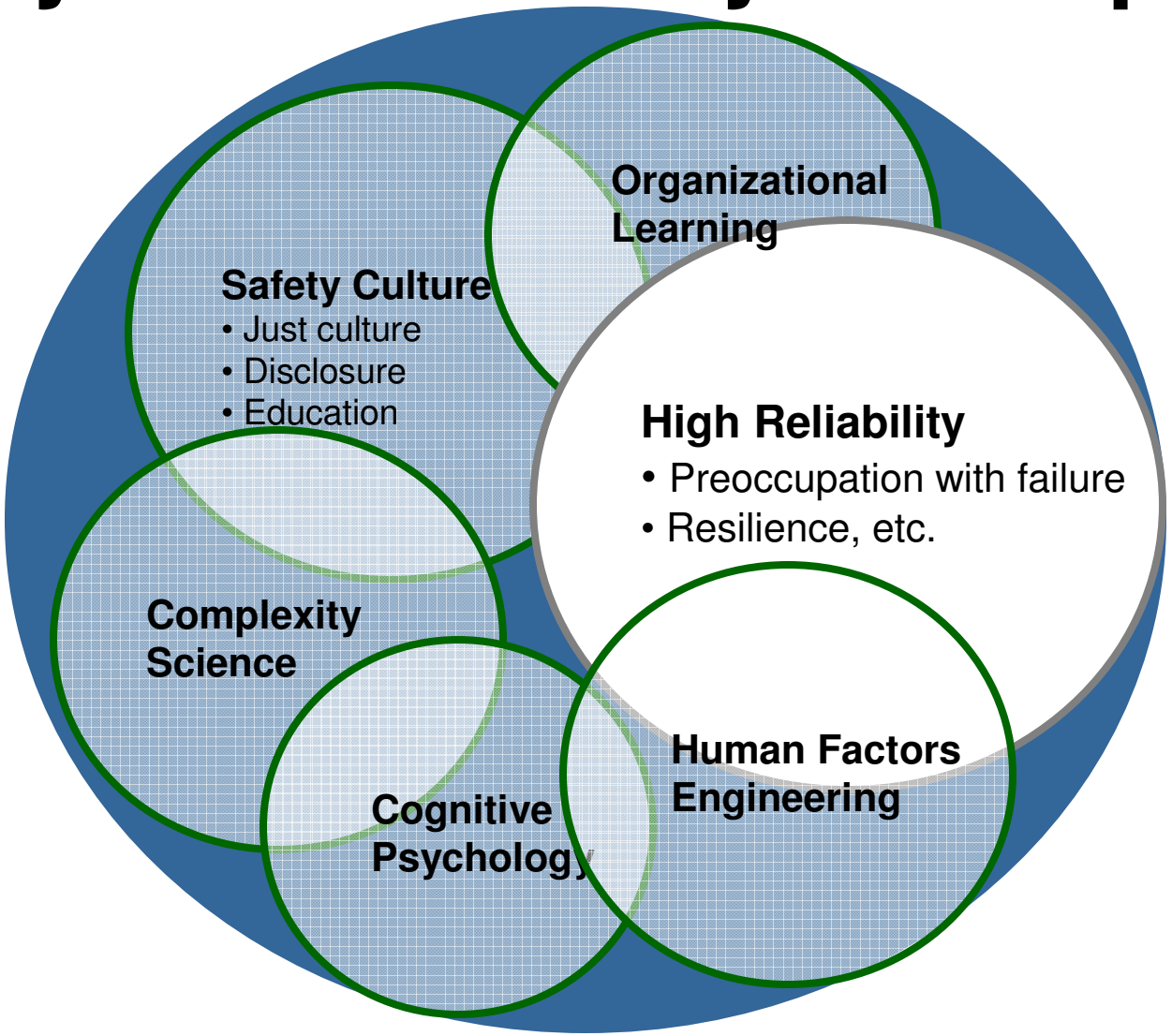
High Reliability Organizations

Key Patient Safety Concepts



HOW OFTEN DOES…..

