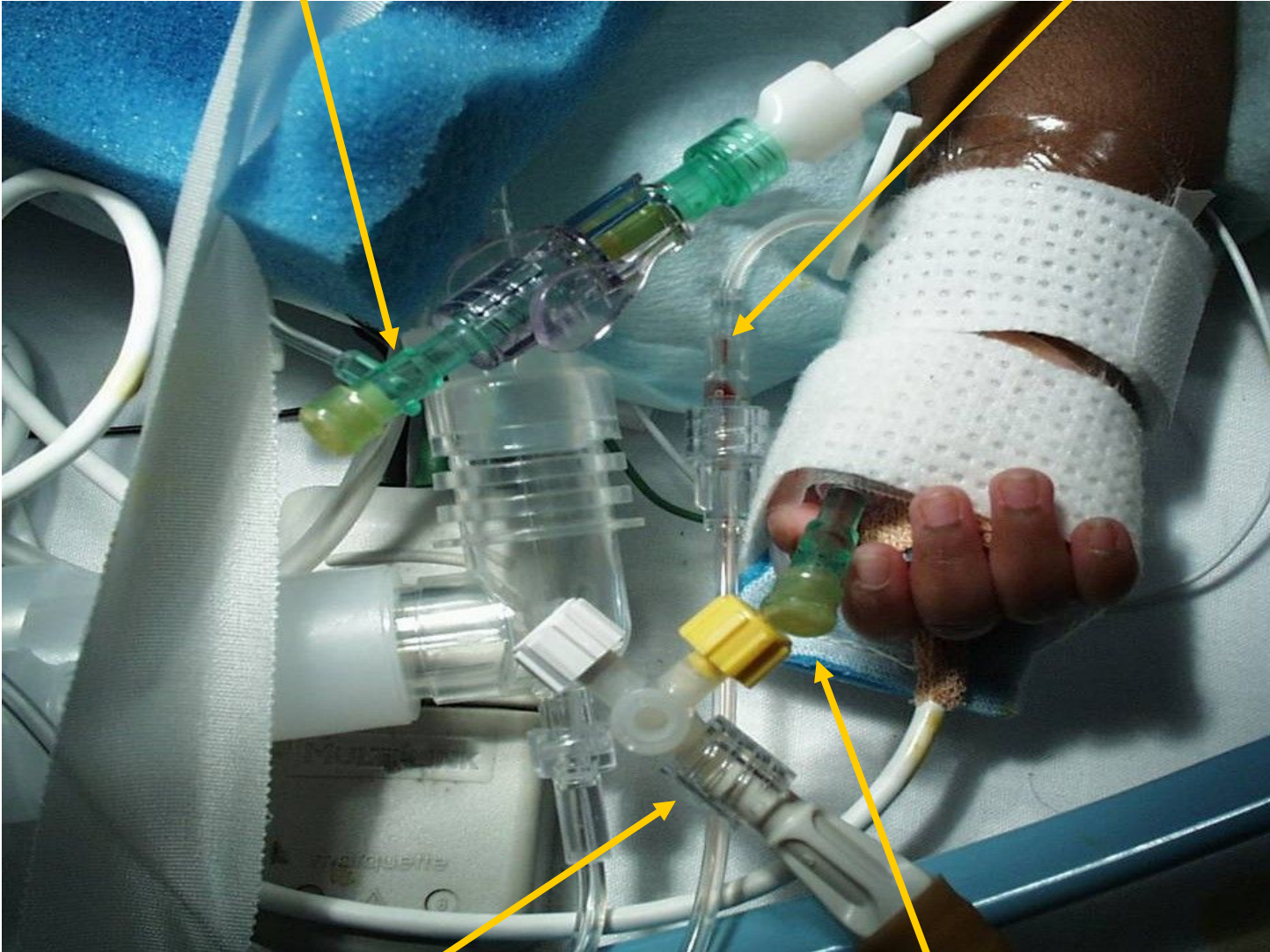
Common themes

(n = 30 reviews in acute pediatric care)

