Medical Crew Resource Management

LESSONS WE SHOULD LEARN

DR JOHN ROOS

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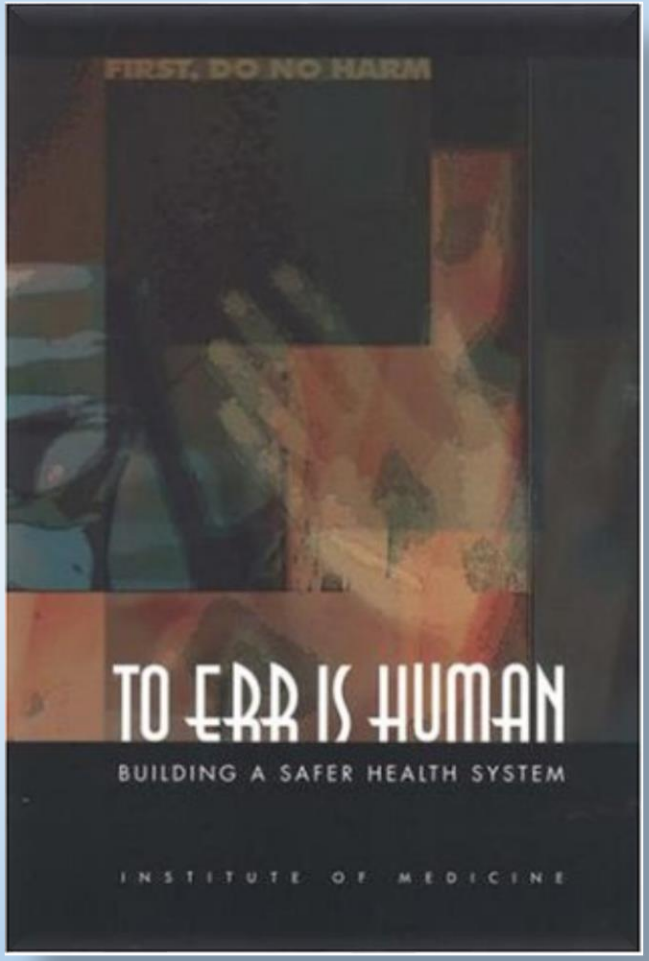
Cicero

(106 BC – 43 AD)

“To err is human”

To err is human

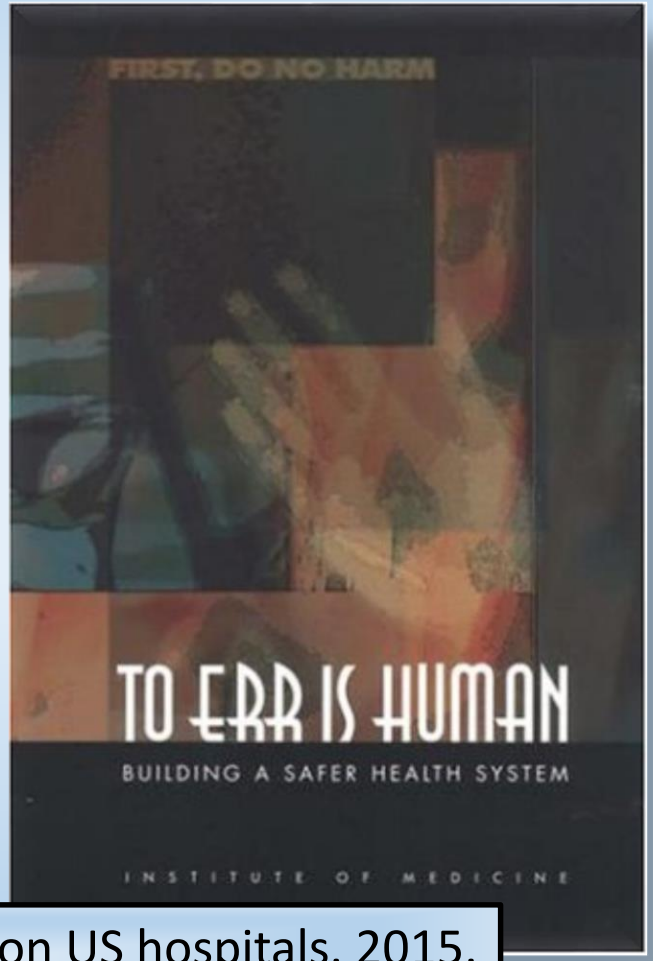
- IOM, USA, 1999
- 44 000 – 98 000 die each year
- $17 – 29 billion per year



Kohn L, Corrigan J, et al.To err is human: building a safer health system. National Academies Press, Washington DC. 2000

To err is human

If this data was updated to 2013, it would equate to more than 400 000 deaths per year



American Hospital Association. Fast facts on US hospitals. 2015. http://www.aha.org/research/rc/stat-studies/fast-facts.shtml


The equivalent of 7 to 8 airline crashes every single day!

Australia

18 000 ***preventable*** deaths annually

Wilson RM, Runciman WB, et al. The Quality in Australian Health Care Study. Med J Aust. 163 (9): 458 – 71 (1995).

Canadian Adverse Events Study

- Adverse events in > 7% of hospital admissions
- 9 000 to 24 000 Canadians die annually from avoidable medical error

Baker R, Norton P, et al. The Canadian Adverse Events Study: the incidence of adverse events among hospital patients in Canada. Canadian Medical Association Journal, 170 (11): 1678 – 1685 (2004).

United Kingdom

Odds of dying as a result of being treated in hospital are **33 000 times higher** than the odds of dying in an airline crash

Sarah Hall, health correspondent, quoting Sir Liam Donaldson, UK Chief Medical Officer, The Guardian Newspaper Tuesday 7 November 2006.

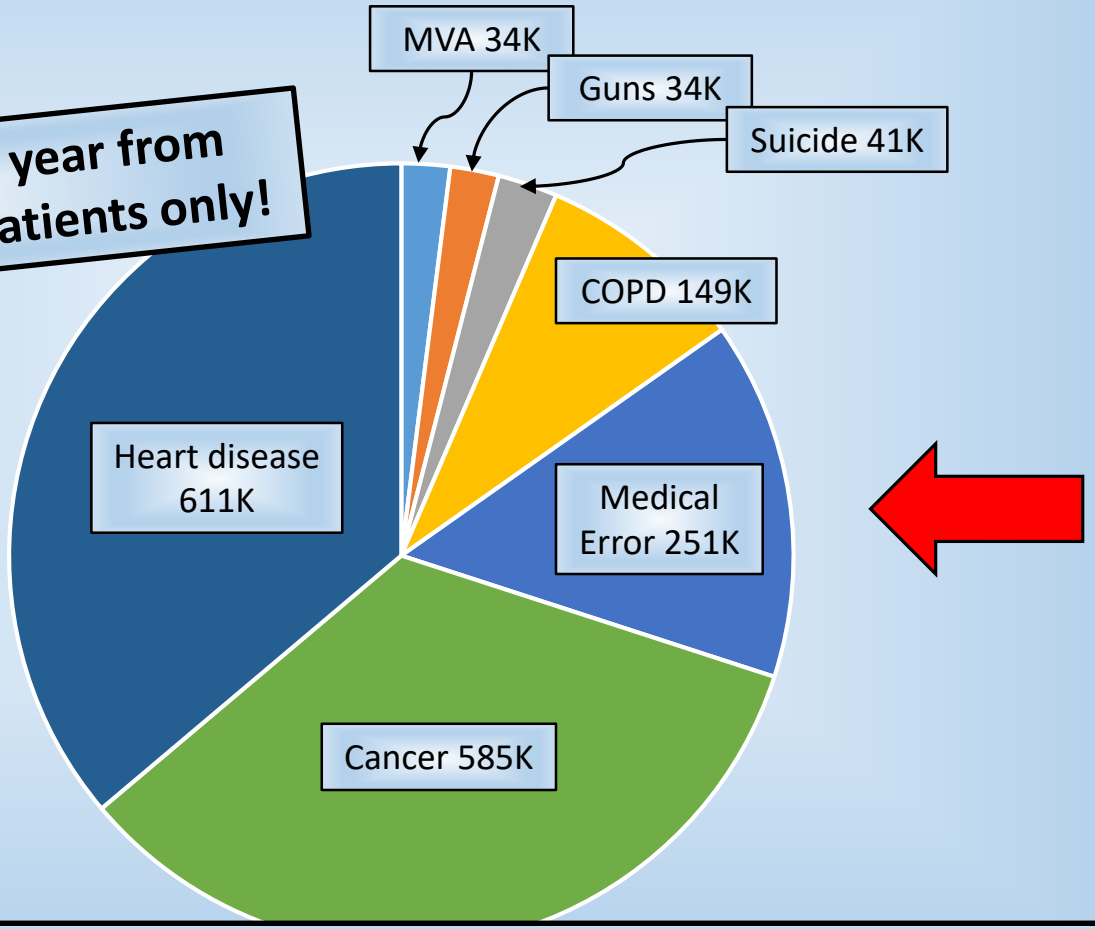
British Medical Journal – 2016

Medical error is the third leading cause of death in the USA!

Makary MA, Daniel M. Medical error – the third leading cause of death in the US. **BMJ 2016**; 353: i2139.

USA overall causes of death p.a.

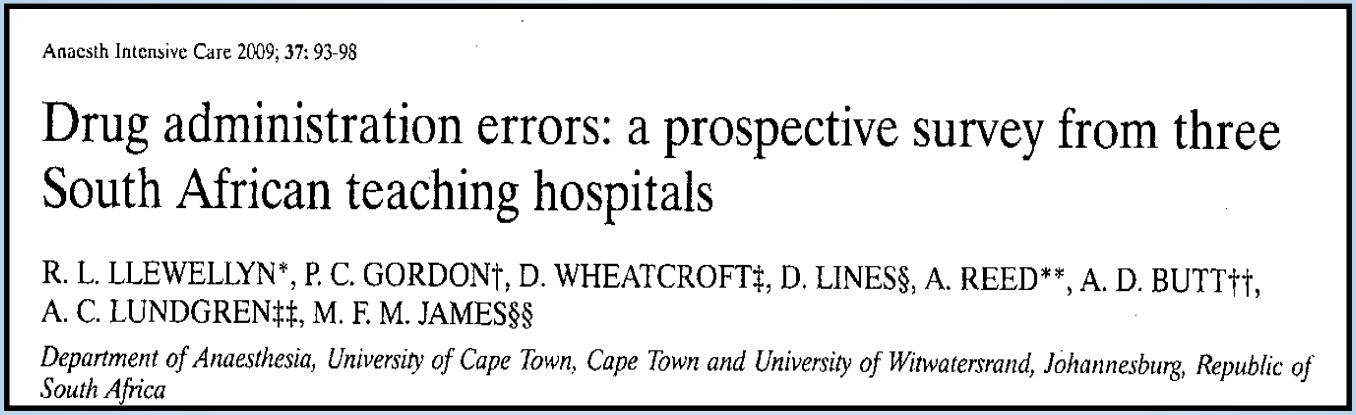
251 454 deaths per year from medical error for inpatients only!



Makary MA, Daniel M. Medical error – the third leading cause of death in the USA. **BMJ 2016**; 353: i2139.

Medication error

- One error per 133 anaesthetics (NZ)[1]
- One error per 274 anaesthetics (SA)[2]



Anaesth Intensive Care 2009; 37: 93-98

Drug administration errors: a prospective survey from three South African teaching hospitals

R. L. LLEWELLYN*, P. C. GORDON†, D. WHEATCROFT‡, D. LINES§, A. REED**, A. D. BUTT††, A. C. LUNDGREN‡‡, M. F. M. JAMES§§

Department of Anaesthesia, University of Cape Town, Cape Town and University of Witwatersrand, Johannesburg, Republic of South Africa

1. *Webster CS, et al. The frequency and nature of drug administration error during anaesthesia. Anaesth Intensive Care 29:494–500 (2001).*
2. 2. Drug administration errors: a prospective survey from three South African teaching hospitals. RL Llewellyn, PC Gordon et al. Anaes Intensive Care 37; 93-98 (2009).

Medication error - MGH

Occurs in one out of every two operations!

One third resulted in an ***adverse event*** or ***harm*** to the patient; the remainder had the potential to do so

More than 80% considered ***preventable***!

Karen C Nanji, et al. Evaluation of Perioperative Medication Errors and Adverse Drug Events. **Anesthesiology 1 2016**, Vol.124, 25-34.

