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What is an error?

- The failure of planned actions to achieve their intended outcome.

- A deviation between what was actually done and what should have been done.

Two ways of <u>not</u> achieving your goal

- The plan may be OK, but the actions don't go as planned. These are called *slips* and *lapses.*

- The actions may go as planned, but the plan is inadequate to achieve the desired goal. These are called *mistakes.*

Perspectives on error

- The person model
- The legal model
- The system model

Person model

- Sees errors as the product of wayward mental processes: forgetfulness, inattention, distraction, carelessness, etc.
- Remedial measures directed primarily at the 'sharp end' error-maker: naming, blaming, shaming, retraining, fear appeals, writing another protocol, etc.

Legal (or moral) model

- Responsible professionals <u>should not</u> make errors (duty of care).
- Such errors are rare but sufficient to cause adverse consequences.
- Bad people make bad errors (just world hypothesis).
- Errors with bad consequences are negligent or reckless and deserve deterrent sanctions.

Common features

Person → Both focus on the individual → Isolation Blame Sanctions

Legal →
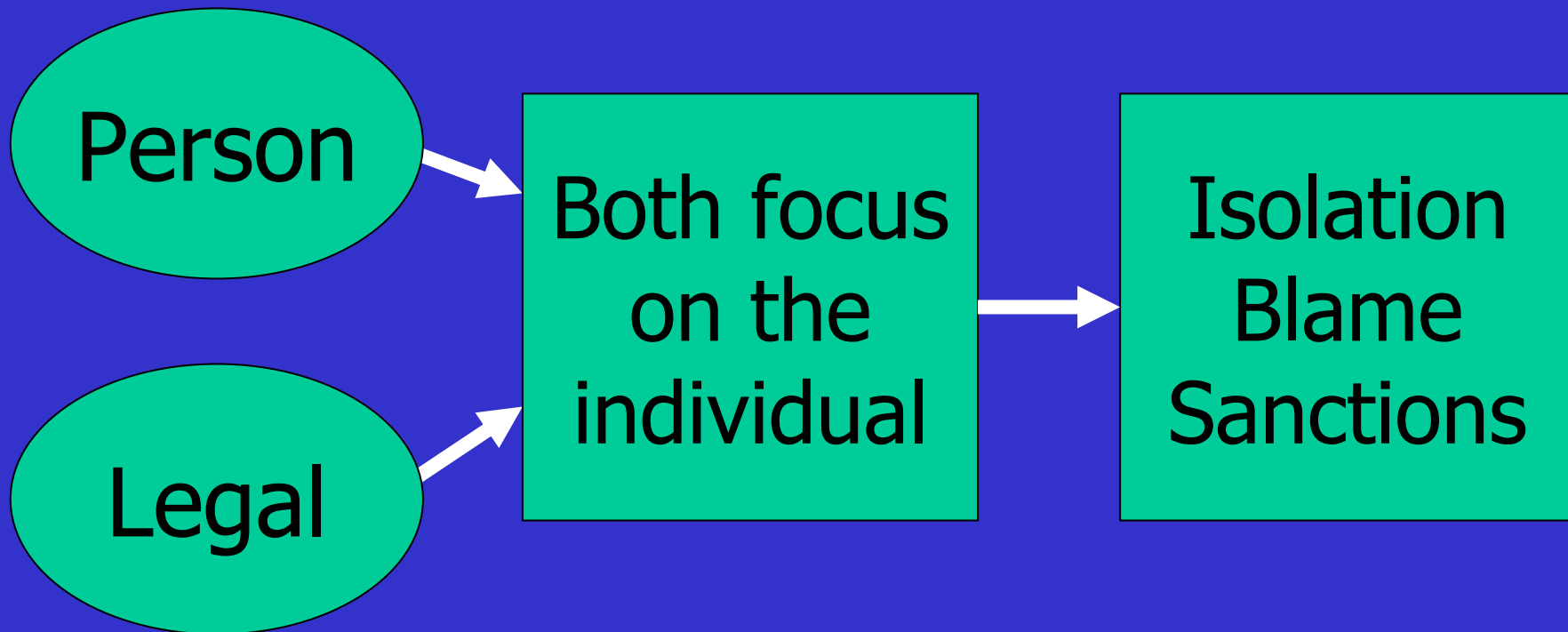
System model

- Errors are commonplace: an enduring fact of life.
- They are only occasionally necessary to cause adverse events.
- 'Sharp-enders' are more likely to be the inheritors than the instigators.
- Adverse events are the product of many causal factors.
- Remedial efforts directed at removing error traps and strengthening defences.