	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%

Central Venous Catheter

Epidural Catheter

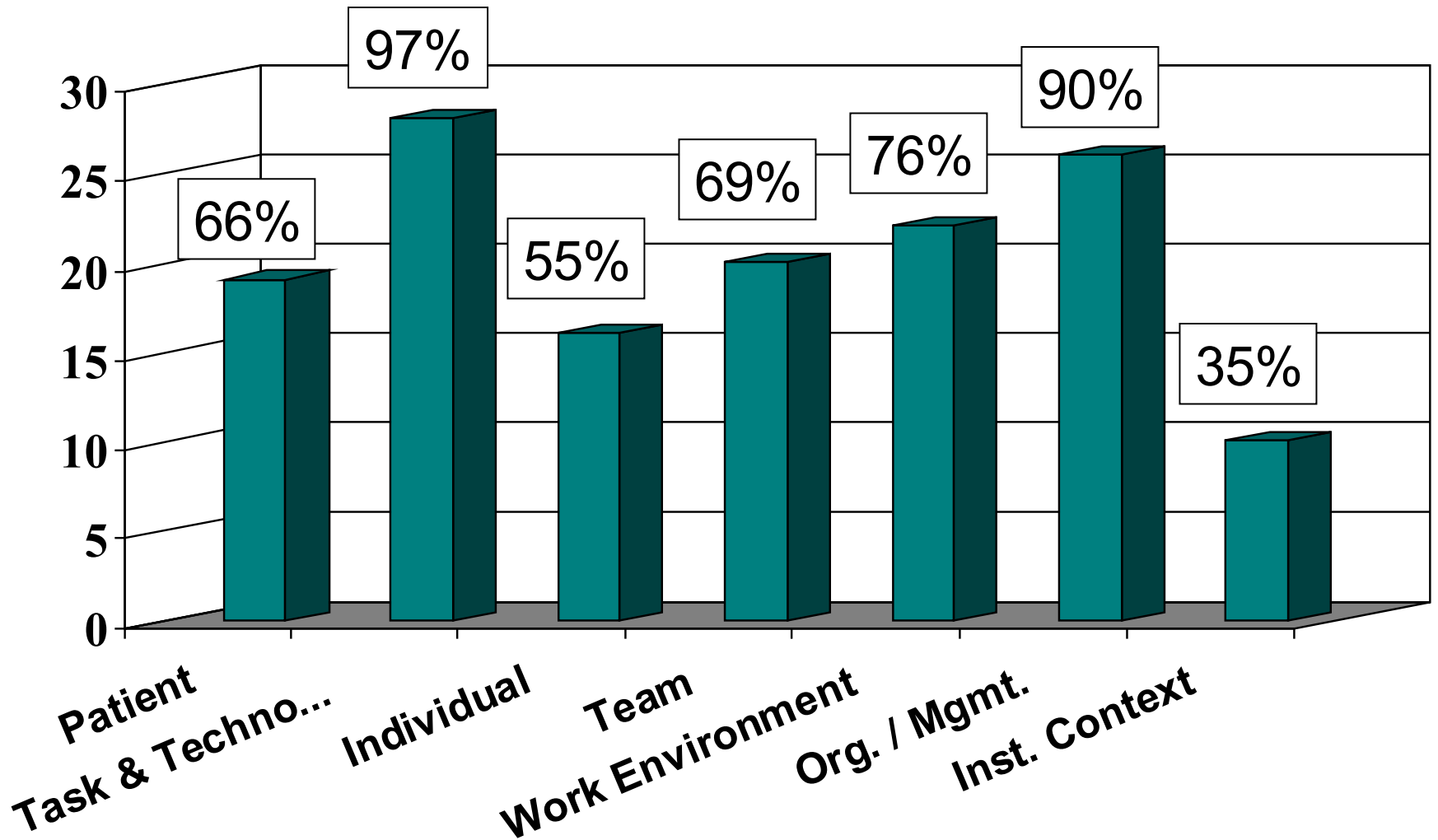


Gastrostomy Tube

Arterial Catheter