World Health Organisation

1 in 10 people worldwide receiving healthcare will suffer ***preventable*** harm

*www.who.int/features/**fact**files/**patient_safety**/en/index.html*

One “hull loss” per ***10 million*** USA commercial airline take-offs

International Air Transport Association (IATA) 2011 Safety Report

One million times…

1,000,000

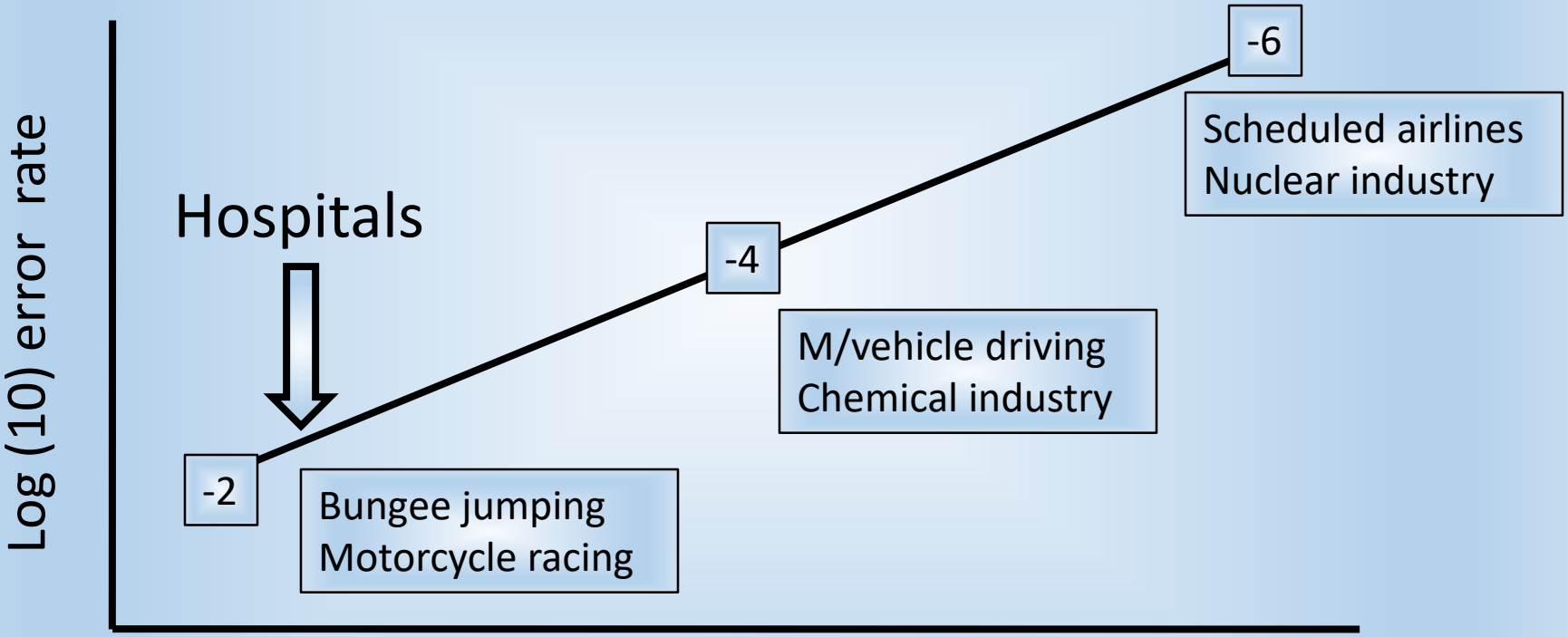
… greater chance of incurring harm in a hospital than on a commercial airliner

Reinertson J. Let's talk about error. BMJ 2000; 320: 730.

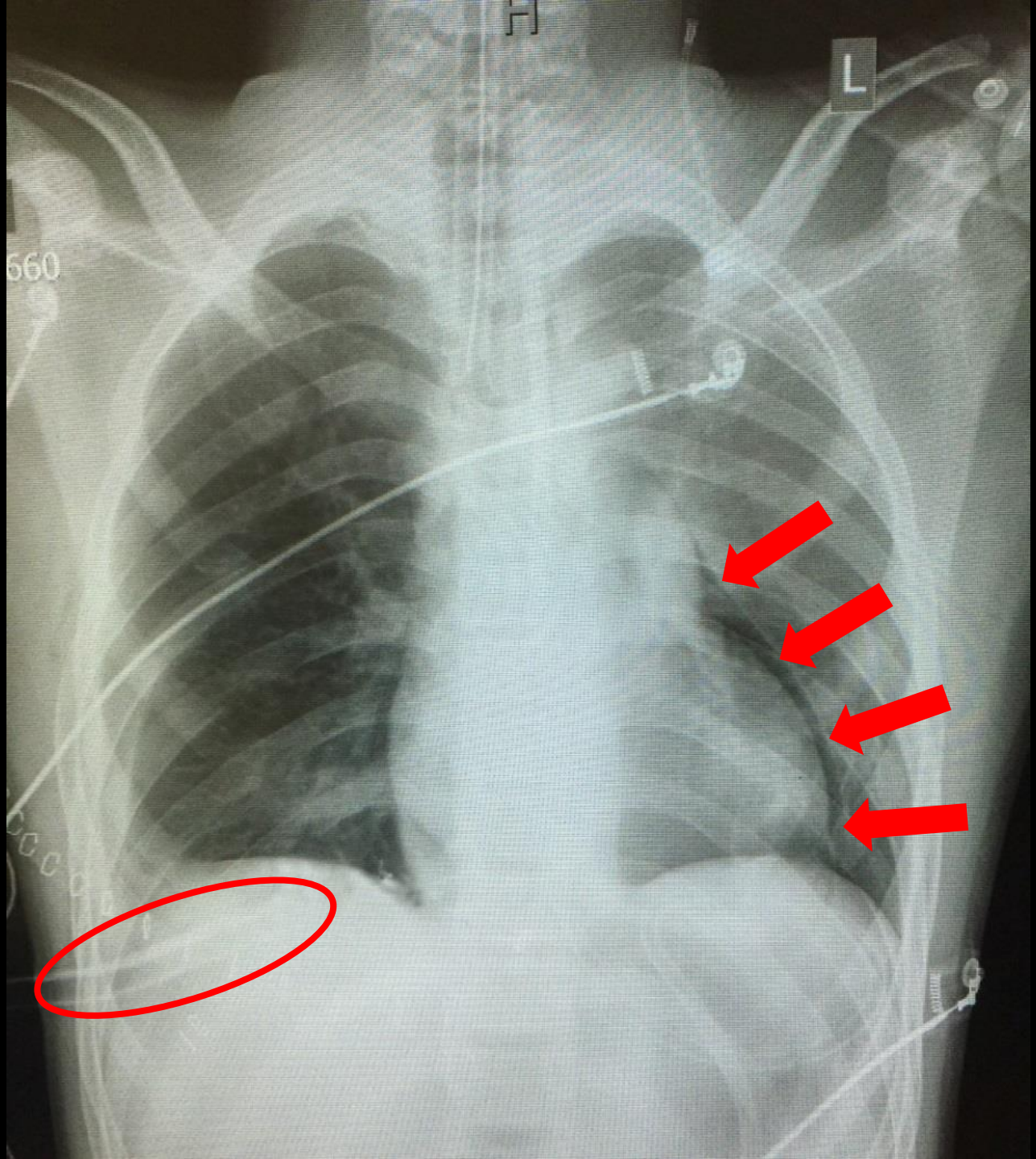
Reinertson J. Let's talk about error. BMJ 2000; 320: 730.


We need to bond with our data…

Error rates



Amalberti R, Vincent C, et al. The Paradoxes of Almost Totally Safe Transportation Systems. **Safety Science** 37: 109-26 (2001).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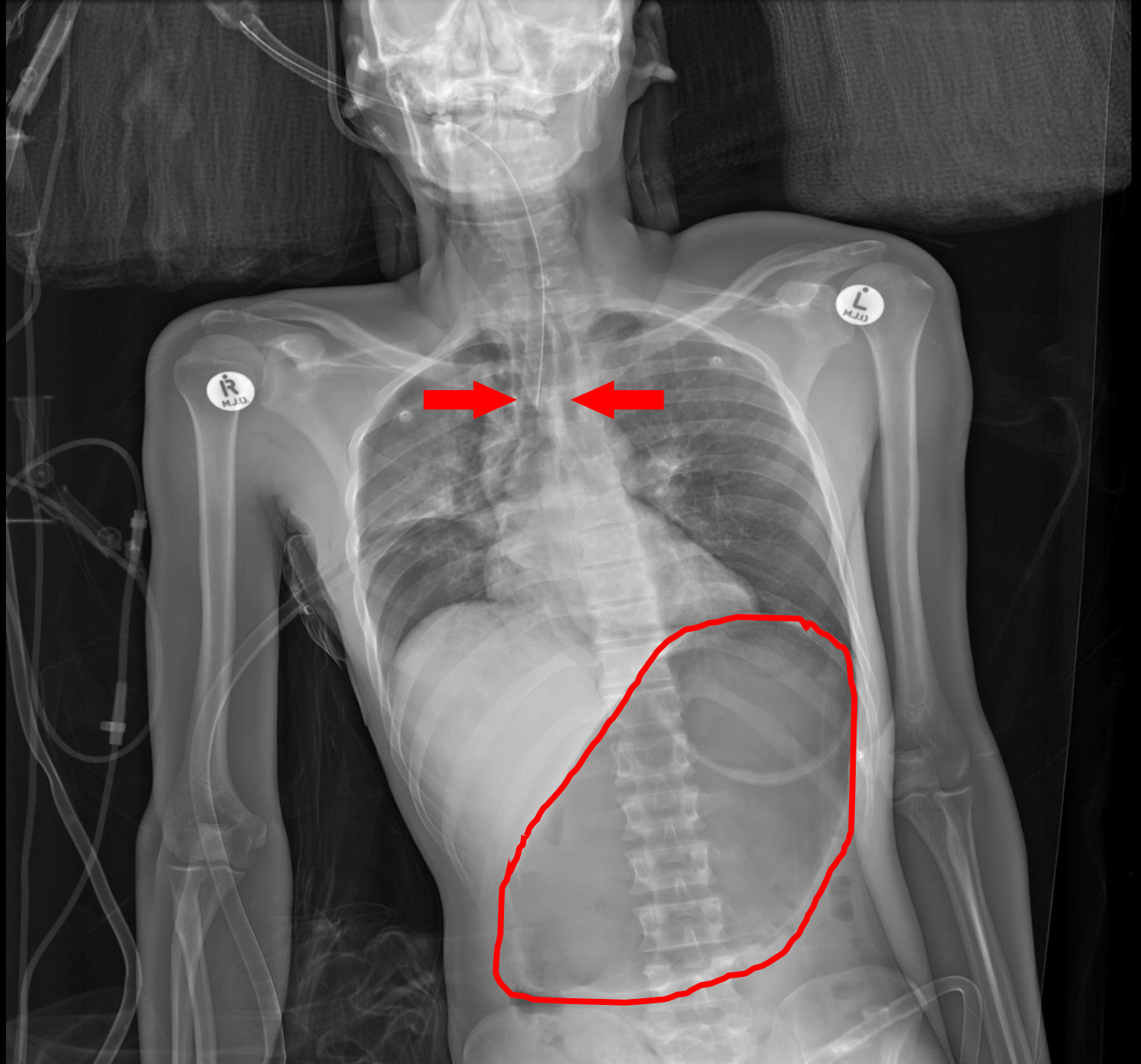


