

Aeromedical Decision Making (ADM) in Regulatory Medical Certification

Dr Peter Clem



Australian Government
Civil Aviation Safety Authority

www.casa.gov.au



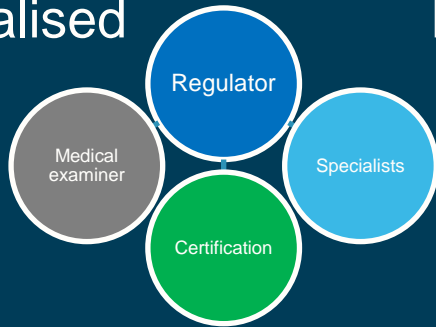
safe skies for all

ICASM 2012

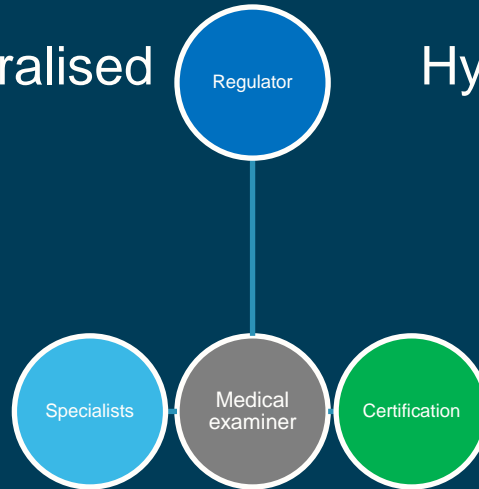
Unique structure



Centralised



Decentralised



Hybrid



Aeromedical Decision Making

as practised by the Civil Aviation Safety Authority
(CASA)

1. Reptilian brain
2. Limbic system
3. Neocortex



1. Regulatory assessment
2. Objective risk assessment
3. Evidence-based risk management paradigm

Evolution designed brain / decision making

1. Regulatory Assessment

- 1911 to the present day
- In exercising its powers and performing its functions, CASA must regard the safety of air navigation as **the most important** consideration.

1. Regulatory Assessment

CASR Part 67

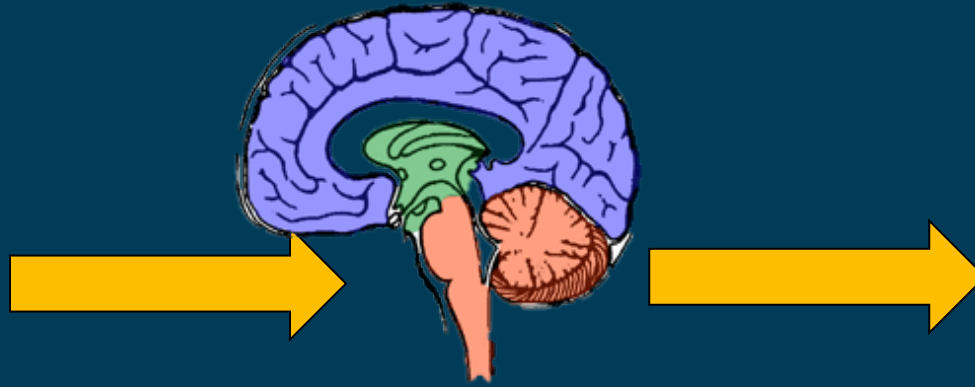
Word picture descriptions of acceptable standards for Mental fitness, Nervous system, Cardiovascular system, Respiratory system, Alimentary system, Reticulo-endothelial system etc, etc.

1. Regulatory Assessment

- Polygon of certainty
- “meets the standard”



1. Regulatory
assessment
“meets the
standard”



“Automatic”
issue



1. Regulatory Assessment



- Major limitation – safe but too exclusive
- Flexibility provisions
- ICAO Chapter 6 and CASA CASR 67.180
- if the applicant does not meet that medical standard — the extent to which he or she does not meet the standard is **not likely** to endanger the safety of air navigation

2. Objective risk assessment

- How to safely move beyond the boundaries ?



2. Objective risk assessment

- 1973 Anderson 44th Annual Scientific Meeting of the Aerospace Medical Association
- Combined aeromedical experience with engineering knowledge to derive the 1% rule