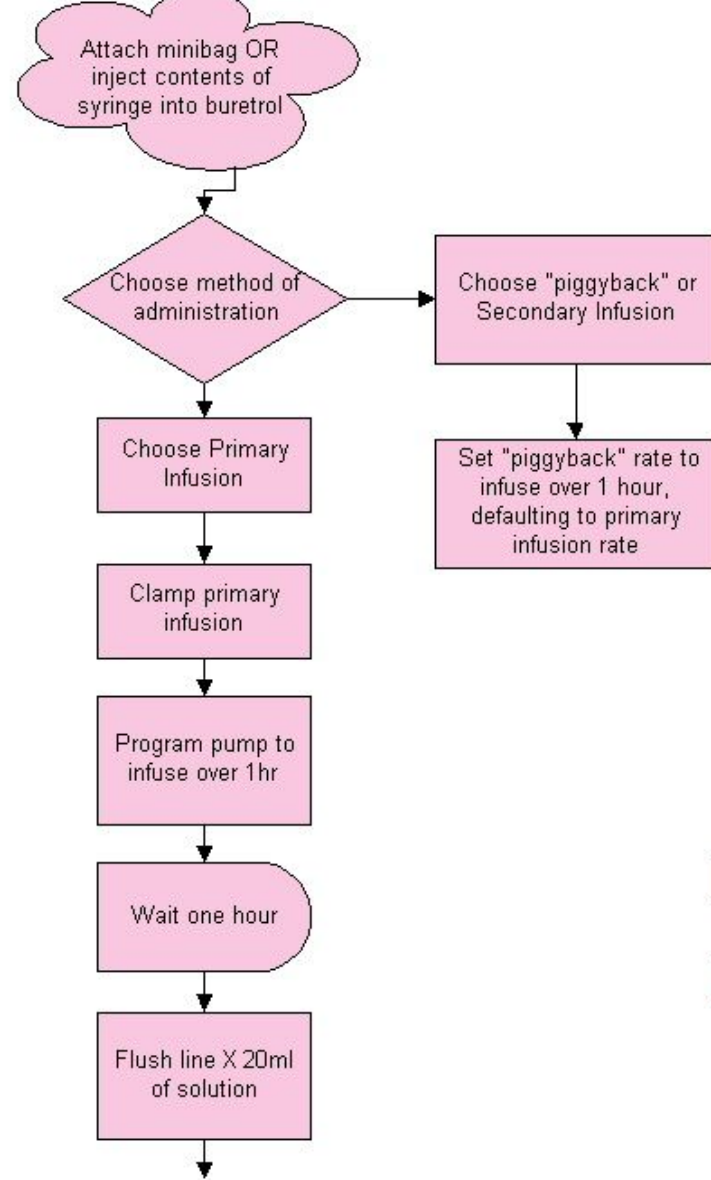
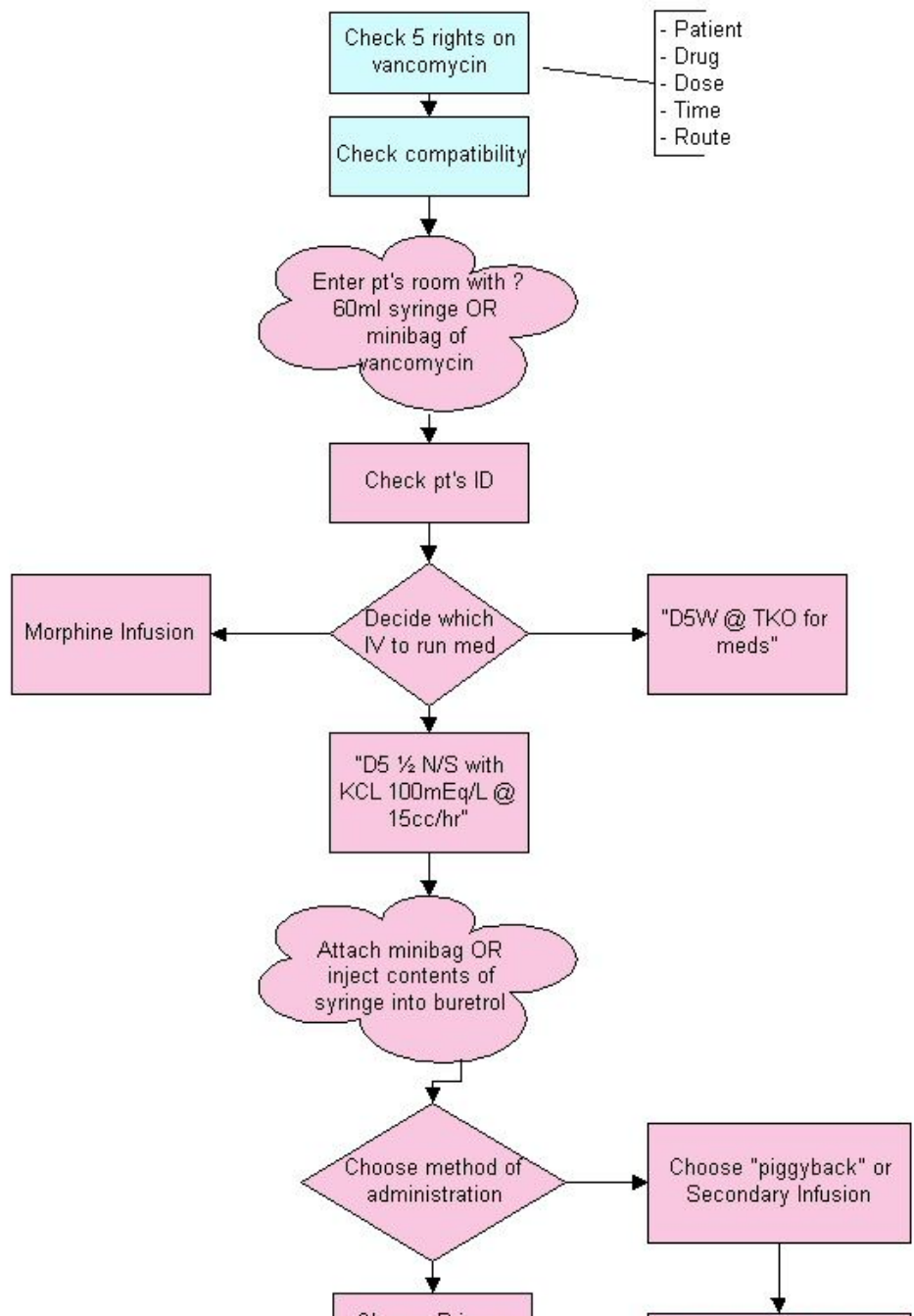
Most occurrences have multiple contributory factors, including patient complexity