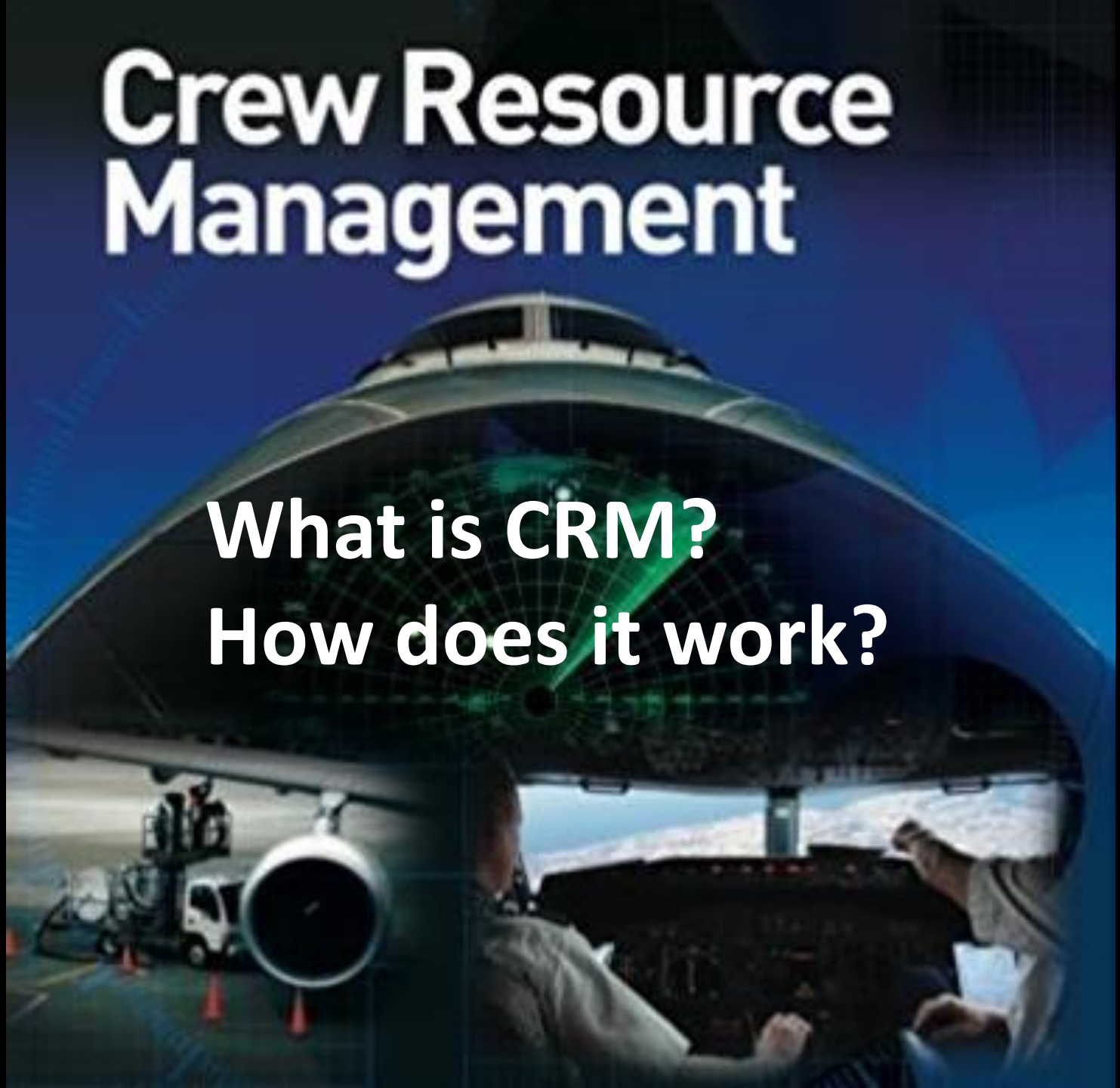

If there’s one thing we’re really good at in Medicine, it’s ***making mistakes***!

The question…

What is the airline industry getting ***right*** that the medical profession is getting ***wrong***?

IATA 2011 Statistics

World: 0.34 accidents/million departures
USA: 1 accident/10 million departures


Crew Resource Management
What is CRM?
How does it work?

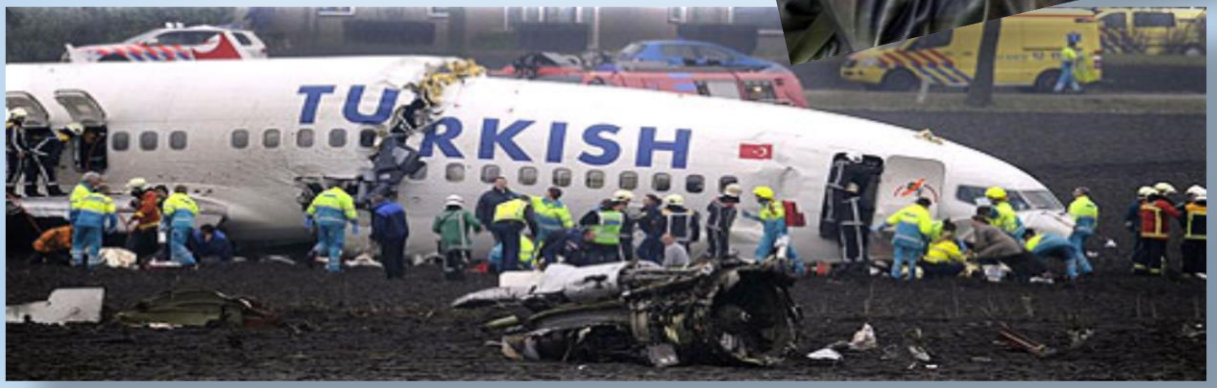
NASA: 1979 Flight Deck Workshop

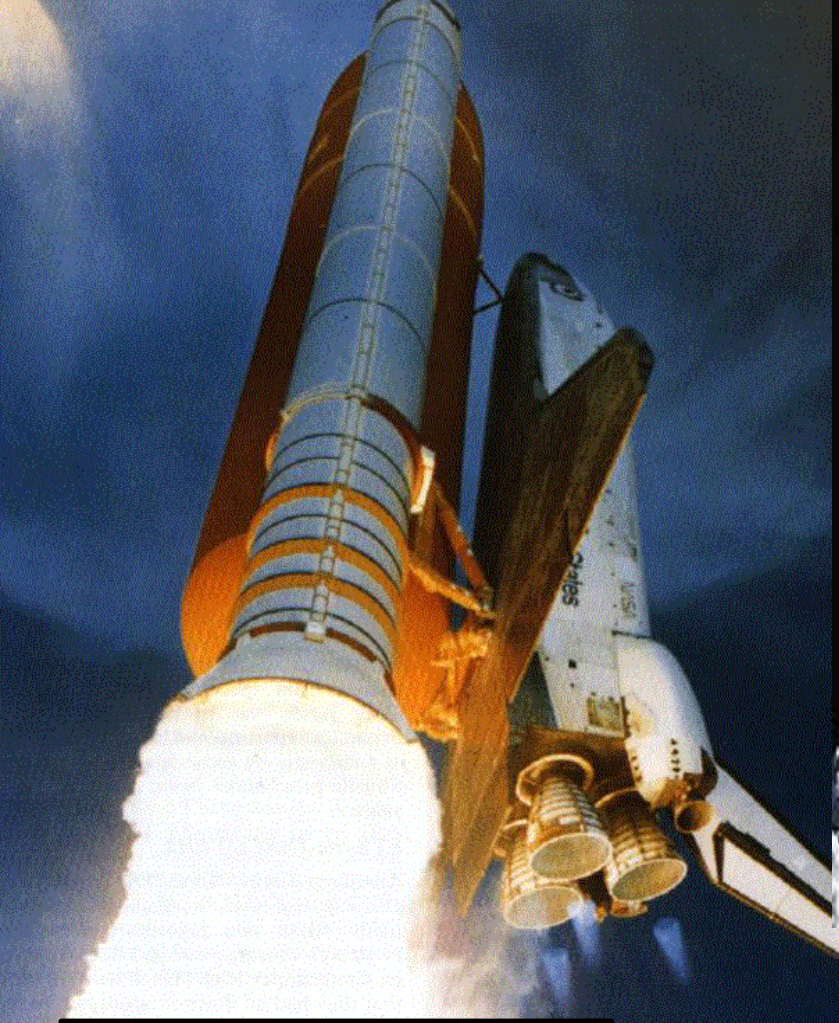
- **Improve aviation safety**
- **Cockpit Resource Management born**
  - **Cockpit crew**
  - **Entire crew**
  - **System**
  - **Organization**

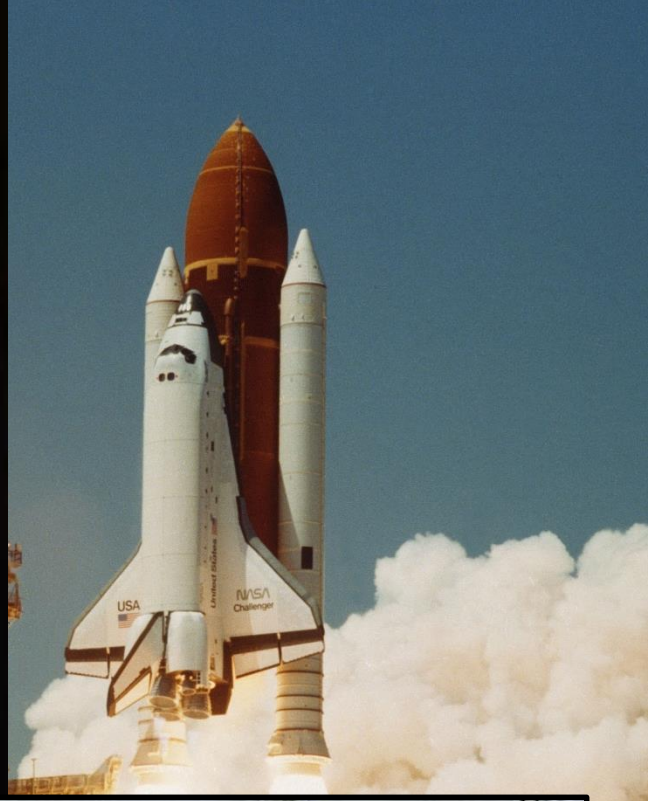
Crew Resource Management

Human components of failure

- **Interpersonal communication**
- **Decision-making**
- **Leadership**
- **Teamwork**
- **Situational awareness**
- **Stress and fatigue**



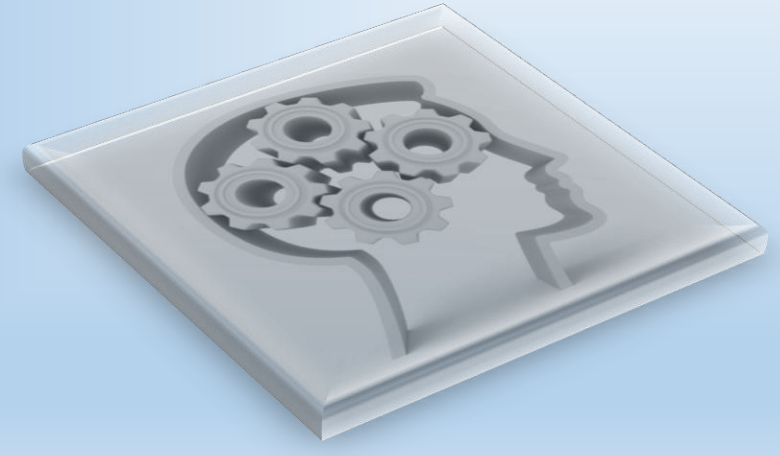



USA
NASA
Challenger


NASA

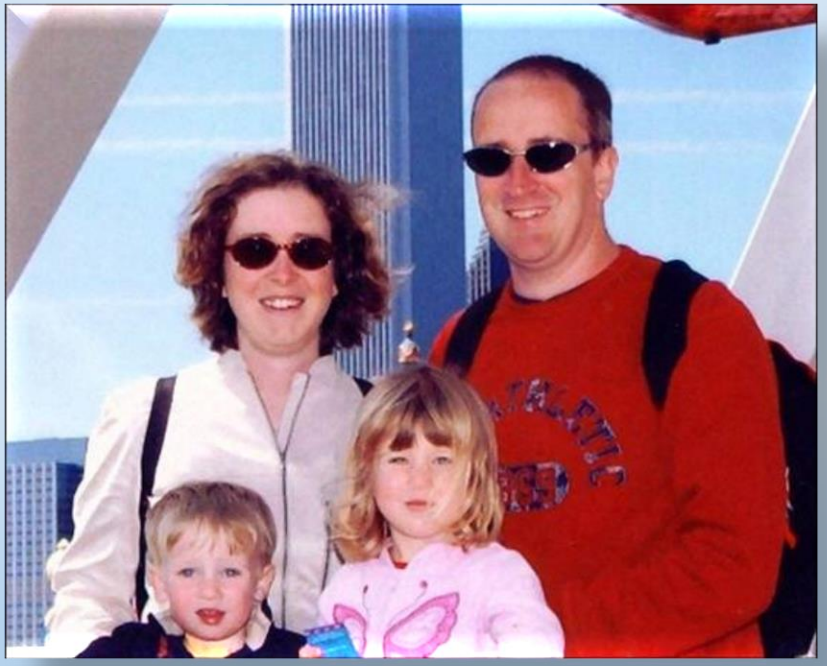
Non-technical skills
Basic psychology

1. Cognitive skills	2. Interpersonal skills	3. Psycho-physiology
• Situational Awareness • Decision-making	• Teamwork • Leadership • Communication	• Stress • Fatigue



The emphasis on non-technical skills?