A system model of accident causation

Some holes due to active failures
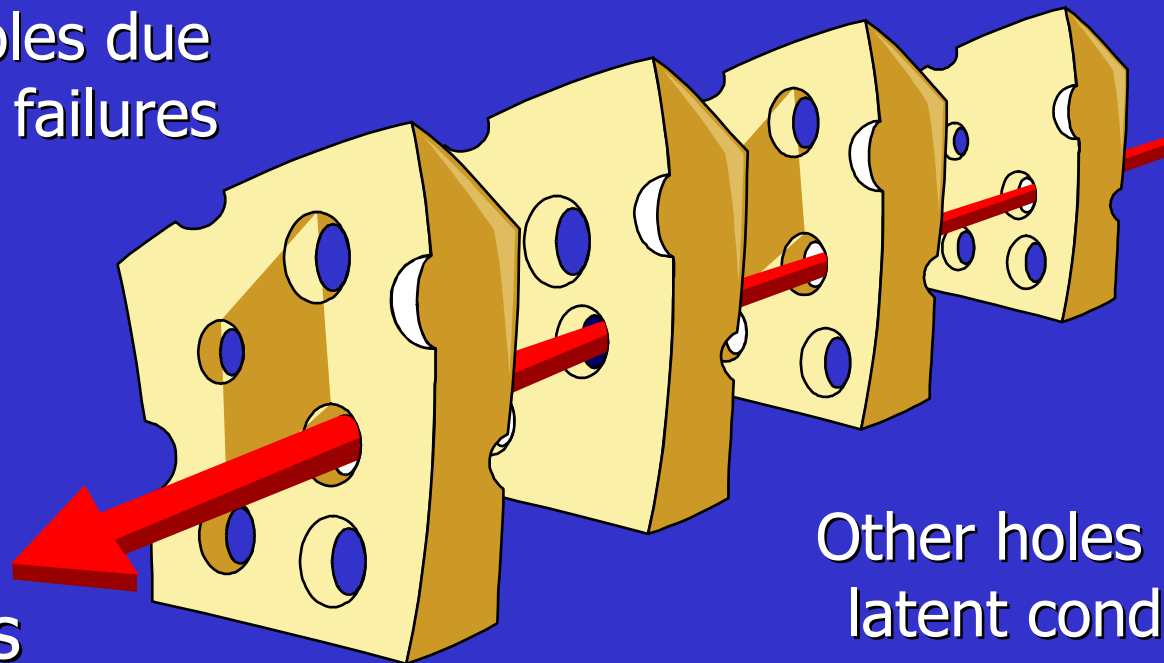
Hazards