Contributory Factors

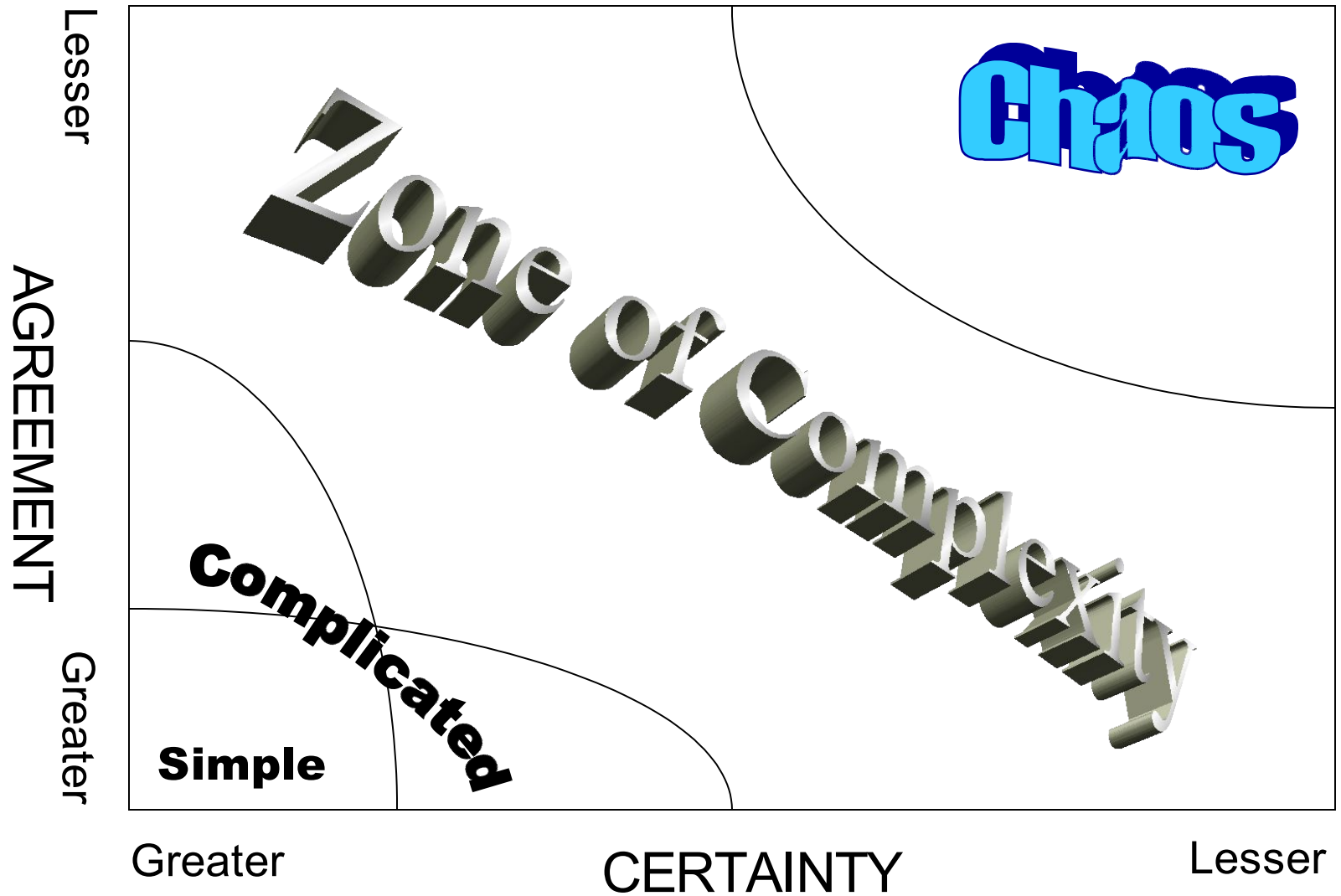


Acute pediatric care is a tightly coupled system with multiple high risk processes

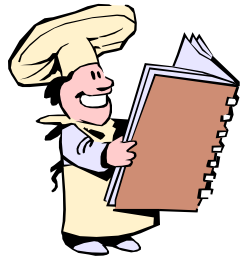
EXHIBIT 1A: Actual Administration of Vancomycin



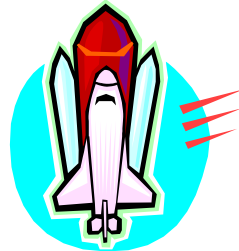
Adapted from Stacey, Ralph, Zimmerman



SIMPLE



COMPLICATED



COMPLEX



Following a Recipe

The recipe is essential
Recipes are tested to ensure replicability
No particular expertise; knowing how to cook increases success
Recipes produce standard products

KNOWN

A Rocket to the Moon

Formulae are critical and necessary
Sending one rocket increases assurance that the next will be OK
High level of expertise in many specialized fields
Coordination
Rockets are similar in critical ways