Elaine Bromiley



Why non-technical skills??

Elaine Bromiley, 37 years old

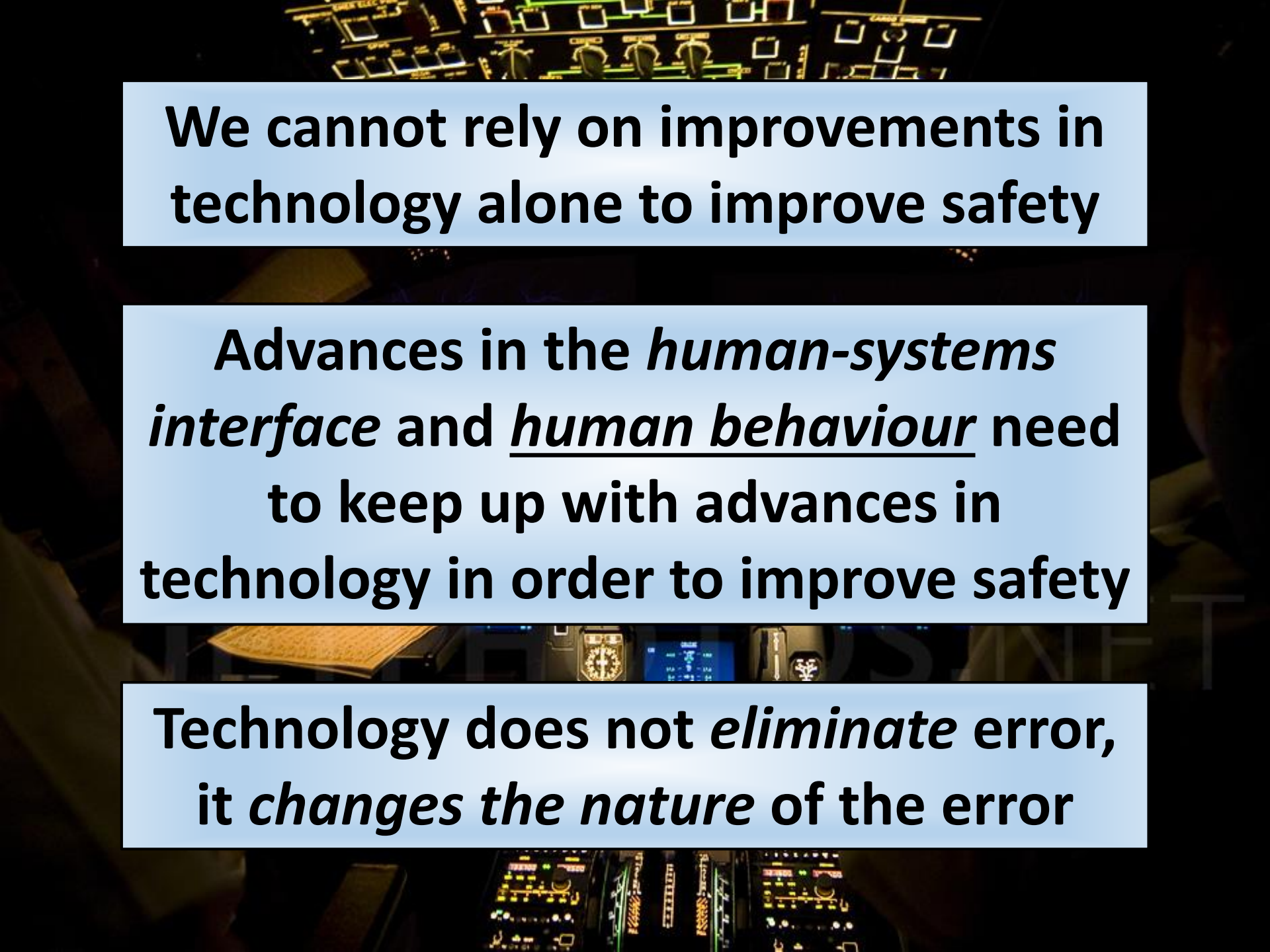
- Routine sinus surgery
- Can’t intubate, can’t oxygenate situation
- Tunnel vision – kept on doing the same thing

Why non-technical skills??

Elaine Bromiley inquest:

Found there were ***behavioural*** and ***cultural*** reasons for failure…¨

– not ***technical*** skills!



We cannot rely on improvements in technology alone to improve safety

Advances in the *human-systems interface* and *human behaviour* need to keep up with advances in technology in order to improve safety

Technology does not *eliminate* error, it *changes the nature* of the error

Complex systems fail in complex ways!

How one shoe can totally ruin a family photo!


Nikon

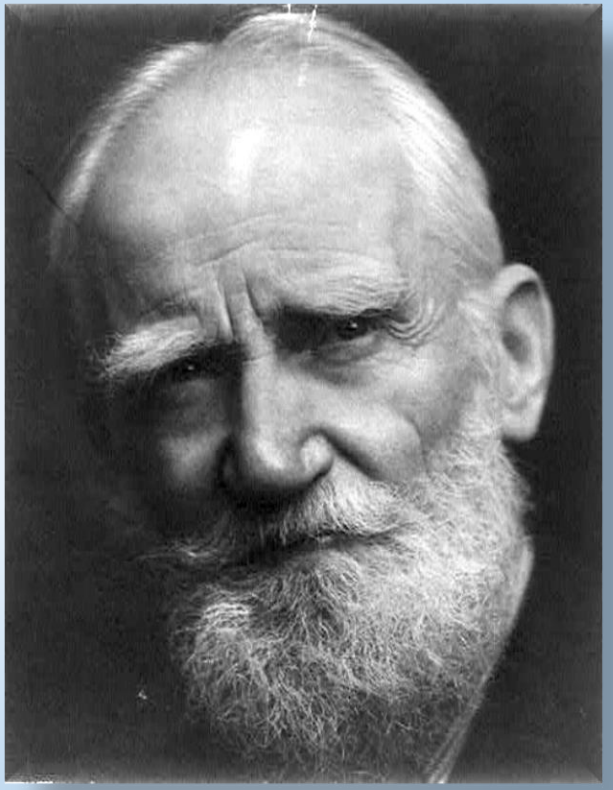
Successful task performance depends on the ***effective integration*** of both ***technical <u>and</u> non-technical*** skills for any given situation

Communication failures account for up to 80% of medical errors

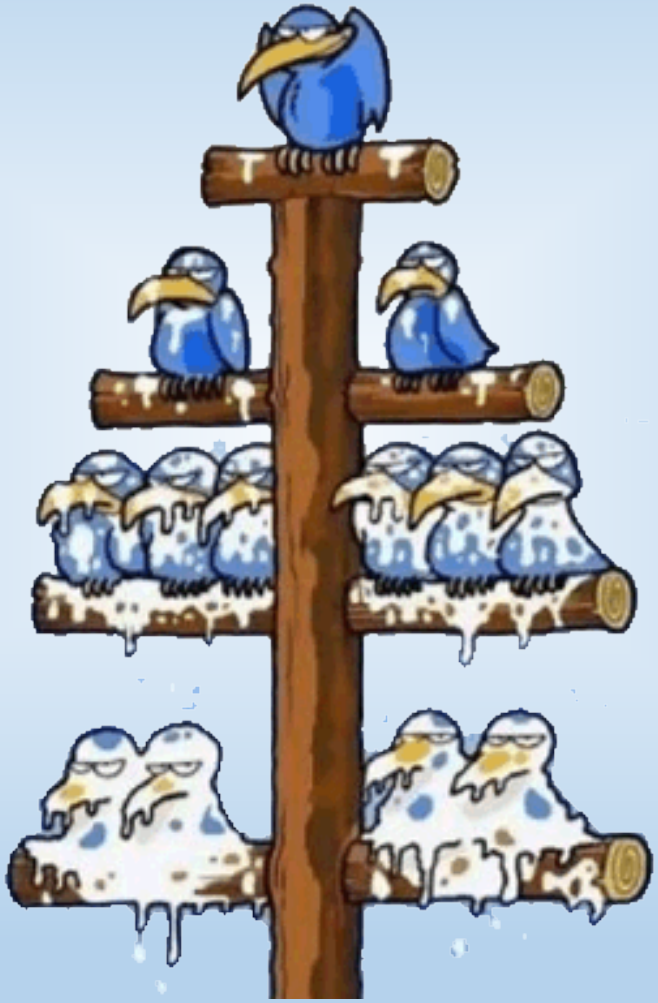
1. Woolf SH, Kuzel AJ, et al. A string of mistakes: the importance of cascade analysis in describing, counting and preventing medical errors. Ann Fam Med 2004; 2: 317 – 26.
2: NCPS Medical Team Training Programme. Executive Summary. Veterans Administration National Centre for Patient Safety.

"The single biggest problem with communication is the illusion that it has taken place."