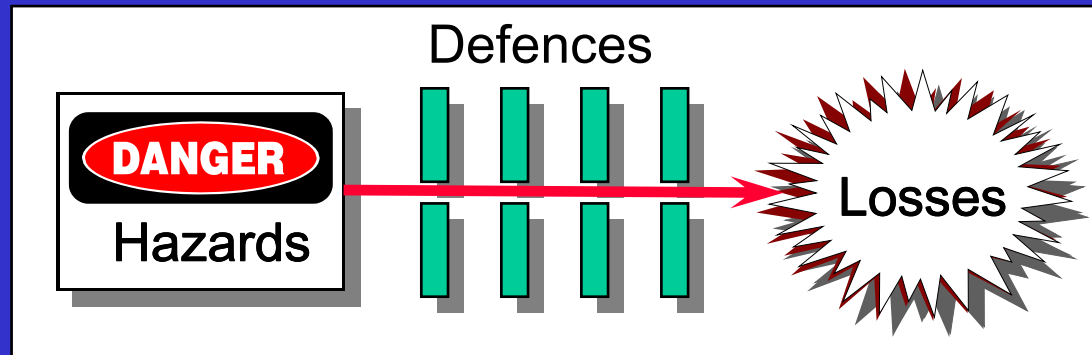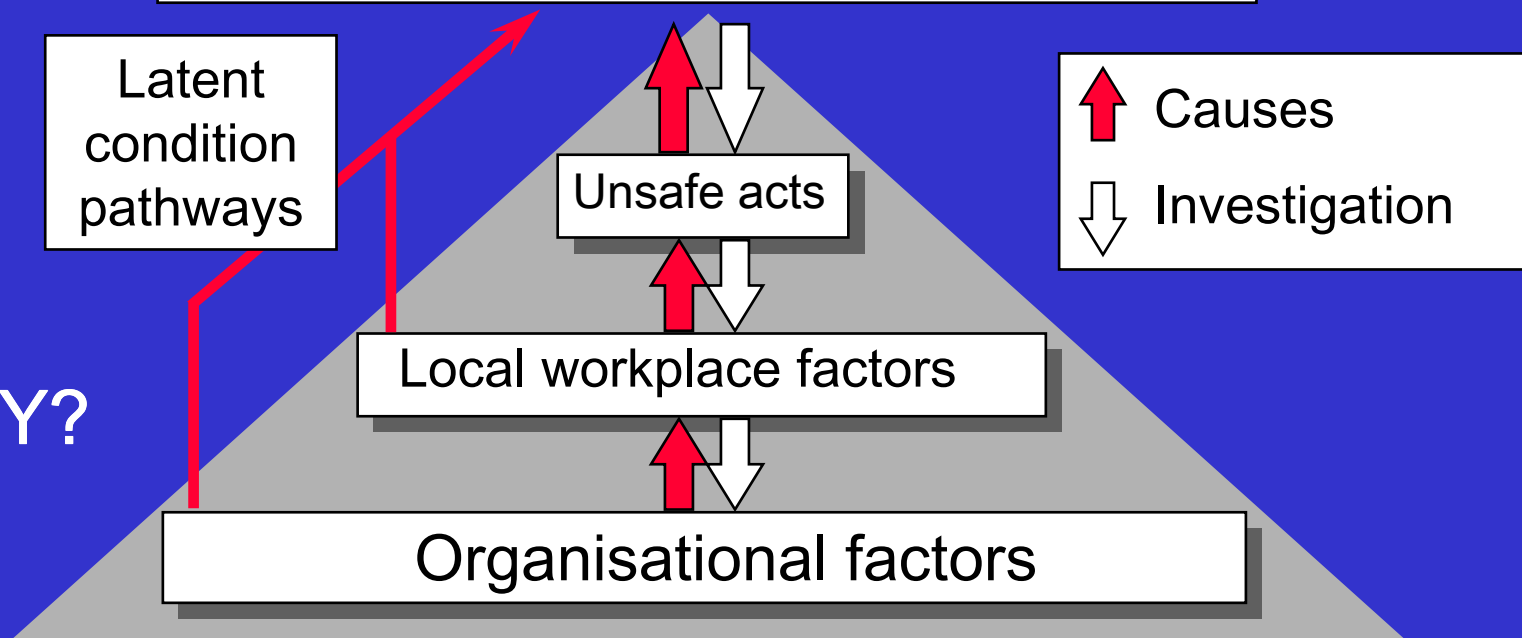
Other holes due to latent conditions