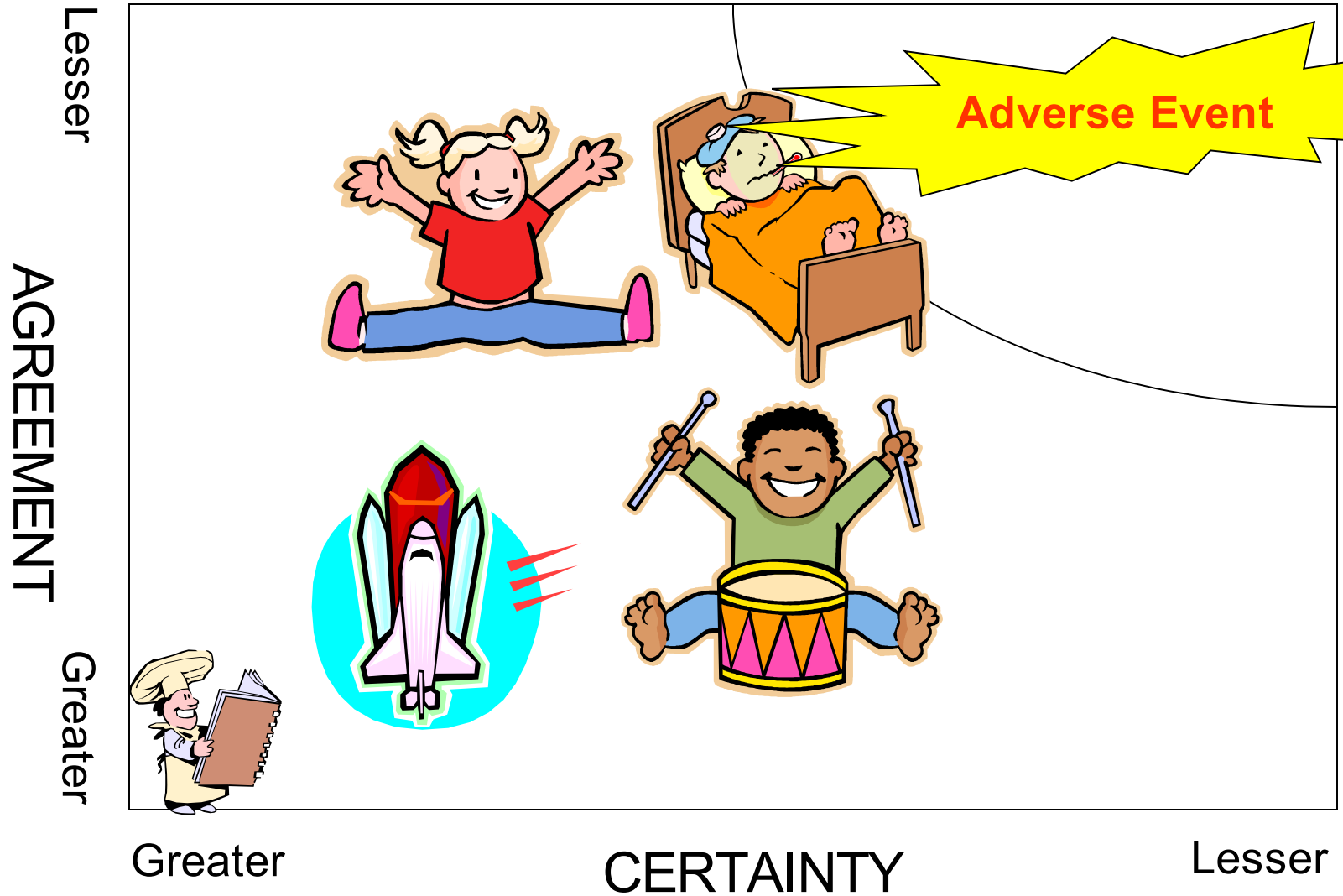
KNOWABLE

Raising a Child

Formulae have only limited application
Raising one child gives no assurance of success with the next
Expertise can help but is not sufficient; relationships are key
Can't separate parts from the whole
Every child is unique

UNKNOWABLE

Adapted from Stacey, Ralph, Zimmerman



COMPLICATED	COMPLEX
Machine metaphor	Biological metaphor: Complex Adaptive System
Limit actions: Implement best practice	Multiple actions: Local Solutions
Specify policy and process	Minimum Specs and Simple Rules

AIDS in Brazil



- Annual per capita income is <\$5000
- In the '80s, Brazil's AIDS problem was worse than South Africa's
- In 1992, the World Bank predicted that Brazil would have 1.2 million AIDS cases by 2000
-but there were only 0.5 million
- Brazil's HIV infection rate today is 0.6%; South Africa's is 25%

World Bank view (COMPLICATED)