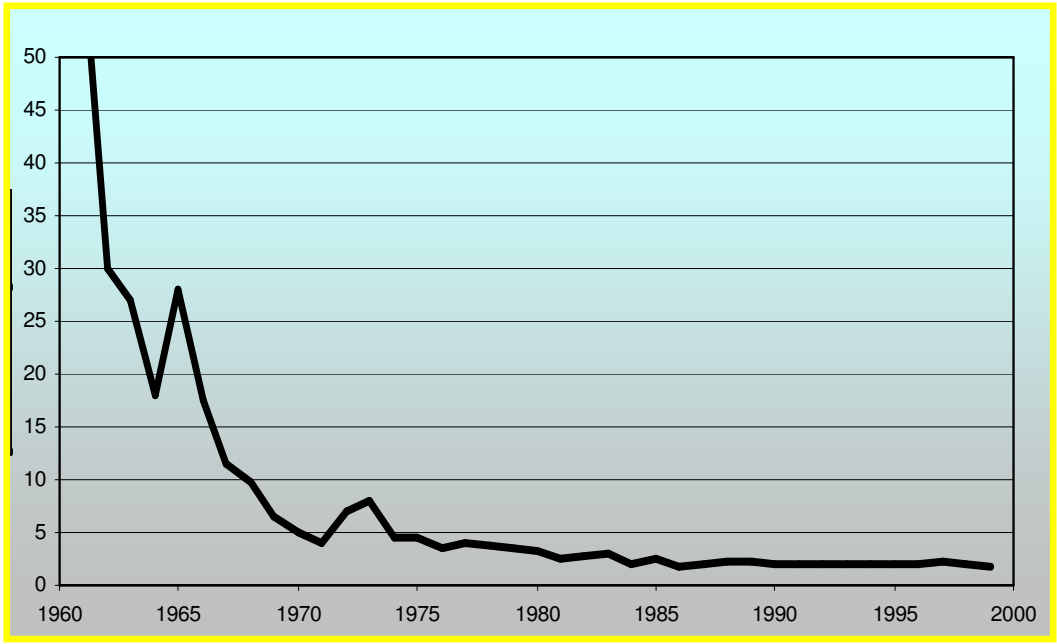
- A key piece of admission get omitted at transfer?
- the wrong medication given?
- A key item get forgotten at the grocery store?
- a nuclear power plant have a disaster?
- a commercial plane crash?
- an MVA occur on the 401?

Learning from others – Human Factors Engineering

- errors are made by the best people in the best organizations
- humans are fallible
- distractions, fatigue & feeling rushed can contribute to error
- humans have limited memory

Learning from Others- Commercial Aviation

- Increased hand-offs = increased risk
- Use of checklists
- Sterile cockpit techniques
- Team building



Convergent Knowledge Solutions, 2004

WHAT IS RELIABILITY?

Failure free operation over time

- The capability of a process, procedure or health service to perform its intended function in the required time under existing conditions.