Losses

Successive layers of defences, barriers, & safeguards

What we need to know

Five error myths

- Errors are intrinsically bad
- Bad people make bad errors
- Errors are random and variable
- Errors of professionals are rare, but they are sufficient to cause harm
- Easier to change people than situations

Errors are not intrinsically bad

- They are essential for coping with novel situations: trial-and-error learning
- They are the debit side of a mental 'balance sheet' that stands very much in credit: but each 'asset' carries a penalty.

Under-specification

- Errors arise when mental processes necessary for correct performance are under-specified.

- Under-specification takes many forms: inattention, incomplete knowledge, sparse sensory data, forgetting, etc.

- When processes are under-specified, the mind 'defaults' to a response that is frequent, familiar and appropriate for the context. This is very adaptive.

Bad errors, bad people

- Often it is the best people that make the worst errors. They tend to push limits.
- About 90% of errors are not culpable.
- But some people knowingly adopt behaviours more likely to produce error: substance abuse, excessively long working hours.
- Where do you draw the line? Discuss later.

Errors are neither random nor particularly variable

- **Errors happen when . . .**
  - You know what you're doing, but the actions don't go as planned (slips, lapses, trips and fumbles)
  - You think you know what you're doing, but fail to notice contra-indications, apply a bad 'rule' or fail to apply a good 'rule' (rule-based mistakes and/or violations)
  - You're not really sure what you're doing (knowledge-based mistakes in novel situations)

Some examples

- Physician writes a prescription for 5 milligrams instead of 0.5 milligrams (a slip).

- Nurse delivers a dose of medication late (a lapse).

- Physician applies wrong formula to adjust dosage of amino-glycoside antibiotic for patient with renal problems (rule-based mistake).

- Physician fails to make adjustment because he/she does not appreciate the requirement (knowledge-based mistake).

Two views of the errors of highly trained professionals

- Errors are rare but sufficient to cause accidents. Assumption: well-trained operators with good procedures should not make errors.

- In reality, errors are commonplace and only very occasionally necessary to complete an accident sequence that usually has a long history within the system.

Error rates in aviation
Derived from observing error rates in 44 flight hours.

100,000,000+ errors per year

1000 official incident files

100 major incidents

25 accidents

Event rates in surgery
Events largely due to errors

- Based on direct observation of 165 arterial switch operations: 21 surgeons, 16 UK centres.

- Average rate: 7 events per procedure
  - 1 major event (life-threatening)
  - 6 minor events (disrupts flow, irritates)

- Over half of the major events were successfully compensated: only 20% for minor events.

In all types of hazardous operations . . .

- Events fall into recurrent patterns.
- Similar types of errors keep on happening in similar kinds of situation.
- Since different people are involved in these events, the underlying causal factors must be error-provoking situations and systemic weaknesses rather than individual accident liability.

Some error traps are obvious

Others are more subtle and involve the insidious conjunction of 'fault lines' within the system defences
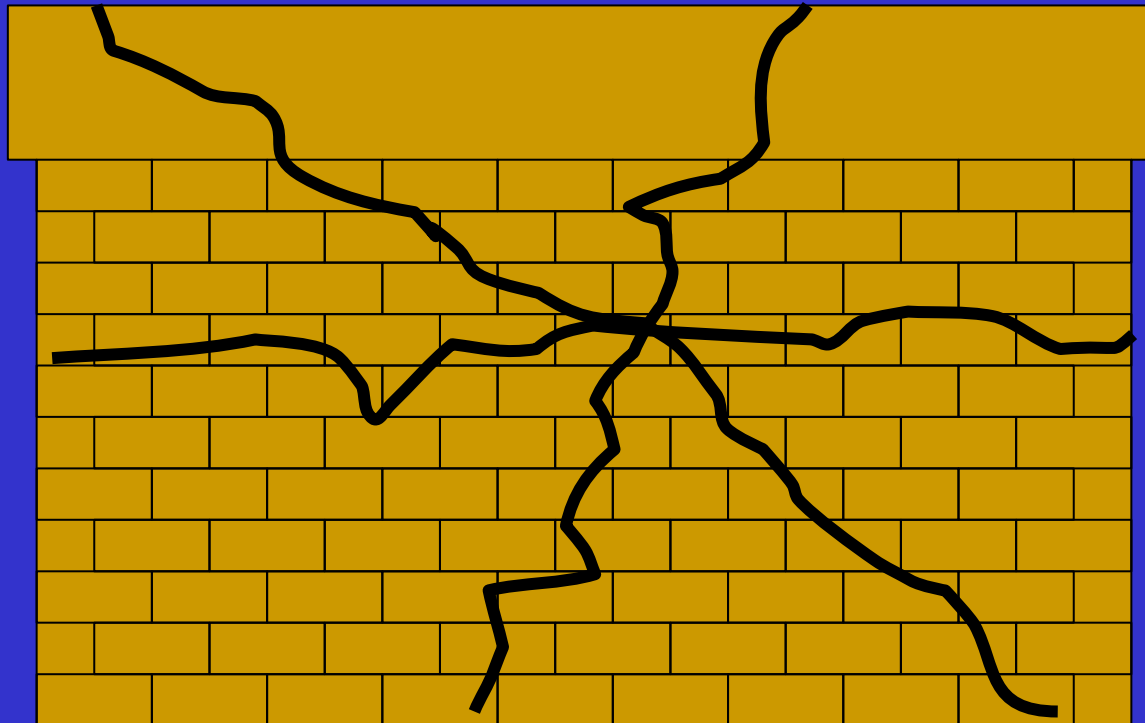
Removing error traps

- A primary function of an incident reporting system is to identify your recurrent error traps.