George Bernard Shaw

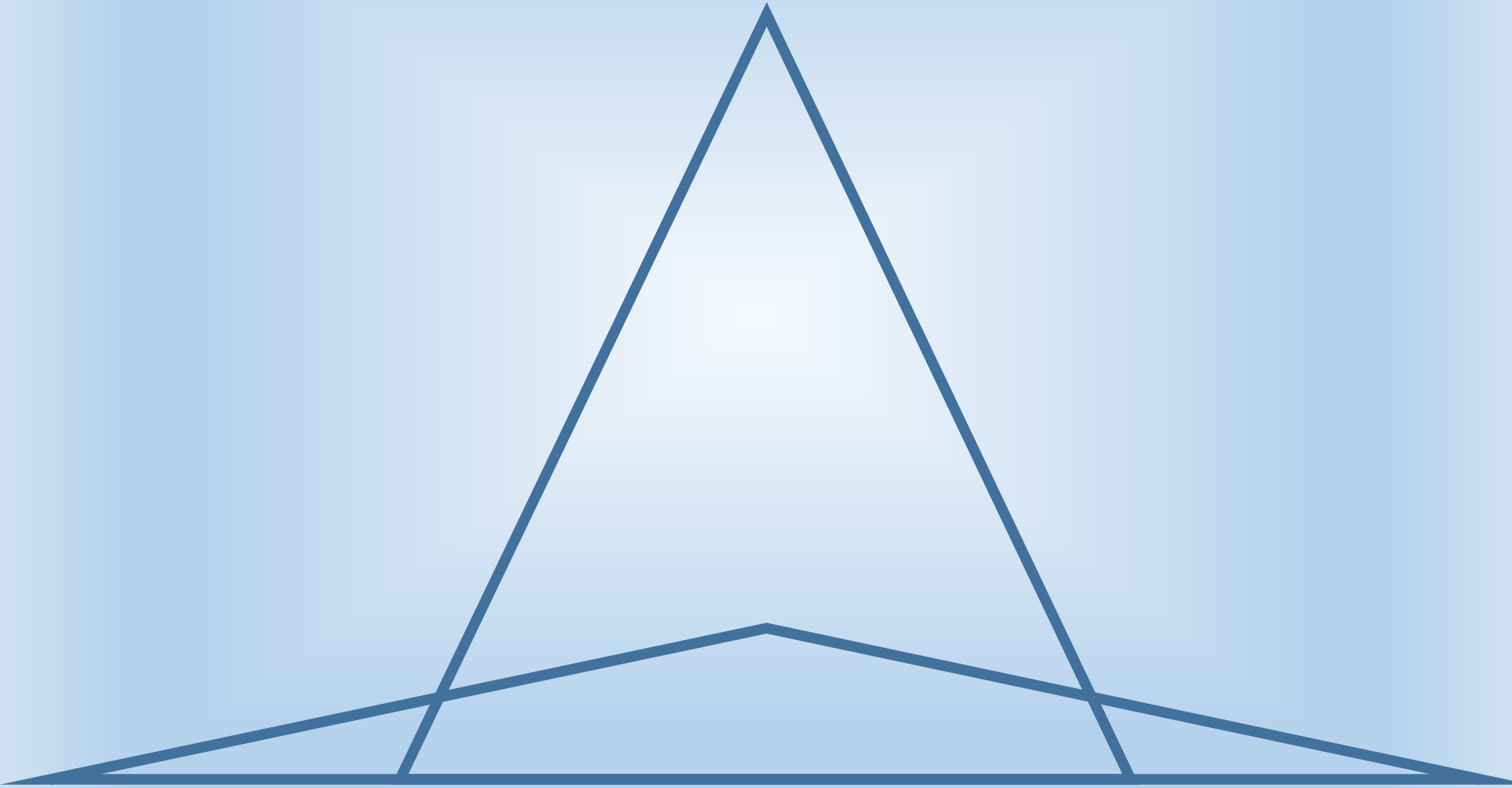


Command gradients



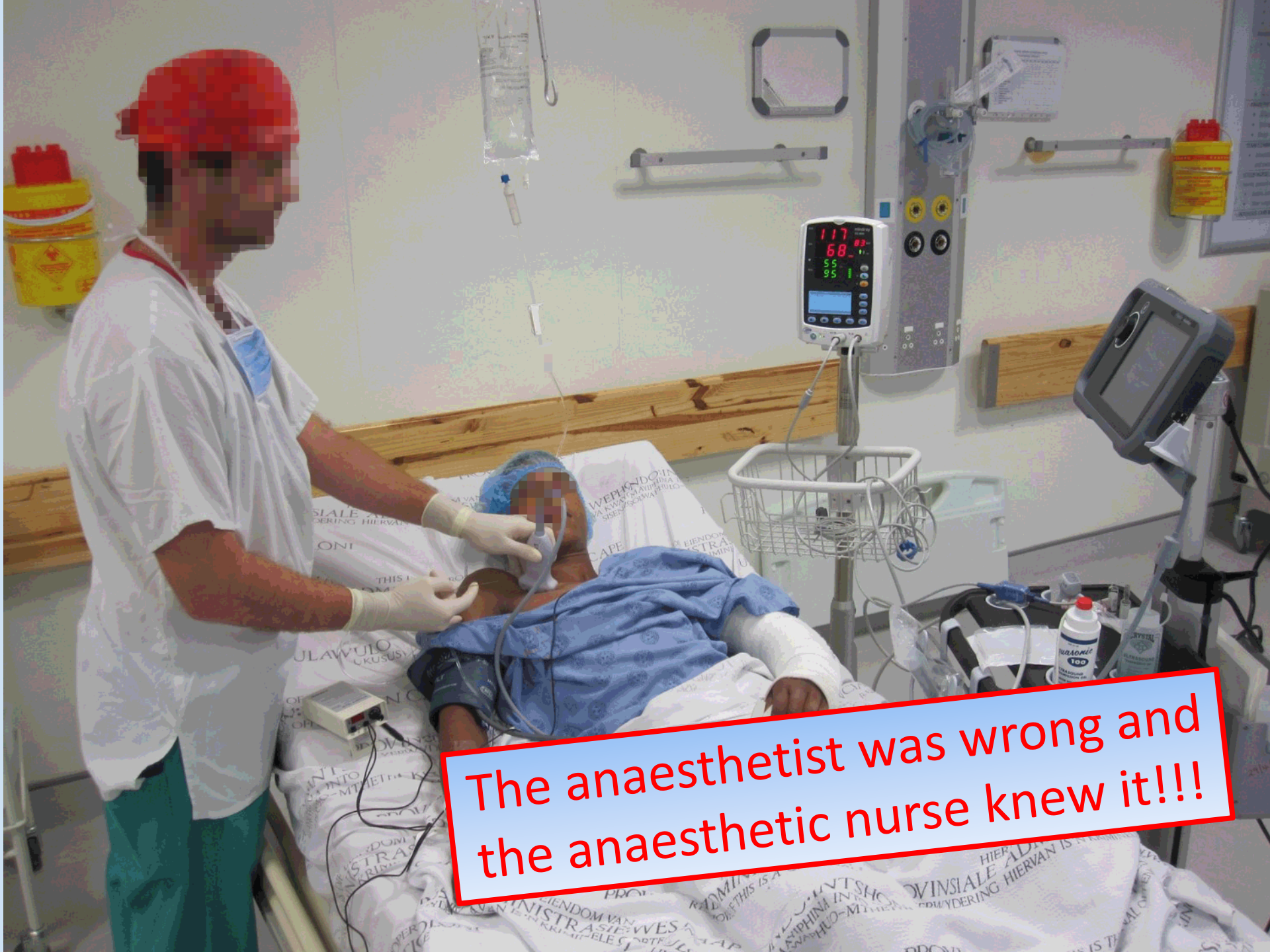
Command gradients

Also known as “Power-Distance Relationships”



Tenerife 1977, 583 people killed

KLM Captain misunderstood ATC – thought he was cleared for take-off


The anaesthetist was wrong and
the anaesthetic nurse knew it!!!

CRM philosophy

Our colleagues are a resource, and we must maximize *every* possible resource at our disposal

The bedrock of CRM – an *organizational culture*

Allows risk to be managed in a ***rational*** and ***appropriate*** way

Errors are seen as ***consequences*** and not as causes of failure

CRM accepts that:

- Humans <u>are</u> fallible
- Errors <u>are</u> to be expected

Nobody gets out of bed in the morning thinking:
"I wonder how badly I can screw things up today?"

"Our systems take wonderful people and put them in harm's way" – Dr Gerald Hickson

We need to fix bad systems rather than fire good people


ACCIDENTS ARE PROHIBITED
ON THIS ROAD
70RCC
38TF

More than half the general public believe that ***punishing*** doctors and nurses who have committed a clinical error is an effective prevention strategy

Blendon RJ, DesRoches CM, et al. Views of practicing physicians and the public on medical errors. New England Journal of Medicine 2002; 347: 1933 – 40.

Two approaches to human error

1. Person-based approach

Concentrates on the faults of the ***individual***

Errors and violations arising from aberrant mental processes

- Forgetfulness
- Inattention
- Carelessness
- Negligence
- Ignorance
- Recklessness
- Incompetence

2. Systems-based approach

Assumes humans ***are*** fallible…

Errors are to be ***expected***

Gives attention to error-provoking ***conditions*** within the workplace…

Known as ***latent errors***… or "***error traps***"

Systems-based approach

Pays atention to ***organizational factors*** that create precursors to individual errors

Asks **WHY** there are gaps in knowledge, experience or ability

Systems-based approach

Not important who blundered

How and why did error defences fail?

How did we allow a colleague to fall into an 'error trap'?

Systems-based approach

Recognises:

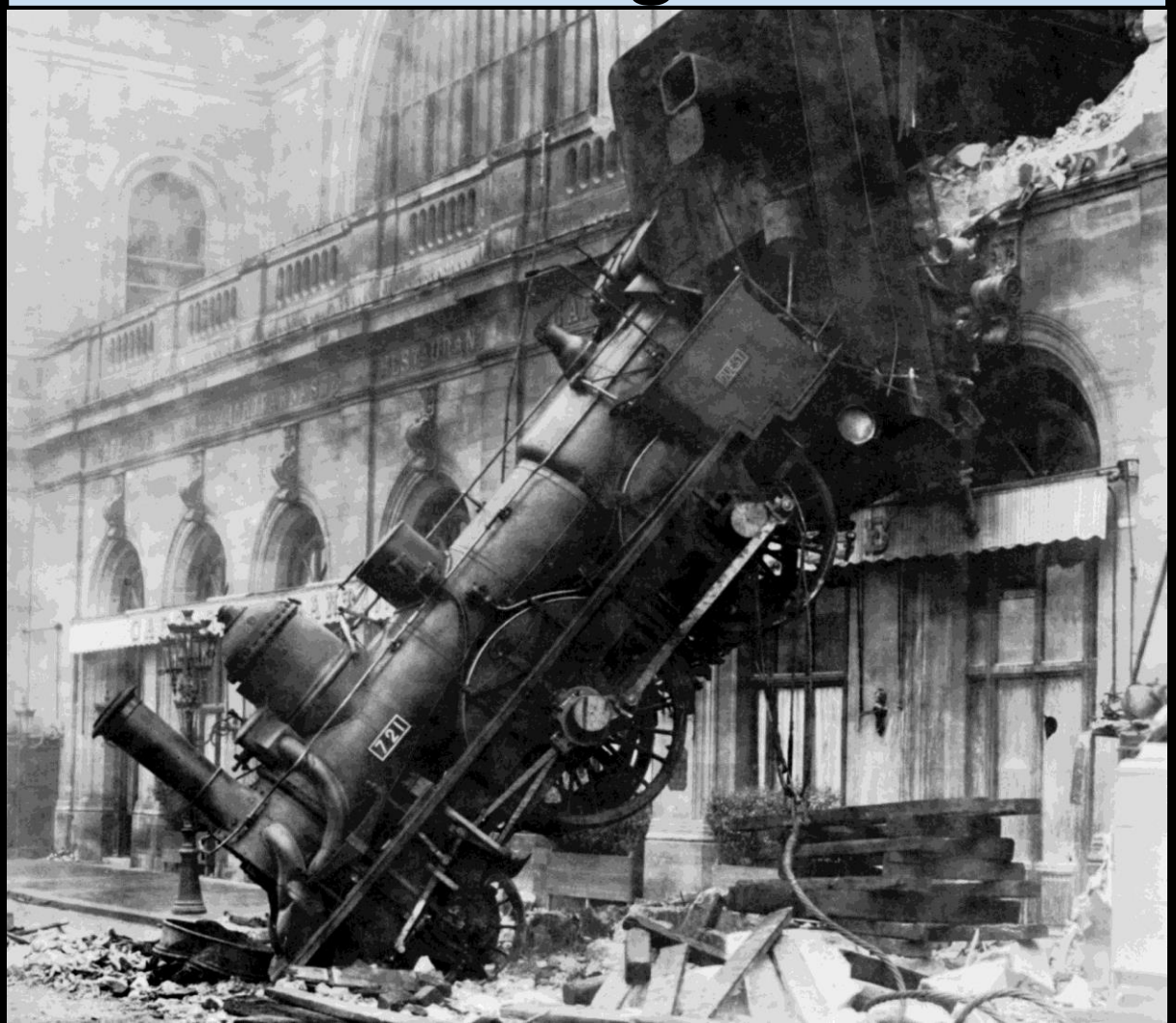
We cannot change the fallible ***human*** condition

But we <u>can</u> change the ***conditions*** under which fallible humans work

We need to make it harder for people to do something wrong, and easier for them to do it right

We need to designs systems in which it is difficult for humans to make errors

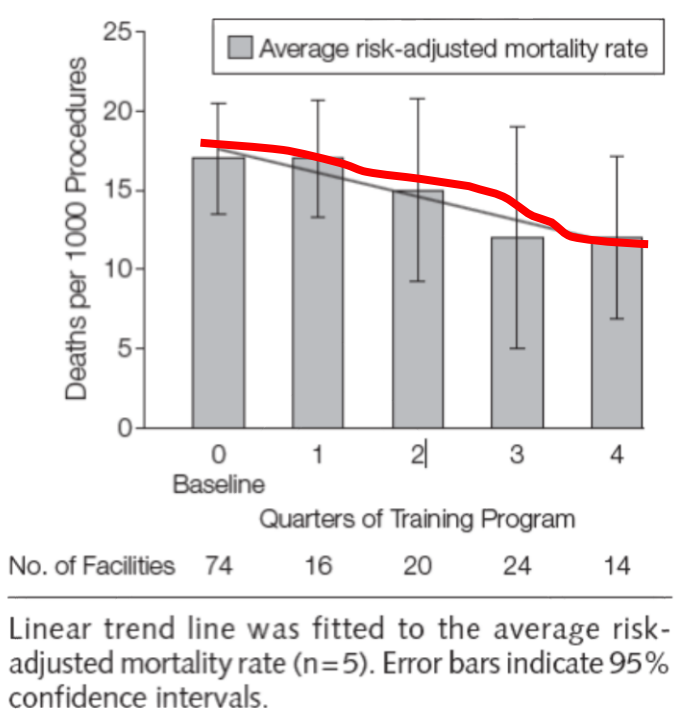
Human error can never be eliminated, but it ***can*** be managed




mmol/L
Total
Albumin
Total B
Direct
Alanine
Alkalin
Gamma g
evidence
Based
Medicine
blc