High Reliability Organizations

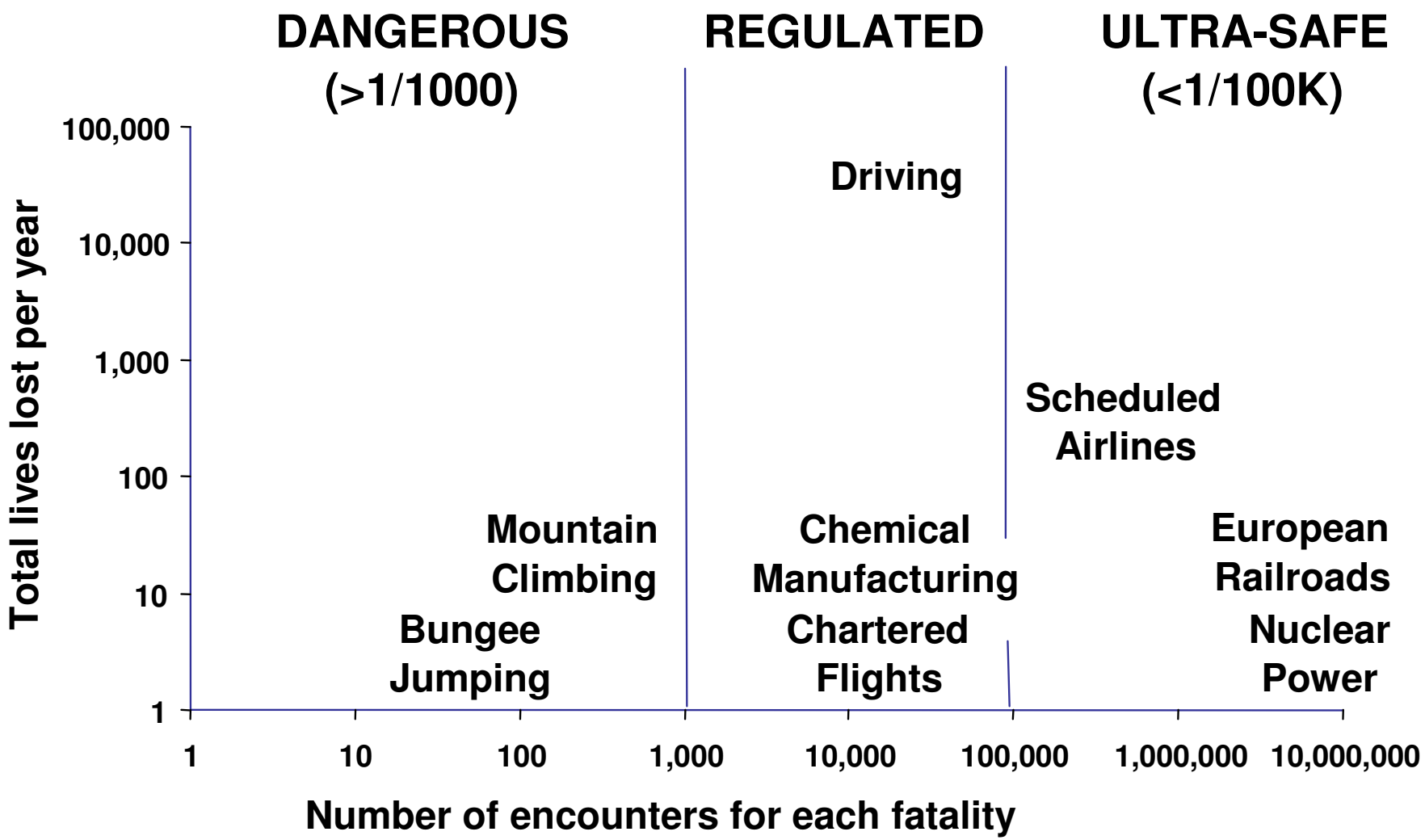
- Preoccupation with failure
- Reluctance to simplify interpretations
- Sensitivity to operations
- Commitment to resilience
- Deference to expertise

Weick & Sutcliffe, Managing the Unexpected, 2001

How do we do in healthcare?