- Identifying and removing these traps is one of the main functions of error management.

Managing the manageable

- Fallibility is part of the human condition.

- We are not going to change the human condition.

- But we can change the conditions under which people work.

Engineering a just culture

- A 'no blame' culture is neither feasible nor desirable.

- Some unsafe acts deserve sanctions.

- A 'just' culture depends on:
  - the trust of the workforce
  - knowing and agreeing the difference between acceptable and unacceptable behaviour.

The behavioural range

10%   90%

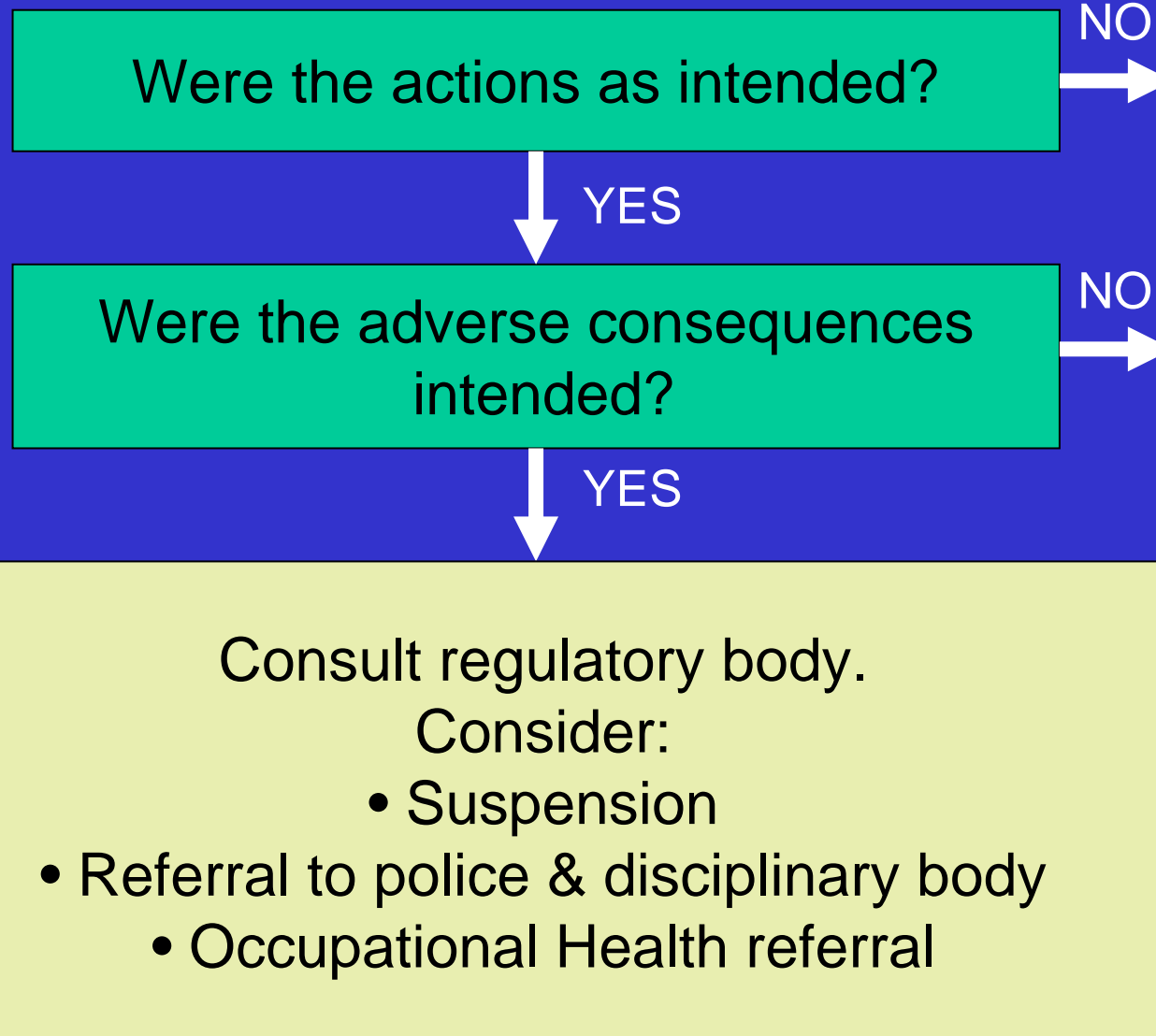*Culpable*   *Blameless*
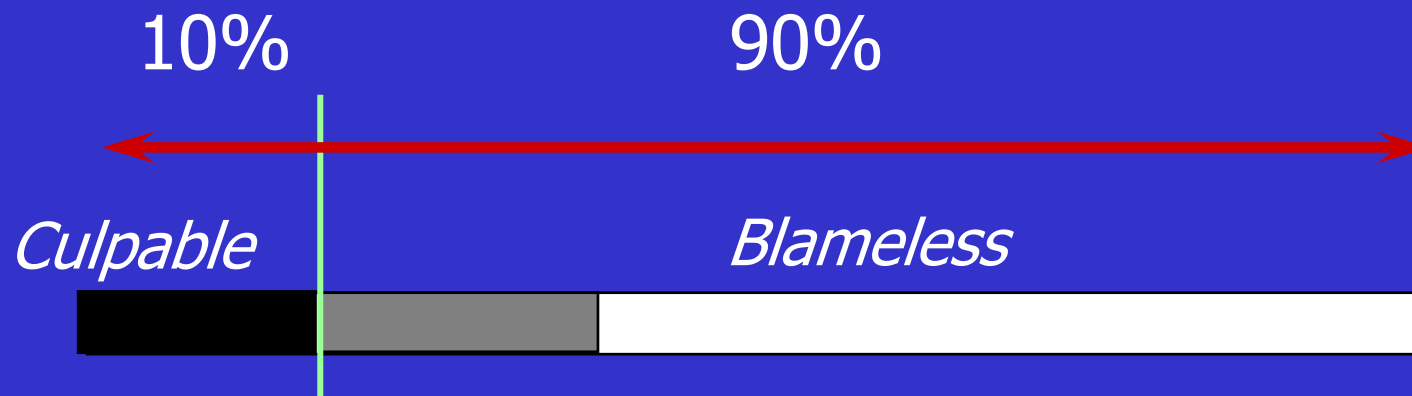
Sabotage Substance abuse Reckless violations, etc.	System-induced violations 'Honest' errors System-induced errors etc.

