

Aeromedical research and critical analysis by Flight Nurses in New Zealand

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PG Certificate Health Science (Endorsed in Aeromedical Retrieval and Transport)

- One year of part time study
- One paper per semester
- Distance learning
- AVMX 719 – Aeromedical Studies for Nurses and Allied Health Professionals
- AVMX 720 – Critical Analysis in Aeromedical Retrieval and Transport



DISTANCE LEARNING

UNIVERSITY OF OTAGO, WELLINGTON

Photo: Iomy Ward

POSTGRADUATE CERTIFICATE IN HEALTH SCIENCES (AEROMEDICAL RETRIEVAL AND TRANSPORT)

ABOUT THIS COURSE

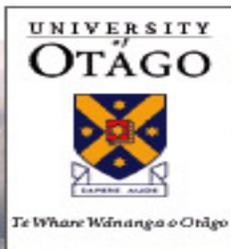
Nurses and paramedics contribute toward optimal patient outcomes in the aeromedical environment when they have completed a course in aeromedical retrieval and transportation. When studied through distance learning mode, students can continue to work at their workplace while learning at a distance, therefore not interfering with duty rosters.



WELLINGTON

From there.....

- PG Diploma
- Masters
- Research program



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AVIATION MEDICINE



Physiological adverse events during aeromedical transport

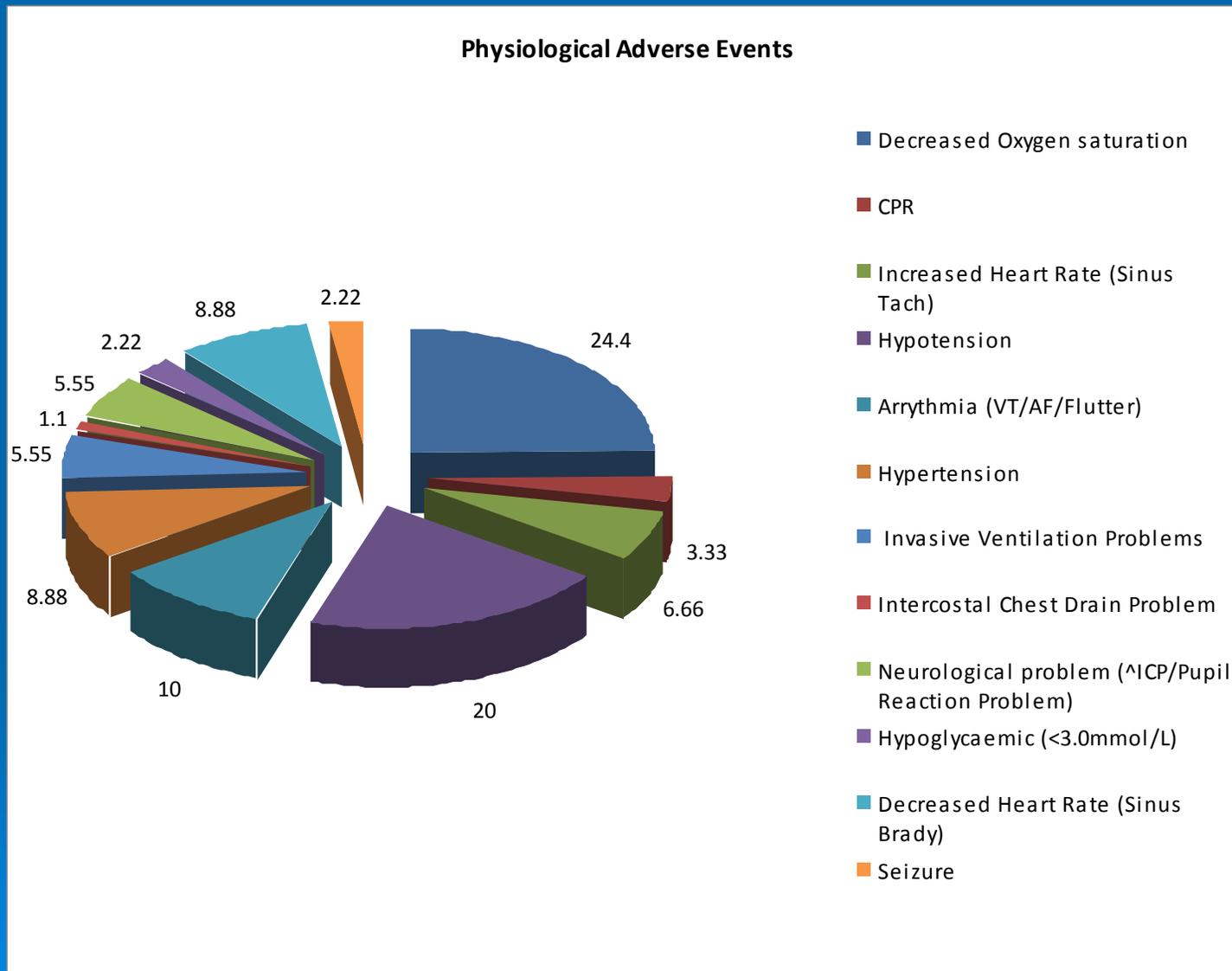
- What physiological adverse events occur commonly during aeromedical transfer, can they be limited, and do flight nurses and services deal with them appropriately?
 - Literature review
 - Service audit
 - National survey
 - Analysis
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Audit of Wellington ICU Flight Service transport records

- Review of physiological events during inter-hospital transport of ICU patients
- 1338 transport records reviewed
- 90 physiological adverse events recorded (5.7%)
- More than half required an intervention
- 5 major adverse events recorded
 - 3 required CPR
 - 2 suffered seizures
- Less than suggested in the literature

Sheppard, J. (2009). Physiological Events During Aeromedical Transport. C&CDHB Flight Retrieval Service.