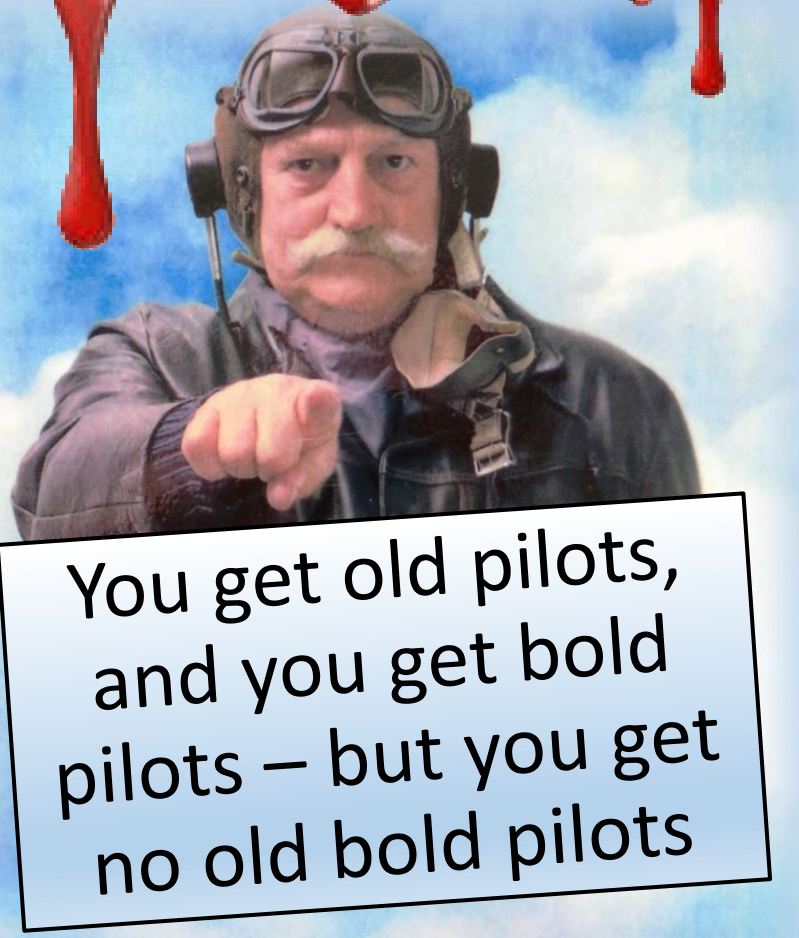
Additional dose-response relationship with further quarterly reduction of 0.5 deaths per 1000 procedures

What if this was a drug?



Neily J, Mills P, et al. Association between implementation of a medical team training programme and surgical mortality. JAMA 304 (15): 1963 – 1700 (2010).

Aviation safety rules are written with the blood of dead pilots

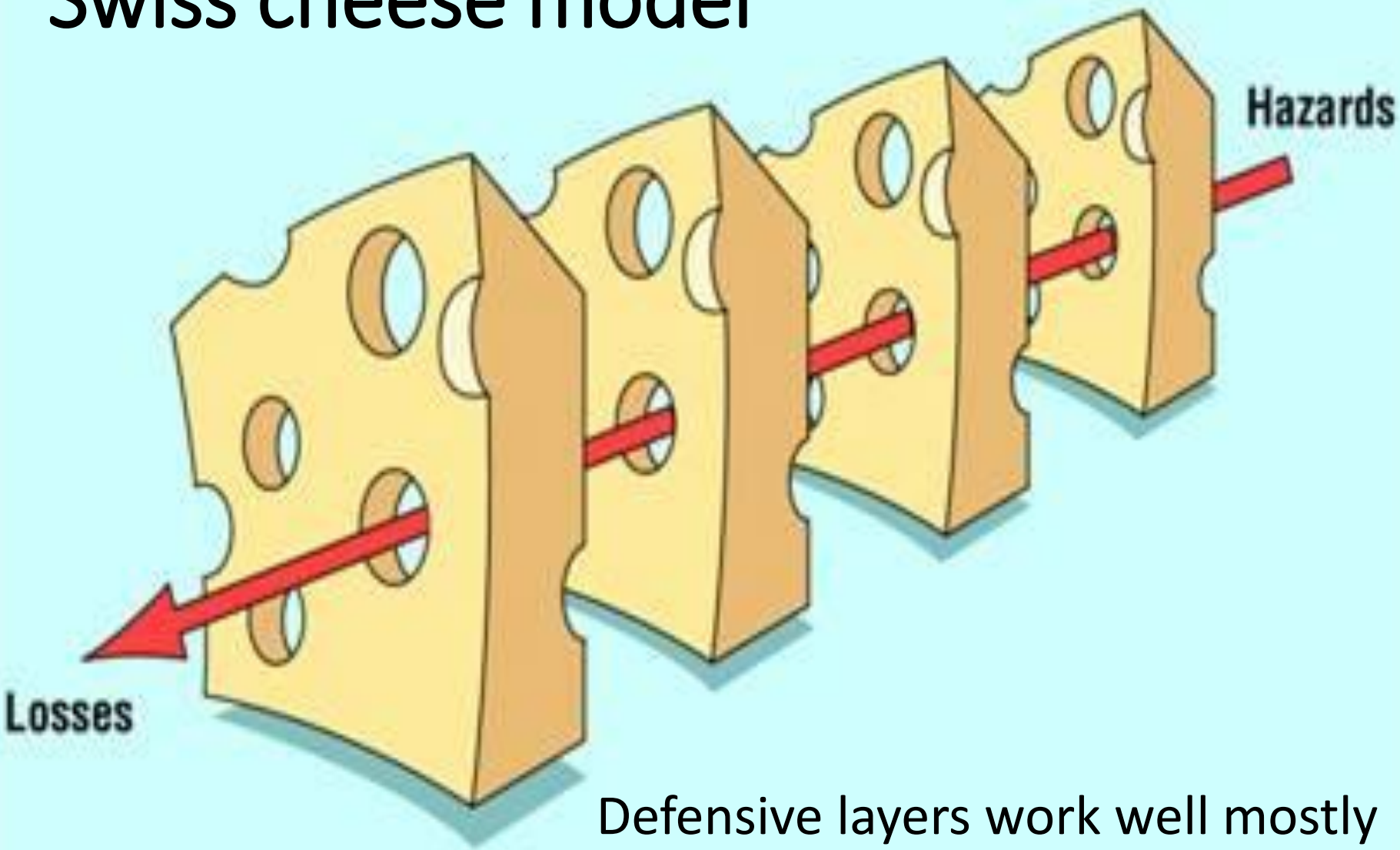


If doctors died with their patients, they'd take a great deal more care…

James Reason

High-tech systems have many defensive layers – alarms, physical barriers, automated shut-downs, etc.

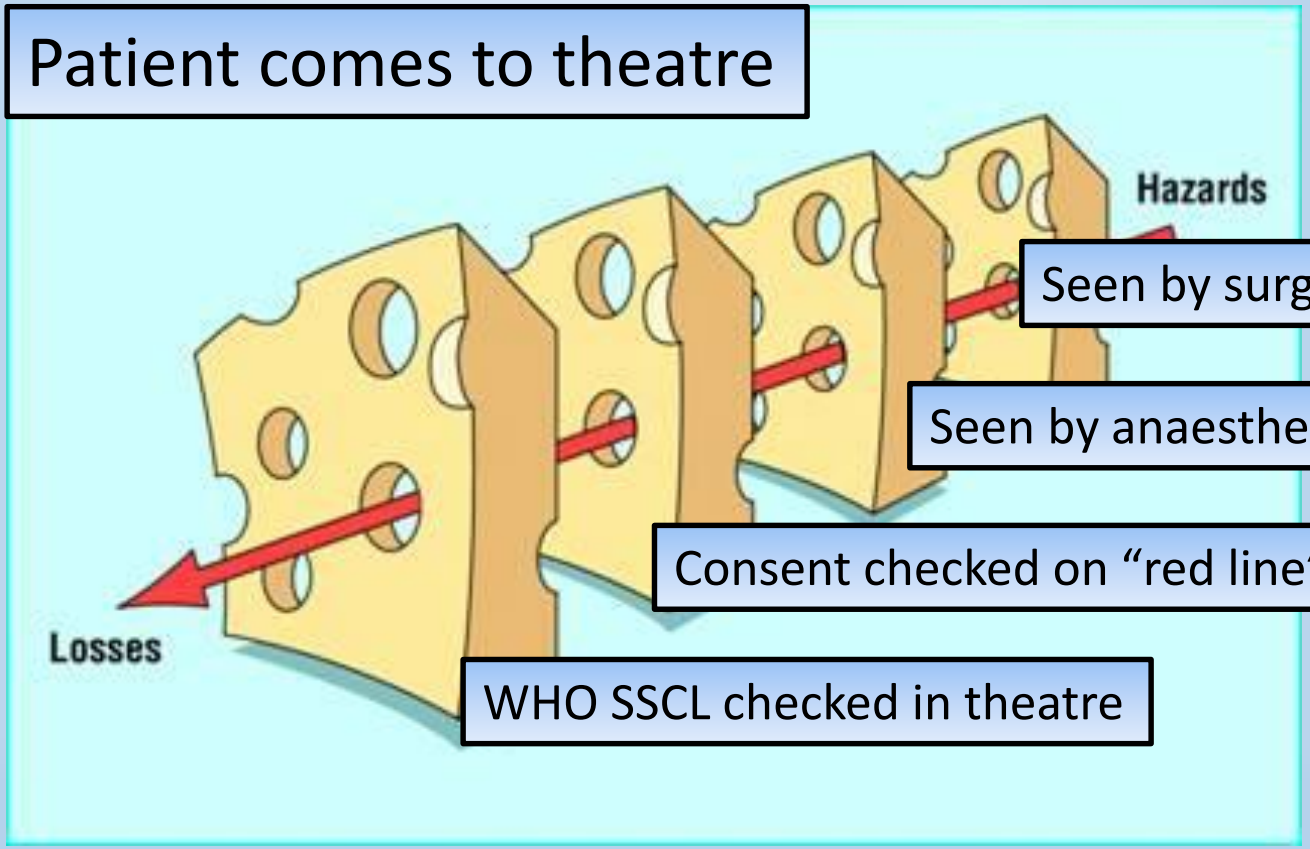
Swiss cheese model



Defensive layers work well mostly

But there are always weaknesses!

Holes in multiple defenses allow a *"trajectory of accident opportunity"*



James Reason

Single failures are often compensated for

But several simultaneous failures…

– a “***chain of failures***” –

Result in an ACCIDENT!