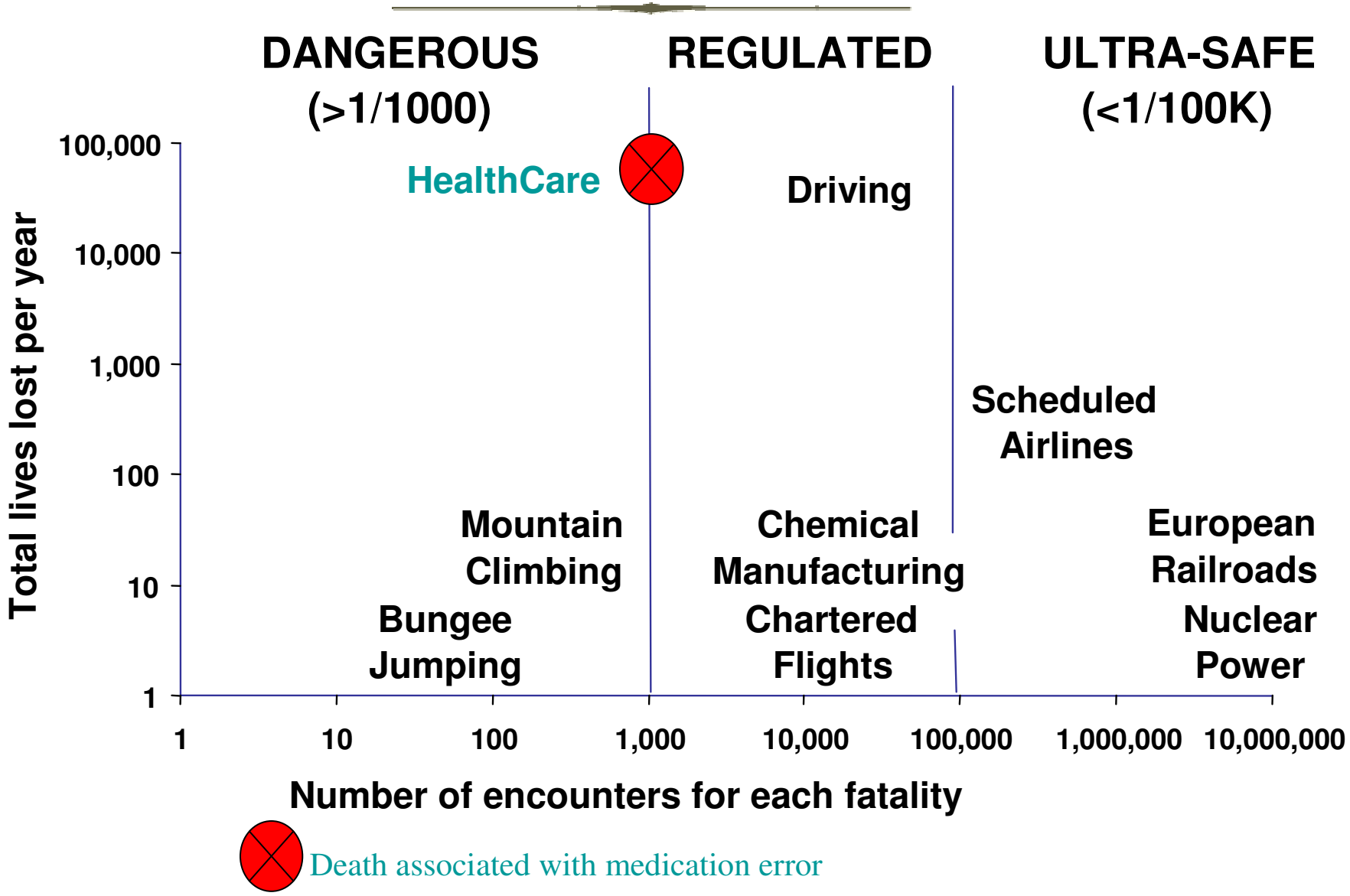
- Preoccupation with failure
- Reluctance to simplify interpretations
- Sensitivity to operations
- Commitment to resilience
- Deference to expertise

How Hazardous Is Health Care?



Source: Leape

How Hazardous Is Health Care?