- Meaningful solutions require sophisticated, integrated, national healthcare systems
- We cannot provide treatment to all
- We cannot afford to manage treatment compliance
- Therefore we should focus on prevention
- It will take a long time to work through

Brazilian view (COMPLEX)



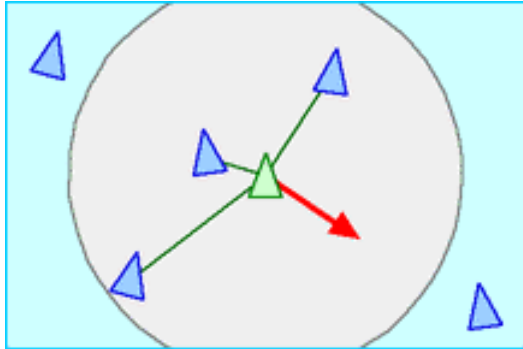
- Find ways to use the resources we have to respond to the problem
- Provide drugs to all by finding ways to reduce drug costs
- Use informal systems and relationships to train people to care for themselves
- Prevention will be part of treatment plan

Lessons from Brazil

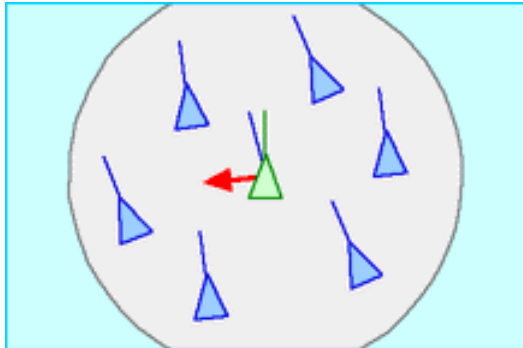


- **COURAGE** - challenged the WTO, the USA, Big Pharma and the World Bank
- **COMPLEXITY** - used to advantage
- **RELATIONSHIPS** - used the power of existing relationships and networks

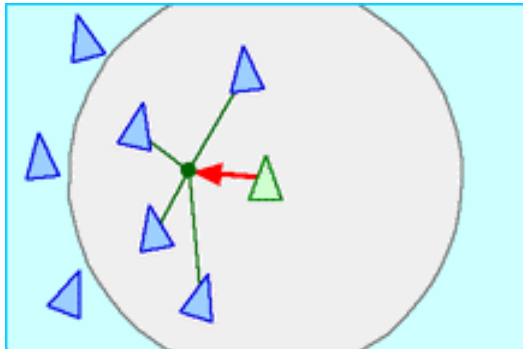
Min Specs for “BOIDS”