NATIONAL
GEOGRAPHIC
An accident is the result of a complex intertwined web of events

Mayo Clinic 'Never Events' study

Sentinel Adverse Events

Five-year prospective study:

- ***Identified 69*** 'never events' across ***1,5 million*** procedures;
- ***628*** human factors contributed to the ***69*** events
- ***4 to 9*** human factors per event¨

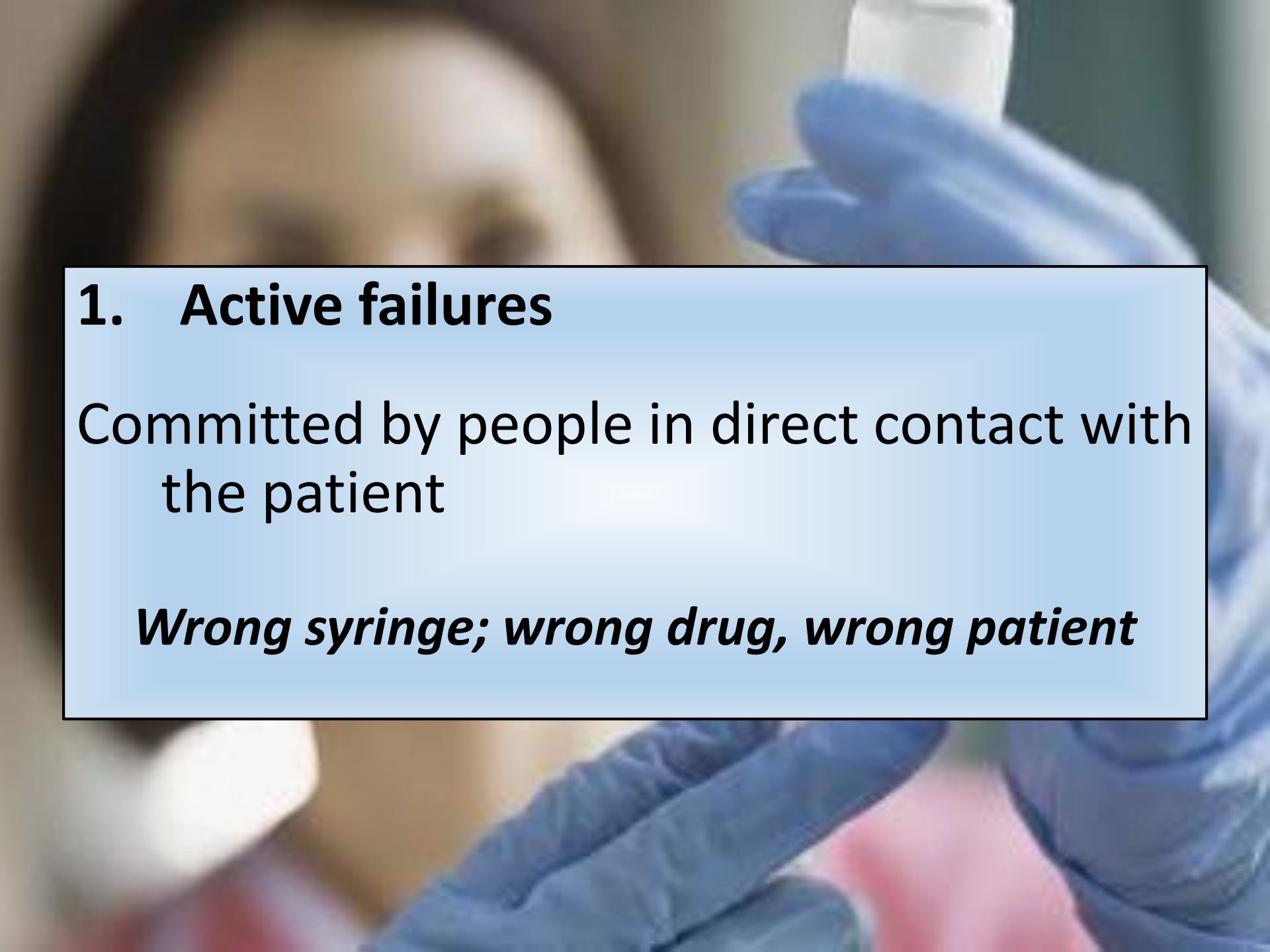
Multiple things have to go wrong for a 'never event' to occur!¨

Often referred to as a "cascade of errors"

Thiels CA, Lal TM, et al. Surgical never events and contributing human factors. Surgery. **2015** Aug; 158(2): 515-21. Epub 2015 May 29.

Two types of failures

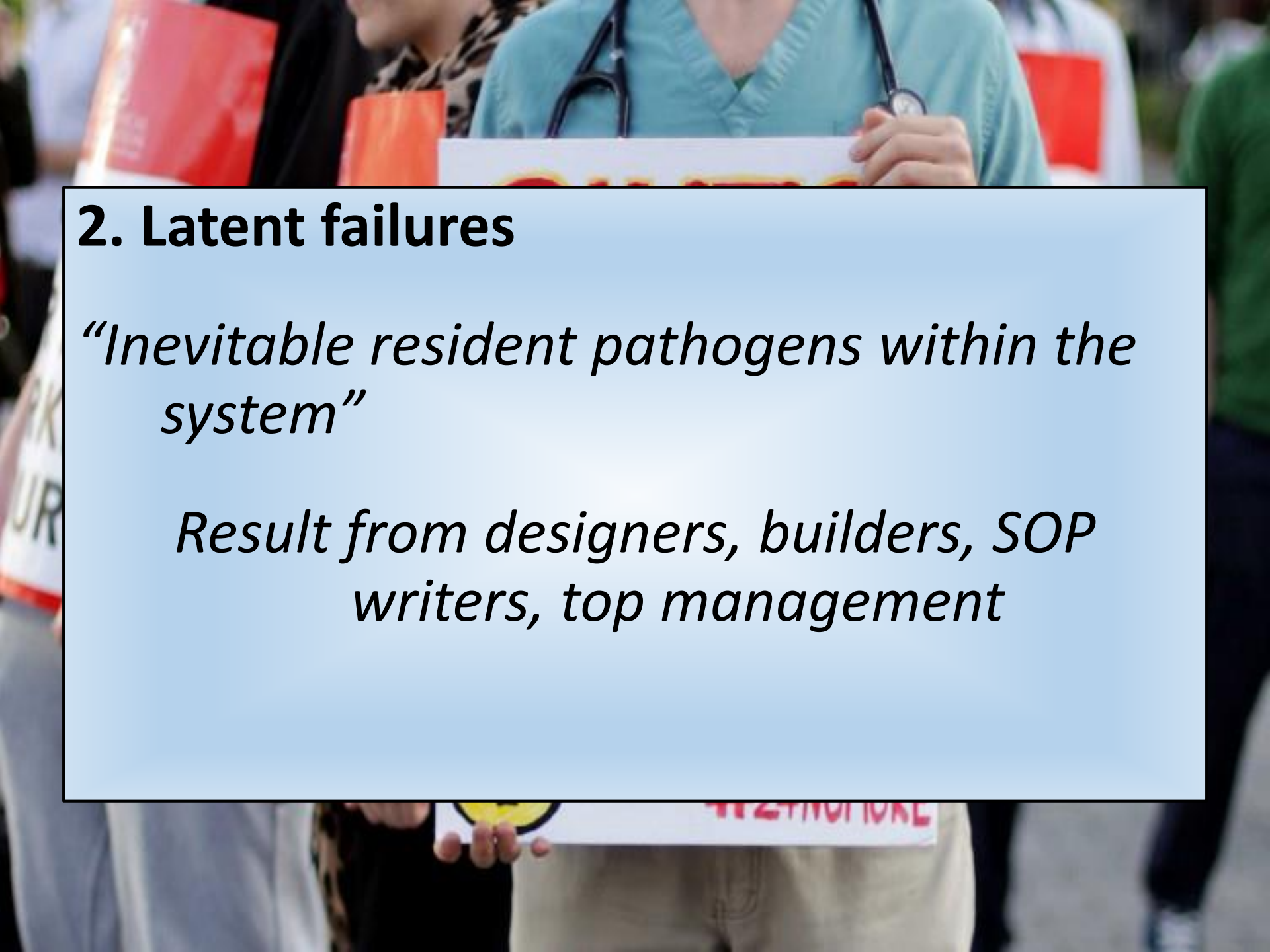
Exxon Valdez



1. **Active failures**

Committed by people in direct contact with the patient

Wrong syringe; wrong drug, wrong patient



2. Latent failures

"Inevitable resident pathogens within the system"

Result from designers, builders, SOP writers, top management

Latent failures

1. Error-provoking conditions within workplace

   (fatigue, under-staffing, inexperience)

2. Long-lasting weaknesses in defenses

   (untrustworthy alarms, unworkable procedures)

Not under the control of healthcare practitioners!

Latent failures

May lie dormant in a system for years

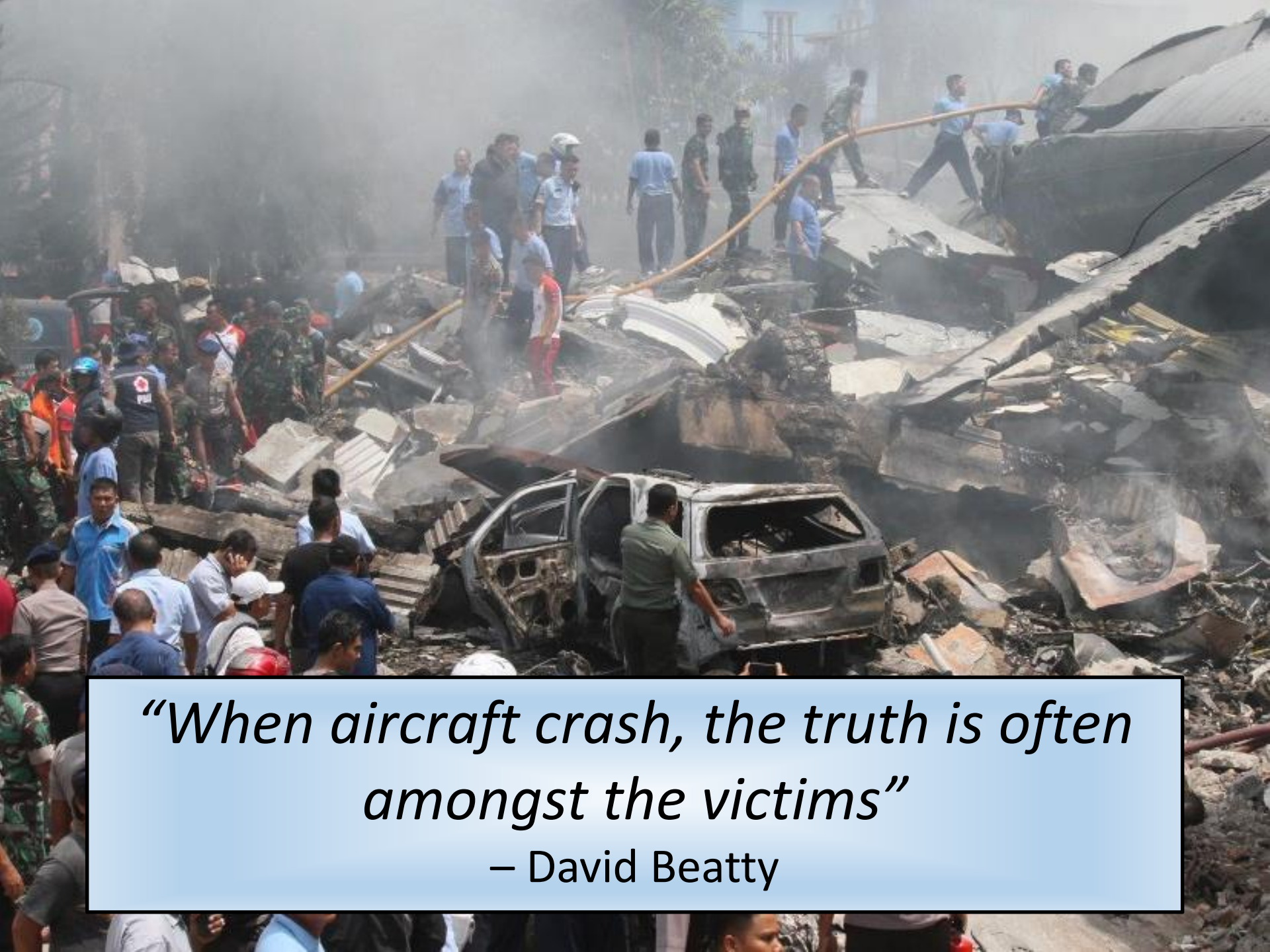
Before combining with active failures and local triggers:

"trajectory of accident opportunity"

Trajectory of accident opportunity

ERROR MANAGEMENT

Moving from a culture of silence to a culture of safety



“When aircraft crash, the truth is often amongst the victims”