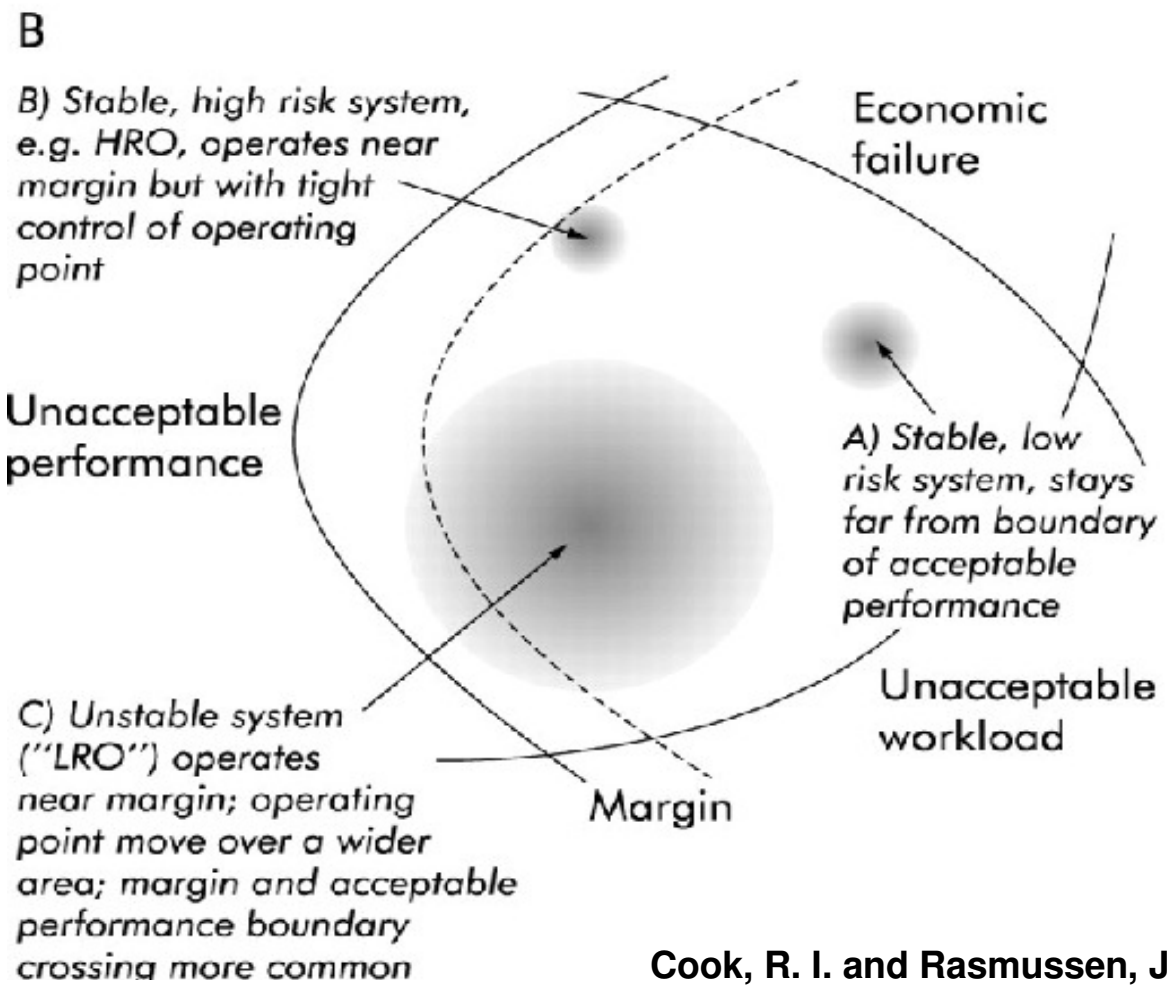
Source: Leape

Limitations to Reliability in Healthcare

- Process factors: eg lack of standardization, reliance on memory
- Human factors: eg fatigue, poor teamwork
- Situational factors: Patient variability, resource availability

* Expect adverse outcomes/ complications

Safety is Dynamic



Cook, R. I. and Rasmussen, J., QSHC, 2005.

MEASURING RELIABILITY

$$\text{RELIABILITY} = \frac{\text{\# actions that achieve intended result}}{\text{total \# of actions taken}}$$

RELIABILITY

Reliability	Failure Rate (1-Rel)
~ 9/10	~ 1/10
~95/100	~ 5/100
~995/1000	~ 5/1000

RELIABILITY LEVELS

Reliability		Failure Rate (1-Rel)
~ 9/10	Level 1	~ 1/10
~95/100	Level 2 (10^{-2})	~ 5/100
995/1000	Level 3 (10^{-3})	~ 5/1000

RELIABILITY LEVELS

Reliability		Failure Rate (1-Rel)
~ 9/10	Level 1 (defect rate of 10^{-1})	~ 1/10
~95/100	Level 2 (10^{-2}) (defect rate of 10^{-2})	~ 5/100
995/1000	Level 3 (10^{-3}) (defect rate of 10^{-3})	~ 5/1000

The Reliability Spectrum

Reliability	Defect rate	expressed as	Examples
	%	Power of 10	
0.9	10	10^{-1}	No ß blocker post MI
0.99	1	10^{-2}	Adverse med events
0.999	0.1	10^{-3}	Gen surg deaths
0.9999	0.01	10^{-4}	Anaesthesia deaths
0.99999	0.001	10^{-5}	Transfn error
0.999999	0.0001	10^{-6}	