Unsafe acts can be judged by a graded series of tests

- Intentionality test
- Incapacity test
- Foresight test
- Substitution test

Intentionality test

	NO
Were the actions as intended?	→

YES ↓

	NO
Were the adverse consequences intended?	→

YES ↓

Consult regulatory body.
Consider:
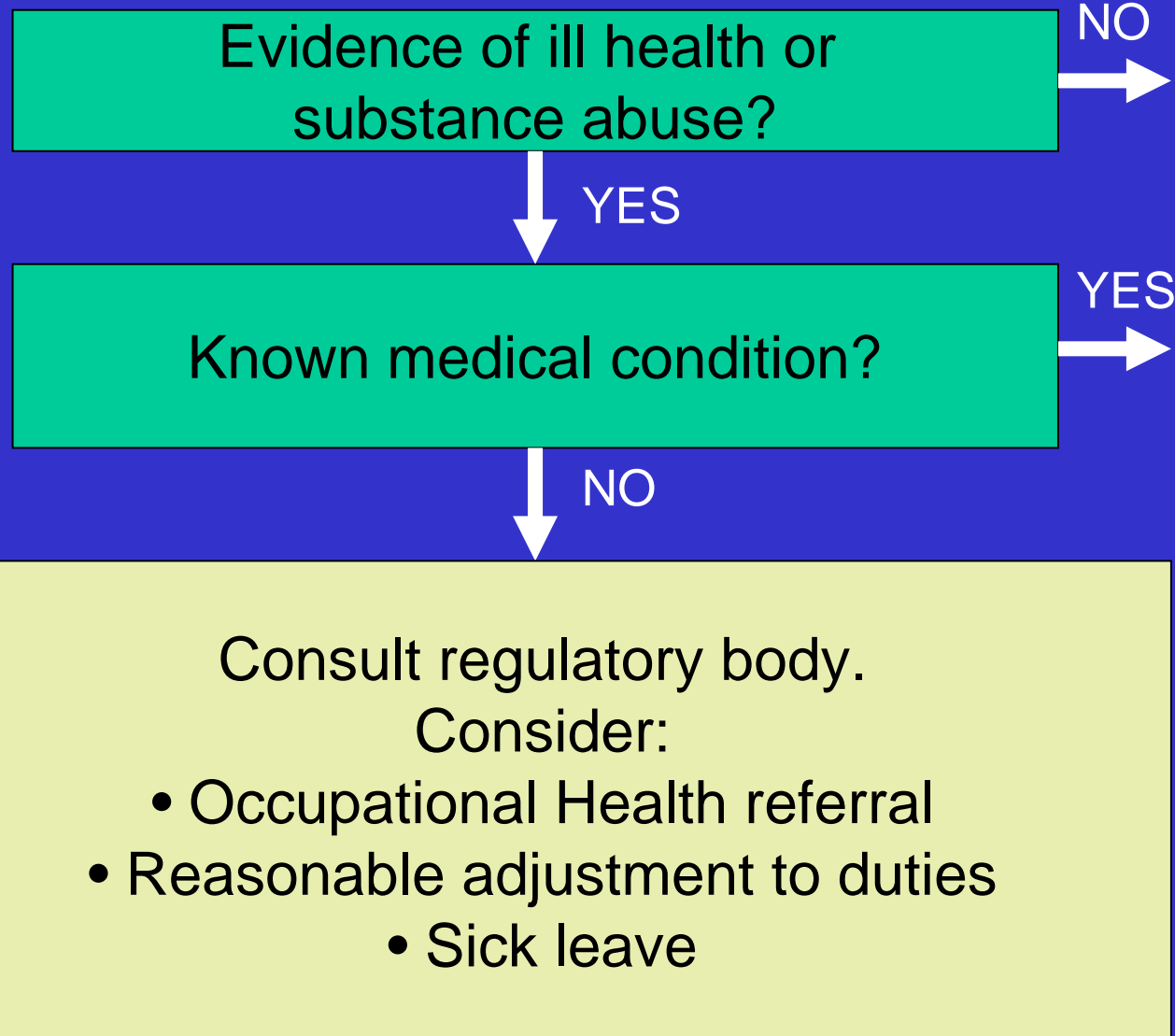• Suspension
• Referral to police & disciplinary body
• Occupational Health referral

Harm: examples

- Deliberately disconnecting an infusion pump.
- Deliberately failing to ventilate an elderly patient.
- Supplying painkilling drugs to a third party and concealing the loss.
- Restraining a patient unnecessarily or for too long.

Incapacity test

Evidence of ill health or substance abuse? → NO

↓ YES

Known medical condition? → YES

↓ NO

Consult regulatory body.
Consider:
• Occupational Health referral
• Reasonable adjustment to duties
• Sick leave

Incapacity: Examples

- A doctor claimed he made a surgical error because he was having an asthma attack. Although doctor was known to be asthmatic, there was no evidence of him experiencing symptoms at time of incident. (NO MITIGATION)

- A surgeon made a serious error, unaware at the time that he was diabetic and on the point of collapse. (YES, MITIGATING CIRCUMSTANCES)

Foresight test

Depart from agreed protocols or safe procedures?	NO →

↓ YES

Were these available, workable, Intelligible, correct and in use?	NO →

↓ YES   YES →

Took unacceptable risk?	

↓ NO

Consider:
• Corrective training
• Improved supervision
• Occupational Health referral
•Reasonable adjustment to duties

Depart from protocols?