– David Beatty

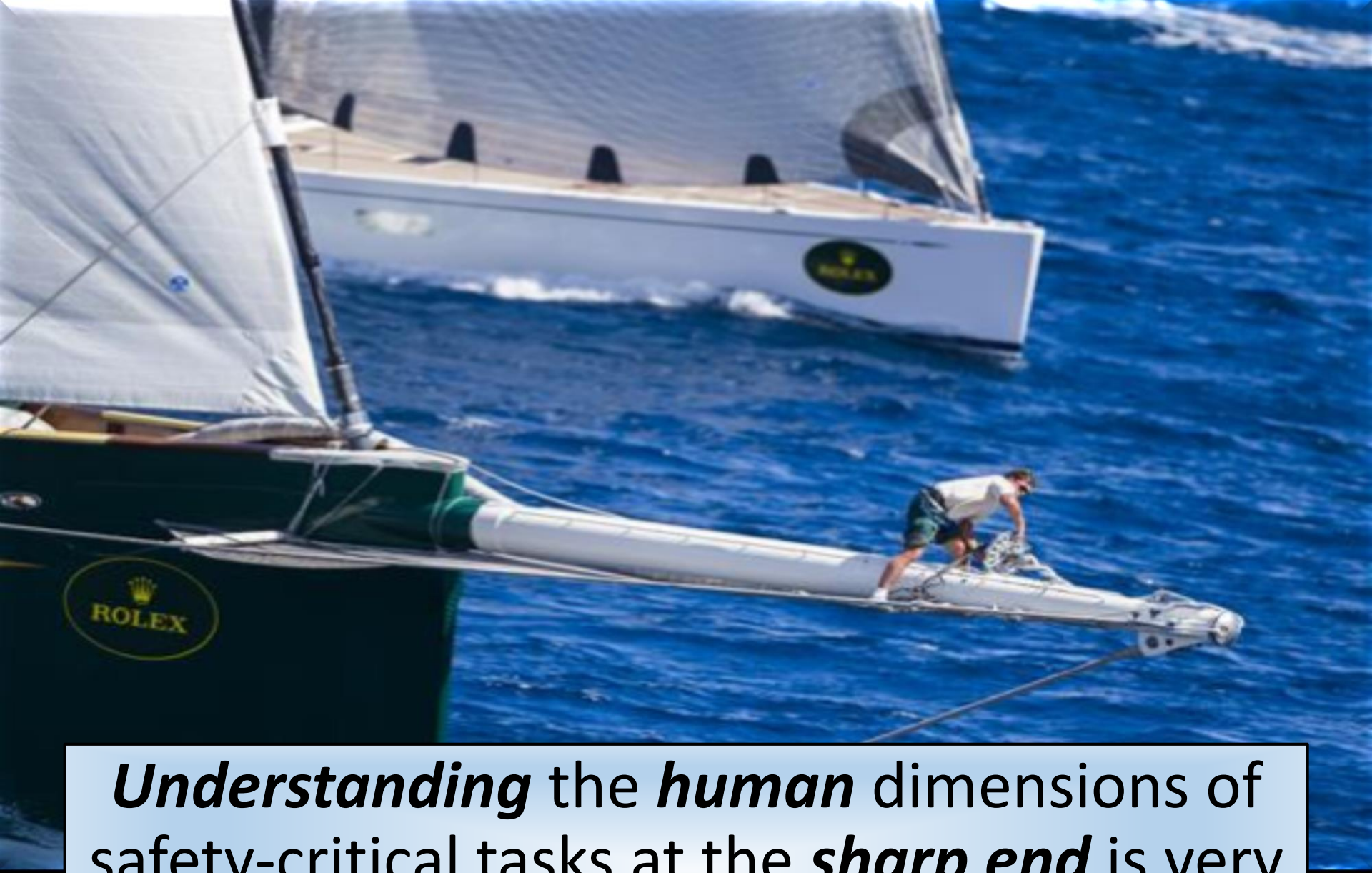
What happens in Vegas stays in Vegas

Up to 80% of accidents are attributable to ‘human factors’

Reason J. (1990) Human Error
Cambridge University Press

We know that:

- Humans make ***frequent*** errors
- In patterned and ***predictable*** ways

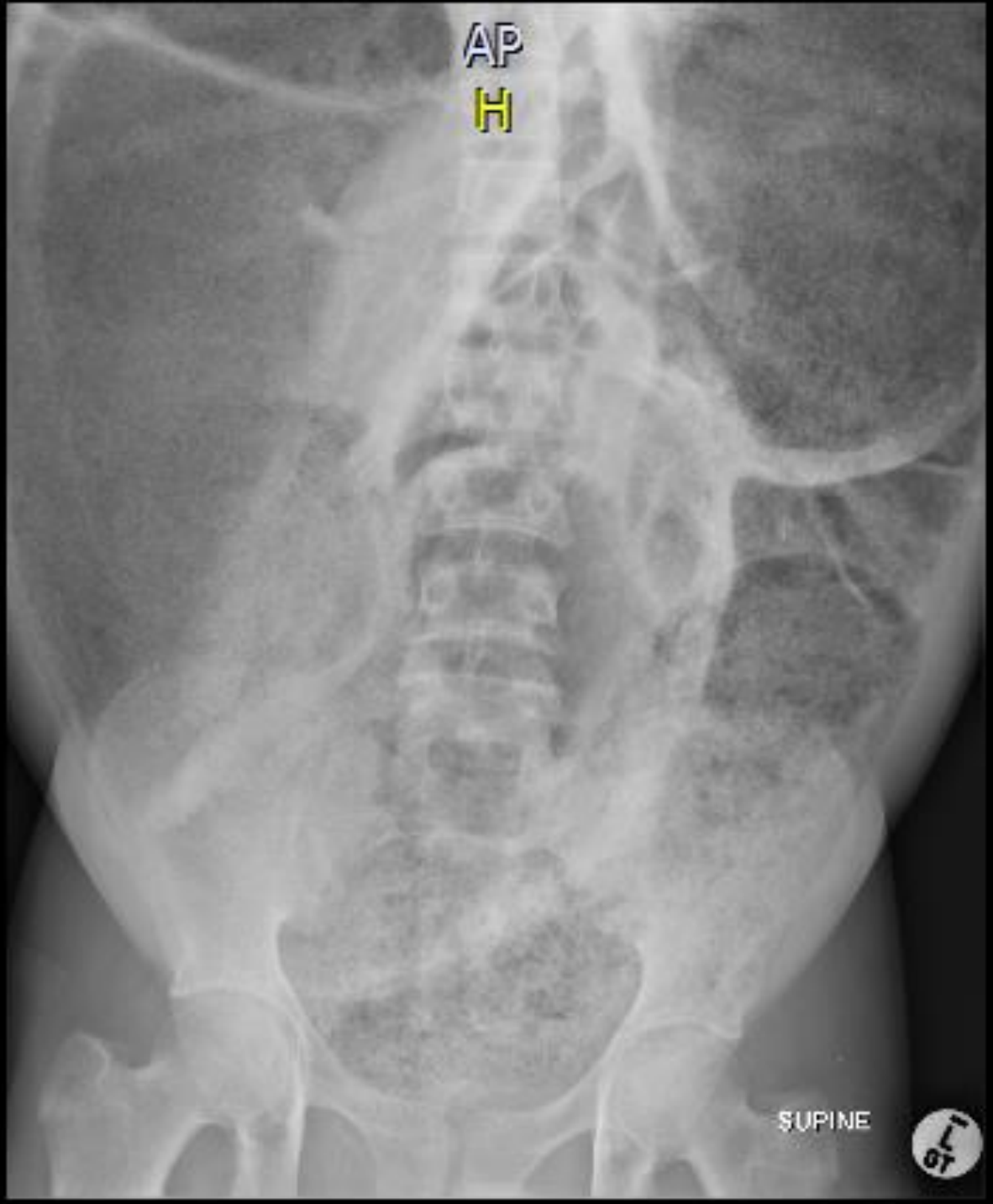


Understanding the ***human*** dimensions of safety-critical tasks at the ***sharp end*** is very important – in managing human error

Safety culture

- Errors **<u>will</u>** happen
- No value in blaming individuals
- Team culture important
- ***Safe staff*** report more errors
- Healthcare systems that admit to ***nothing*** have the most to ***hide***!¨

If you are not reporting your errors,
you are not ***managing*** your risk!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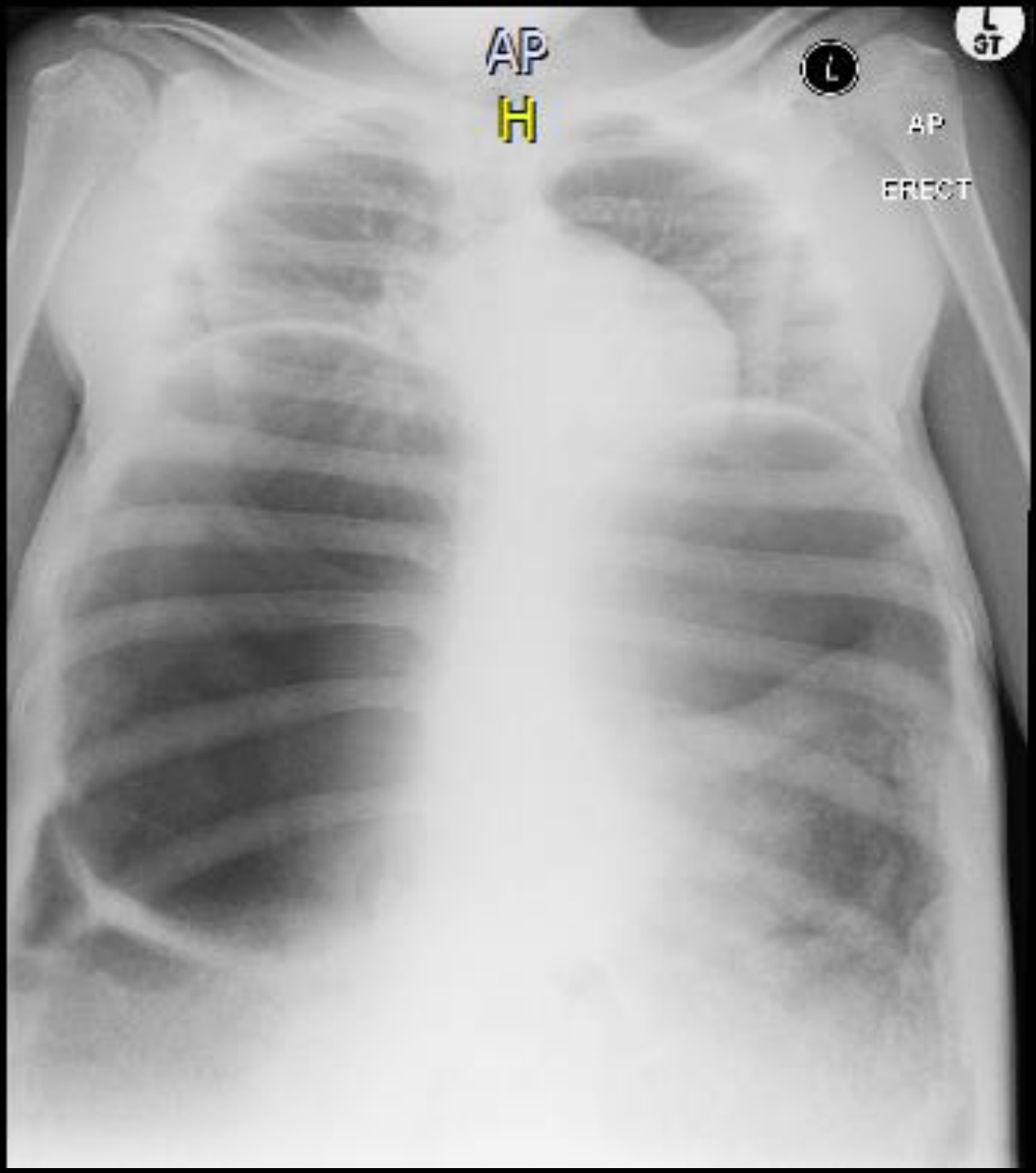
AP
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AP
ERECT

Incident-reporting

- There should be no punishment for safety-related infringements
- We should ***want to know*** what is going on¨

"Immunity from prosecution" and freedom from ridicule is mandatory!

Truth and reconciliation go hand in hand


THE TRUTH
MAY HURT
BUT SILENCE
KILLS

“The response to acts that hurt should not be more acts that hurt”

When an error occurs…

We should share it ***proactively***, so that:

1. We can ***learn*** from it
2. We can ***fix*** what needs fixing
3. We can ***prevent*** it from happening ***again***

Free lessons

1. Learning “free lessons”
2. Teaching free lessons

We must learn from every error that we and our colleagues make!

The only REAL mistake is the one from which we learn nothing!

We have an ***ethical responsibility*** to our patients and our colleagues to signpost the potholes in the road!

Reporting

- Without the ***psychological freedom*** to report, there can be no analysis
- Without analysis, ***latent conditions*** cannot be discovered
- Without being able to discover latent conditions, ***malignant influences cannot be contained and removed***

A positive note…


Humans *can*
be heroes!

In summary

CRM is an ***error prevention*** me

How could we *not* want to embrace such a programme?

An ***lessons*** through safe and effective ***error reporting***

Never forget to be afraid!

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Mitchell's Plain Hospital

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