The characteristics of systems that perform at

10^{-1} (one defect in 10)

are different than those that perform at

10^{-3} (one defect in 1000)

Level of Reliability Components

Level 1 (10^{-1})

Standardization
Check Lists, Vigilance
Awareness, Feedback
=Training and reminders

Level 2 (10^{-2})

Decision Aids, Redundancy
Desired Action is Default
Real Time Identification
of Failure
= Human factors principles

Level 3 (10^{-3})

Pre-Occupation with Failure
Resilence
Standardization of Behavior
System is Visible
Process/ structure/ outcome

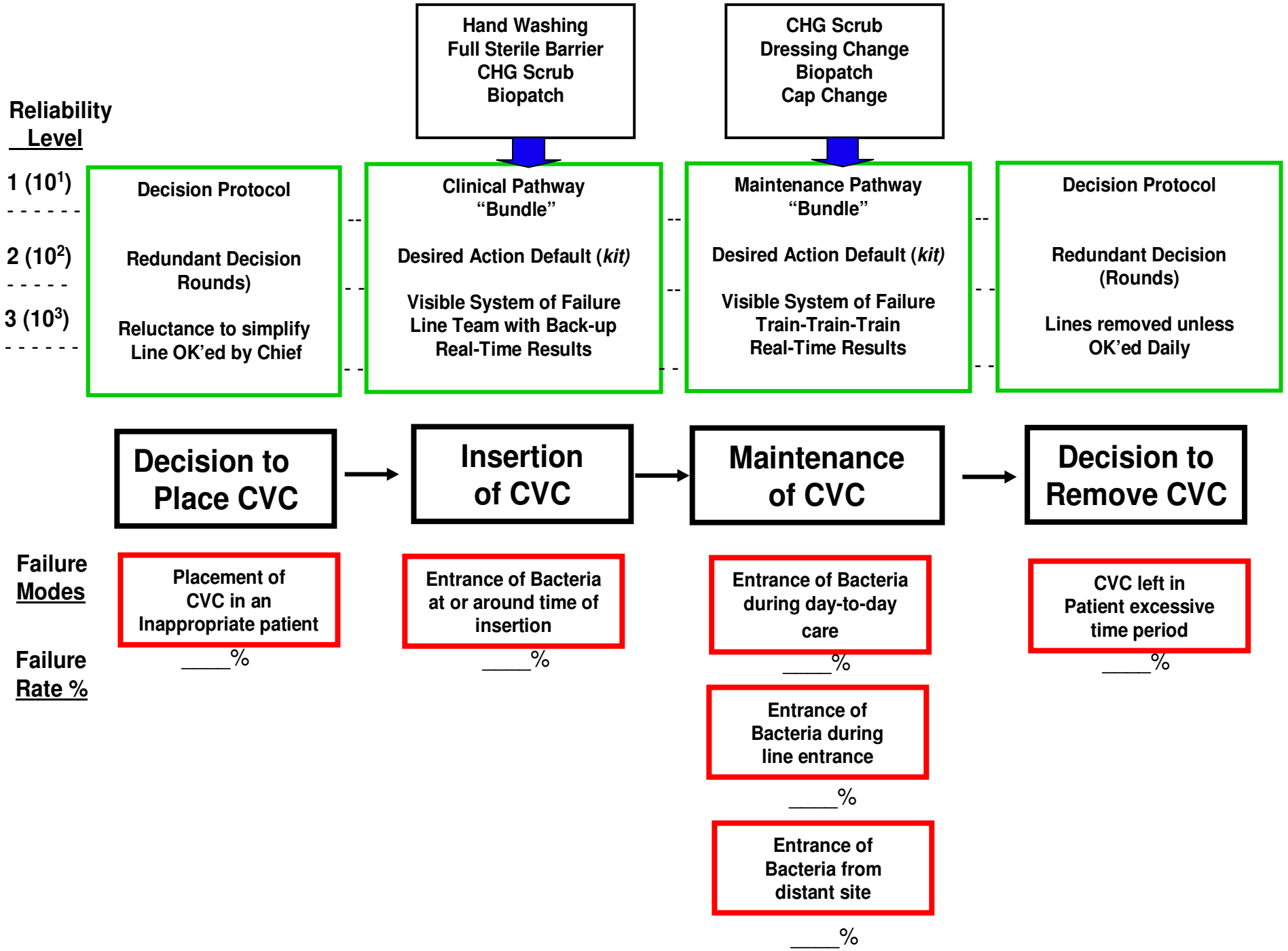
The RN Checklist

SickKids Transfer Checklist

- DO NOT SKIP ANY ITEMS
- FOLLOW THE EXACT ORDER OF THE CHECKLIST
- READ BACK SHADED AREAS
- IF YOU ARE INTERRUPTED START OVER AT THE BEGINNING OF THE SECTION

	Section 1 – COMPLETE FOR ALL TRANSFERS e.g. ER to unit, unit to unit, unit to other department
	Name
	MRN - medical record # required to double check patient identification
	Age
	Weight
	Allergies e.g. type, past reactions, treatment needed during reaction
	Admitting diagnosis
	Pertinent history of present illness
	Co-morbid conditions e.g. sickle cell, congenital anomalies, syndromes
	Vital signs//physical findings on examination – include pain assessment/scores
	02 sats/02 delivery e.g. concentration, method of delivery, patient tolerance
	Intake & output e.g. NPO status, IVs/access, infusions, urinary output, stools, vomiting
	Medications administered or pending e.g. medications at home or on transferring unit; time last administered, time next due, response to medications
	Labs/diagnostics completed or pending e.g. abnormal results, tests not yet completed, results pending
	Treatments or therapies completed or pending e.g. date, patient response
	Isolation required on unit – based on patient symptoms & current isolation policies
	Monitoring/level of observation required on unit e.g. continuous electronic monitoring, constant observation
	Transport requirements e.g. who will accompany patient, monitoring during transfer
