Aeromedical Decision Making (ADM) in Regulatory Medical Certification

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Unique structure

Centralised:
- Regulator
- Medical examiner
- Certification
- Specialists

Decentralised:
- Regulator
- Specialists
- Medical examiner
- Certification

Hybrid:
- Regulator
- CASA
- Designated Aviation Medical Examiner
- Certification
- Specialists

ICASM 2012
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

- Plan
  - Identify Risks
  - Formulate policy
- Act
  - Identify improvements
- See / Check
  - Monitor
  - Confirm effectiveness
- Do
  - Educate
  - Implement

Process

- Clinical condition
- Likelihood Clinical Event
- Likelihood Aviation Event
- Mitigation likelihood
- Mitigation consequence
3. Evidence-based risk management paradigm - Risk Assessment

- **Clinical Condition**
  - Yellow Flags

- **Likelihood Clinical Event**
  - Incidence and prevalence data
  - Prognostic data

- **Likelihood Aviation Event**
  - Aviation environment
  - Human performance

**Treating Clinician**

**Aeromedical Assessment**
3. Evidence-based risk management paradigm

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3. Evidence-based risk management paradigm - mitigations

**Likelihood**
- Definitive treatment
- Medication
- Surveillance

**Consequence**
- Additional pilot
- No passengers
- Local flying / No flying over built-up areas

**Clinical**

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

2. Objective risk assessment not acceptable

3. Evidence-based risk management paradigm

Risk assessed +/- mitigation

Issue or Refuse
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