Maintain a minimum distance from other Boids



Match the speed of other Boids



Move towards the centre of the flock

MAX SPECS

Too many rules



MIN SPECS

Impossible to say I
didn't know the rules

Min Specs = Simple Rules



Are the tools of visionary leaders

Allow creativity and accountability to coexist

Increase diversity and maintain coherence

With truly novel situations, there are no Best Practices

Examples of Simple Rules



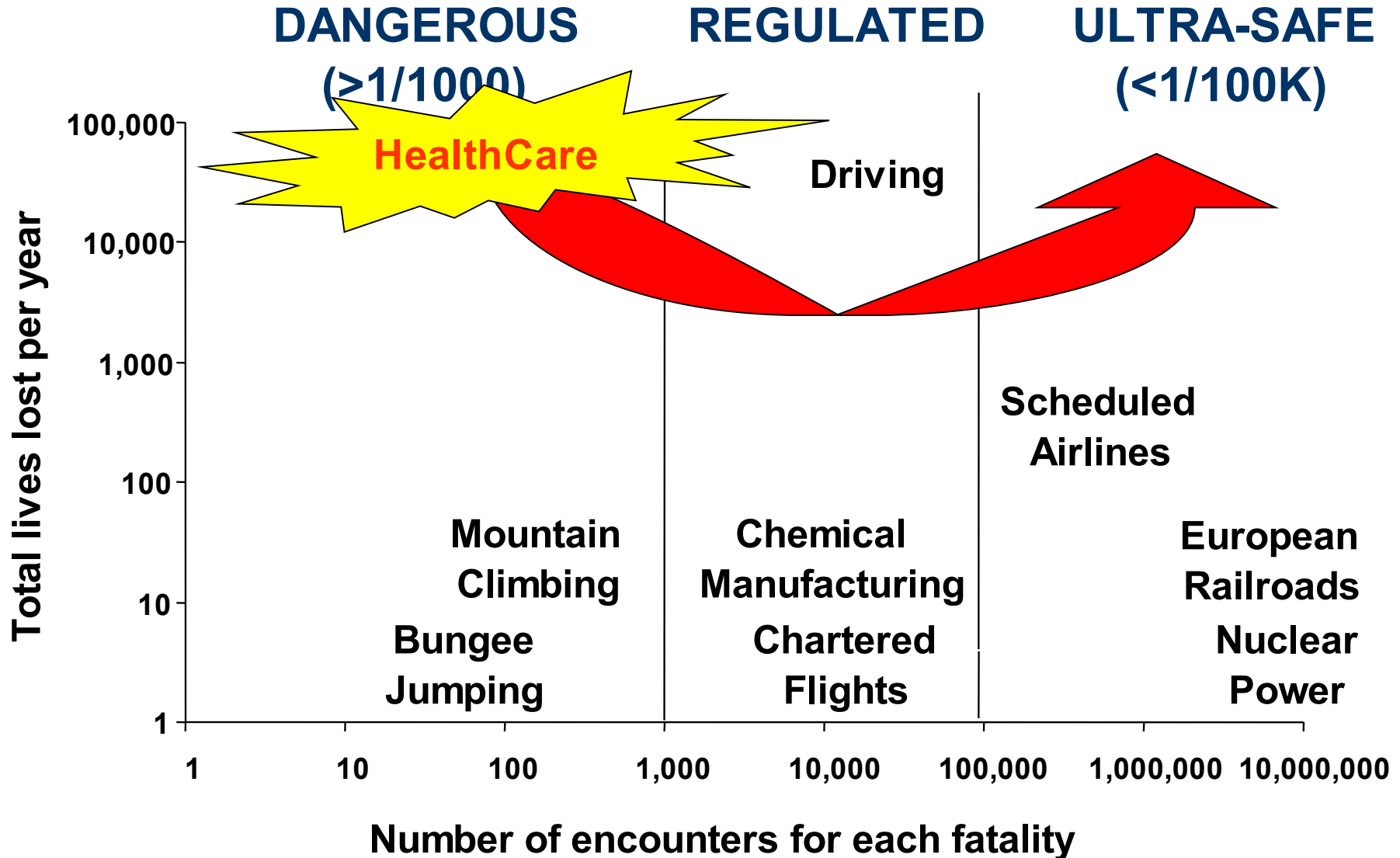
Do no harm

(Hippocrates)

Prevent all injuries

(ALCOA)

How Hazardous Is Healthcare?



High Reliability Industries

Aviation

Aerospace

Nuclear Power

Transportation

Oil

Chemical processing

Military operations



Characteristics of High Reliability Organizations (HRO)

- Collective preoccupation with the possibility of failure”
- Expect to make errors and train their workforce to recognize and recover from them
- Continual rehearsal of familiar scenarios of failure
- Strive hard to imagine novel scenarios of failure
- They generalize failures (not isolate them)
- They look for “system” reforms, instead of making local repairs
- “Failures and safety on the brain”



Thinking like an Engineer

Engineers

- Begin with the premise that anything can and will go wrong
- Don't expect humans to perform perfectly or without variation
- Design systems accordingly and be proactive



Health Care professionals

- Errors are the result of human failures
- Humans generally perform flawlessly
- Perfect performance is the expectation
- Use re-training, and punishment to root out bad apples

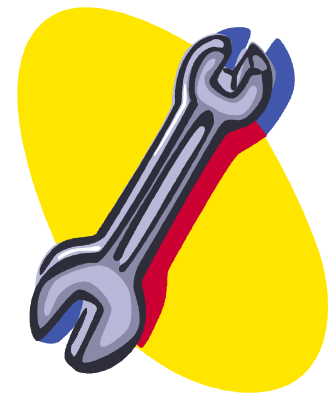
Human Factors Engineering 101

HFE: a discipline concerned with design of systems, tools, processes, machines that takes into account human capabilities, limitations, and characteristics