	Transfer orders in place & reviewed

	Section 2 – COMPLETE IN ADDITION TO SECTION 1 FOR UNIT TO UNIT TRANSFERS
	Past medical/surgical history including home medications/treatments
	Consults completed and/or to be completed
	Special needs or equipment e.g. wheelchair, splints, glasses
	Language barriers e.g. interpreter needed/arranged
	Psychosocial needs or follow-up required


Hand Washing
Full Sterile Barrier
CHG Scrub
Biopatch
CHG Scrub
Dressing Change
Biopatch
Cap Change
Reliability Level
1 (10^1)
2 (10^2)
3 (10^3)
Decision Protocol
Redundant Decision Rounds)
Reluctance to simplify
Line OK'ed by Chief
Clinical Pathway "Bundle"
Desired Action Default (kit)
Visible System of Failure
Line Team with Back-up
Real-Time Results
Maintenance Pathway "Bundle"
Desired Action Default (kit)
Visible System of Failure
Train-Train-Train
Real-Time Results
Decision Protocol
Redundant Decision (Rounds)
Lines removed unless OK'ed Daily
Decision to Place CVC
Insertion of CVC
Maintenance of CVC
Decision to Remove CVC
Failure Modes
Failure Rate %
Placement of CVC in an Inappropriate patient
____%
Entrance of Bacteria at or around time of insertion
____%
Entrance of Bacteria during day-to-day care
____%
Entrance of Bacteria during line entrance
____%
Entrance of Bacteria from distant site
____%
CVC left in Patient excessive time period
____%

Achieving Reliability Day to day

1. Standardize your approach
2. Build decision aids and reminders into your systems
3. Take advantage of pre-existing habits and patterns
4. Make the desired action the default, not the exception
5. Create redundance
6. Bundle related tasks
7. Encourage teamwork, feedback and training

Elgert G. Reliability Science: reducing the error rate in your practice. Family practice management. Oct 2005.

DESIGN FOR RELIABILITY

- Prevent Failure (a breakdown in operations or functions)
- Identify and intercede, and mitigate failure
- Redesign the process based on the failures identified

Institute for Healthcare Improvement