2. Objective risk assessment

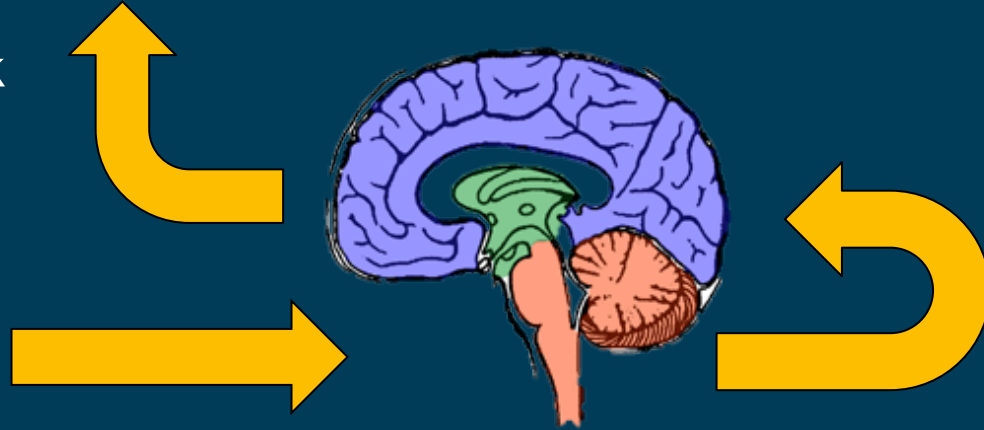
CASA applies the following thresholds

- Class 1 medical certificate is 1% for unconditional certification
- Class 2 medical certificate is 2% for unconditional certification

Issue

2. Objective risk assessment acceptable

1. Regulatory assessment “does **not** meet the standard”

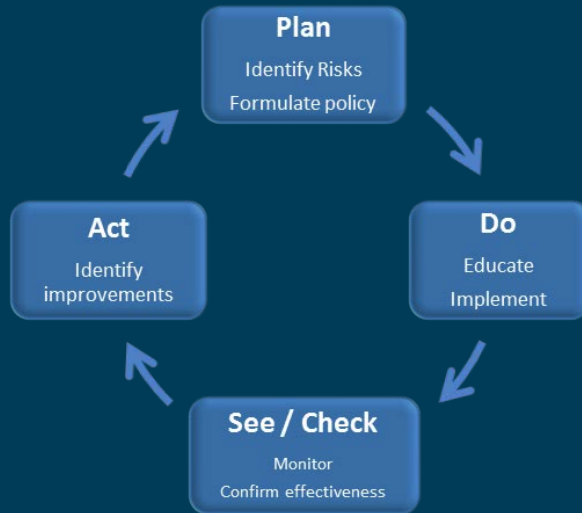


3. Evidence-based risk management paradigm

- Improvement on objective assessment 1% paradigm
- Evidence-based aeromedicine
- Risk management systems

3. Evidence-based risk management paradigm

Framework



Process



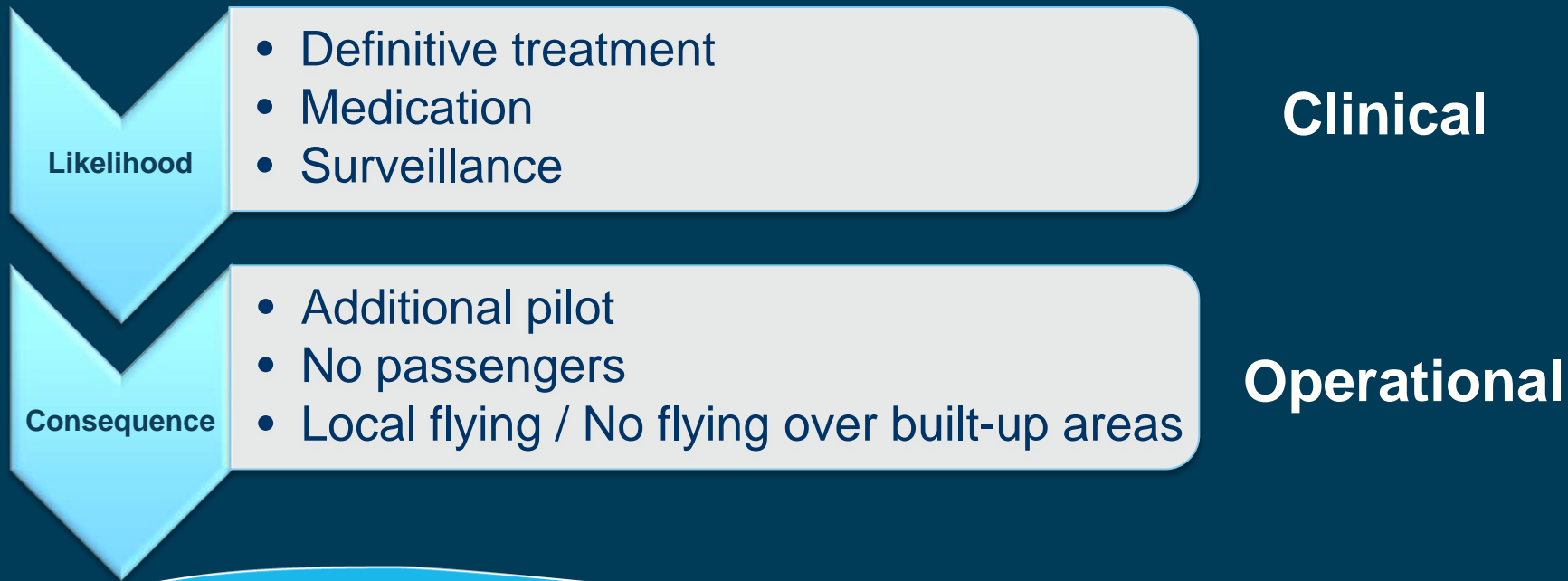
3. Evidence-based risk management paradigm - Risk Assessment