Types of physiological adverse events recorded



Sheppard, J. (2009). Physiological Events During Aeromedical Transport. C&CDHB Flight Retrieval Service.

Practice developments

- Review of medical orientation and training
- Education for flight team regarding identification of adverse events
- Inclusion of prompts on transport record to identify and record events

The Impact of Shift Duration on Flight Nursing Performance and Patient Safety in the Aeromedical Environment

- Does flight nursing, as a secondary role, with extended shifts impact on nursing performance in-flight?
- Pilot exploratory research survey
- Literature review
- National survey questionnaire
- Critical analysis



Findings

- 80% employed in secondary employment position
- Part-time rostered 'on-call' positions
- On-call shifts 12 hours 62%, 8 hours 25%, combination 13%
- Extended shifts of up to 16 hours were common
- 80% often rostered on-call before, during and after scheduled shifts in primary position
- Some on-call 16h after 12h in acute area of primary practice
- 20% were never rostered on-call before or after a scheduled shift
- 30% rostered for flight nursing service while rostered to work in acute area of primary practice

Discussion

- 24 hour availability of service
- Accumulative effect of fatigue on flight nursing performance
- Unpredictably long work hours
- On-call while on duty doesn't mean exempt from effects of fatigue
- On-call characteristics of flight nursing role
- No simple solution, complex and multi-faceted issues effecting rostering schedules

Recommendations

- Further research required
- Review of flight nursing standards of practice and rostering schedules
- Unified approach to national flight nurse rostering practices in line with CAA and NZNO MECCA regulations
- Rostering of flight nursing as a secondary position must be addressed and regulated. National consensus and agreement to work towards reducing risks of fatigue and impact on nursing performance
- Audit and reporting by individual services every 3 years to ensure compliance with legislation

OETT cuff pressures

- Changes in ETT cuff pressure at low altitude
 - is this significant enough to cause tracheal damage?
 - should we be instilling saline into ETT cuffs for aeromedical transfers?
- National survey of current practices
- In depth literature review
- Local data gathered (Inter-hospital transfers only)
 - Cuffs inflated as usual to achieve effective seal
 - Cuff pressures measured at ground level just before takeoff, at cruising attitude and at destination

Findings of local study

- Rapidly apparent cuff pressures were increasing to an unacceptable level so study stopped and practice change initiated
- Mean increase of 25cmH₂O
- At sea level many of ETT cuffs deflated to less than pre-take off pressure
- Possibility of 'over-stretch' at altitude causing loss of elasticity of cuff

Is water better?

- Mannequin study developed to evaluate effectiveness of saline filled ETT
- Excessive volumes of saline required to achieve adequate seal resulting in higher cuff pressures
- Up to 20mls of saline required to achieve adequate seal producing cuff pressures that exceeded the safe limits for tracheal mucosal blood flow

Practice changes

- A clinical practice change was initiated within the local flight team
- All intubated patients now have cuff measurements performed pre, during and post flight
- ETT cuffs are adjusted as required to maintain effective seal with the least amount of pressure

Other work within the local aeromedical community

- Pre-transport acuity scoring tool designed specifically for inter-hospital transport
- Use of in-situ simulation team training for the development of non-technical skills in aeromedical teams
- Aviation dentistry
 - Modified treatment plans for aeromedical crew to prevent in-flight dental pain
- Flight paramedic role
 - Feasibility of a nationally recognised flight paramedic qualification
 - Role of high fidelity simulation for training of flight paramedics in New Zealand



Current projects

- Clinical audit of in-flight interventions during inter-hospital transport (incidence and indication)
- Analysis of the need for national neonatal transport standards and recommendations for the development of these
- Training requirements for novice flight nurses – review of current practice and recommendations for minimum standards
- Fatigue in aeromedical crews and relationship between crew hours and performance
- Analysis of the incidence of aeromedical aircraft accidents and development of a generic policy for DHB's and aeromedical services to manage such an event.
- Critical analysis of the risks of unrecognised pneumothorax during pre-hospital trauma transport and the use of prophylactic thoracostomy to reduce these

Outcomes

- Emerging body of work by flight nurses and aeromedical personnel examining clinical and academic aspects of practice in our very unique New Zealand context
 - Small studies, audits and projects
 - Build towards larger scale research studies
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Challenges ahead

- To appropriately apply these works to our aeromedical practice and to find ways to disseminate findings to the wider aeromedical community
 - Encourage and support more local and national research activity by flight nurses and paramedics
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