- Surgeon operated on wrong side of body, the site having been incorrectly marked. Surgeon had not examined patient before operating. Trust assumed safe procedure had been violated. But while it is good practice to examine pre-op, it was not enshrined in any protocol or professional code of conduct. Trust got it wrong. Go to 'substitution test'.

Unacceptable risk? Cases

- The surgeon who continued to operate despite being aware she was HIV+. (YES)

- Theatre nurse who knew she was in the early stages of Parkinson's disease dropped an instrument, injuring a patient. She had been advised by her doctor to 'carry on as normal'. (NO)

Mitigation? Cases

- A theatre nurse cut corners sterilising instruments. She needed to leave work early to check on a sick relative. Her manager had been unsympathetic. (YES)

- Midwife failed to notice discrepancies in heartbeat trace. Baby needed resuscitation. She pleaded tiredness. She had been on duty 15 hrs without a break and had worked a total of 65 hrs over previous 5 days to cover colleagues' absence. (NO)

Substitution test

Would 'peers' have acted in same way in same situation?	YES →

↓ NO

Were there deficiencies in training, experience or supervision?	YES →

↓ NO

|	
Significant mitigating circumstances?	YES →

↓ NO

Consider:
- Referral to disciplinary body
- Reasonable adjustment to duties
- Occupational Health referral
- Suspension

Peer judgement: Case

- A patient told a radiographer that she was feeling heat from the X-ray equipment. Radiographer dismissed concerns and carried on. Protocol advised switching off the machine only if the malfunction warning light was on. This had failed and patient suffered burns as a consequence.

- Peers decided that they would have heeded patient's concerns—(NO)

A safe culture: Interlocking elements
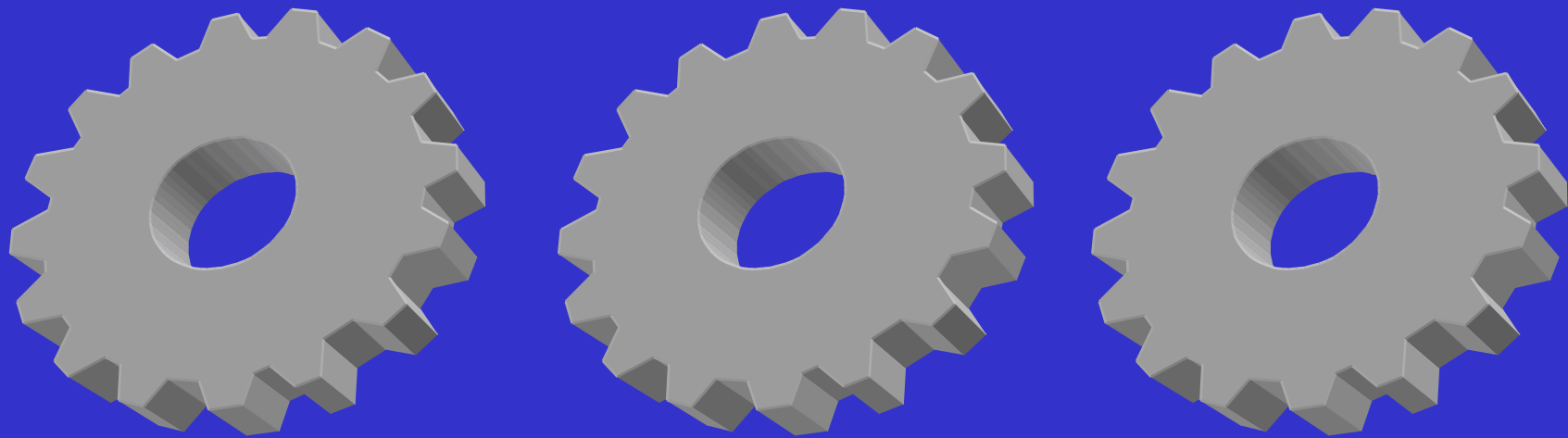
Just culture → Reporting culture → Learning culture

Conclusions

- Dispositional judgements are tempting but generally unjust and unreliable.

- Focus upon actions and especially situations involved in a patient safety incident.

- Can apply incapacity, foresight and substitution tests in the 'grey' area.

- Just culture essential for a reporting and learning culture → safe culture.