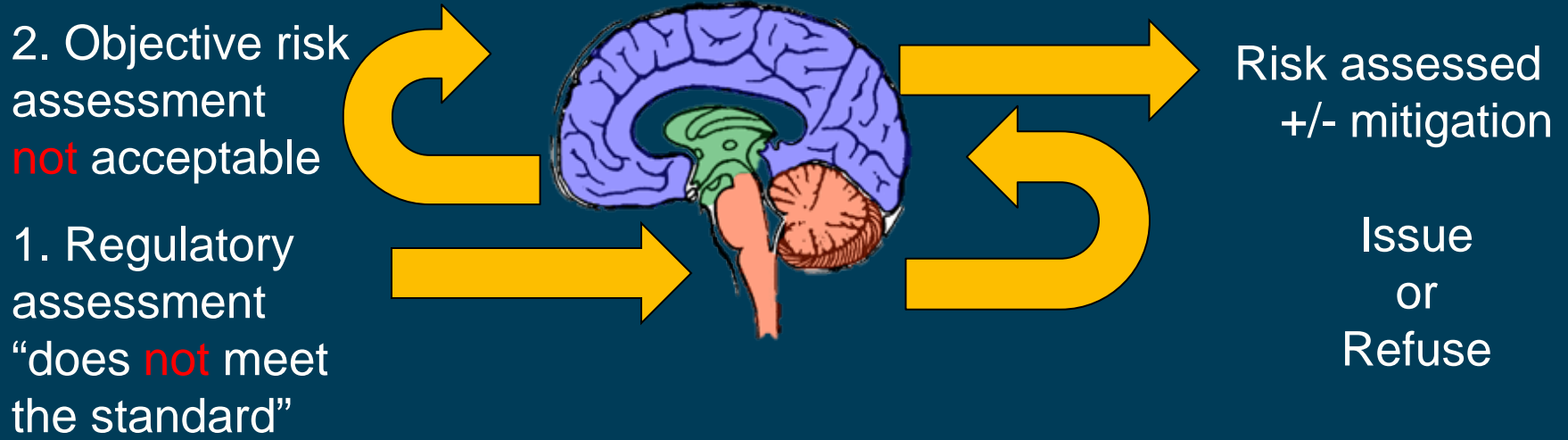
3. Evidence-based risk management paradigm

LIKELIHOOD	CONSEQUENCES				
	Insignificant	Minor	Moderate	Major	Catastrophic
Almost certain	High	High	Extreme	Extreme	Extreme
Likely	Moderate	High	High	Extreme	Extreme
Possible	Low	Moderate	High	Extreme	Extreme
Unlikely	Low	Low	Moderate	High	Extreme
Rare	Low	Low	Moderate	High	High

3. Evidence-based risk management paradigm - mitigations



3. Evidence-based risk management paradigm



Benefits and difficulties of EBM based ADM

- Fair
- Flexible
- Defensible
- Consistent
- Transparent
- Individualised



- Need more data to risk stratify
- More costly - invasive investigations
- Clinical management / Risk management disconnect

Questions ?



References:

Aeromedical decision-making: an evidence-based risk management paradigm. Watson ASEM 2005

The “1% rule” reassessed. Mitchell and Evans ASEM 2004

44th Annual Scientific Meeting of the Aerospace Medical Association. Anderson 1973

2. Objective risk assessment

- 5 parameters of “1% rule”
- Target fatal accident rate 1 in 10^7 flying hrs
- Contribution of crew failure to total risk 10%
- Contribution of medical incapacitation to crew failure
10%
- Critical portion of flight 10%
- Probability that co-pilot could safely take over 99%

CASR 67.105

- Meaning of safety relevant
- For the purposes of this part, a medically significant condition is safety-relevant if it reduces, or is likely to reduce, the ability of someone who has it to exercise a privilege conferred or to be conferred, or perform a duty imposed or to be imposed, by a licence that he or she holds or has applied for.

3. Evidence-based risk management paradigm

- Improving medical questionnaire
- 2011 new medical form reduced questions for < 40 yo Class 2 applicants
- 2013 review of the data