Ergonomics

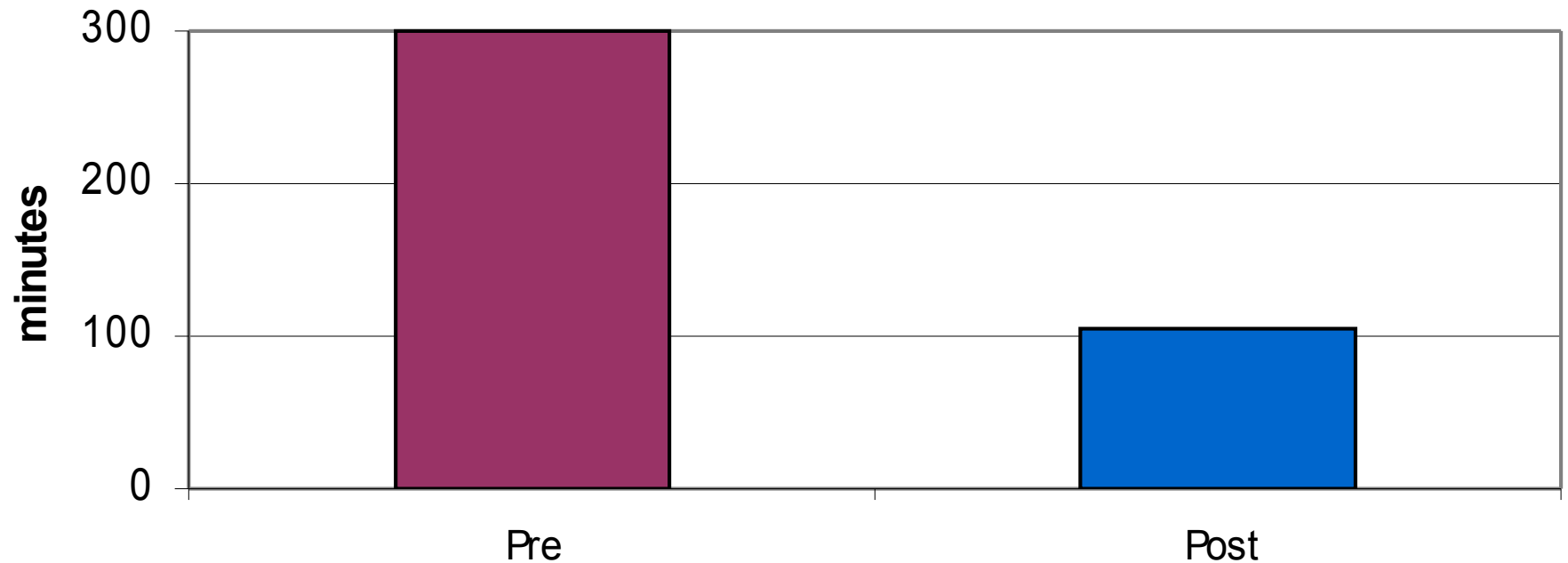
Usability engineering

User centered design

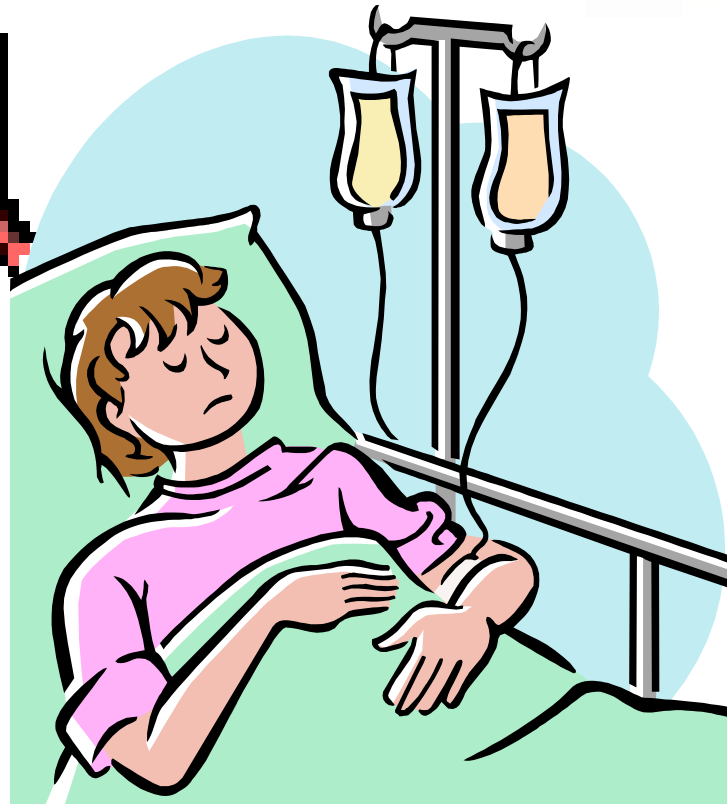
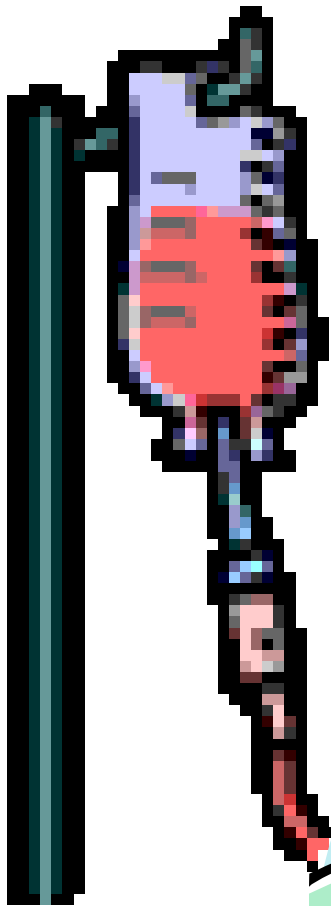


Reengineering the care of children with Febrile Neutropenia

Mean Triage Time to 1st Antibiotic



t-test: $p < 0.05$



**13 units
Up to 6
different
methods of
administering
intermittent IV
medications**

Gerarda's challenge for CAPHC

in the safe delivery of medications to children

Let's all agree to

- Standardize – when we can!
- Recognize Complexity
- Develop and use Simple Rules
- Become High Reliability Organizations
- Leverage Relationships
- Have Courage

