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INDEX OF AUTHORS AND ABSTRACT TITLES

ACAP EDUCATION SPECIAL INTEREST GROUP (VICTORIAN BRANCH).

Jeff Allan, Brett Williams

THE CHANGING NATURE OF EMS DELIVERY: POTENTIAL MODELS FOR THE FUTURE!

Frank Archer, Greg Gibson, David Shugg, Rhona Macdonald

FORMATION OF THE WADEM OCEANIA REGIONAL CHAPTER: AN OPPORTUNITY FOR PARAMEDICS IN THE REGION.

Frank Archer, Frederick Burkle, Paul Arbon, John Coleman, Graeme McColl, Roman Chute, Andrew Bacon

A MODEL FOR EMERGENCY PREPAREDNESS AND DISASTER HEALTH – THE UNDERPINNING DOMAINS.

Frank Archer, Geert Seynaeve, Frederick Burkle

RECOVERY – THE FORGOTTEN STAGE OF PANDEMIC PLANNING.

Frank Archer, Caroline Spencer, Ingrid Brooks, Erin Smith, Rhona Macdonald, Frederick Burkle

THE TREATMENT OF POSTPARTUM HAEMORRHAGE WITH OXYTOCIN IN THE PRE-HOSPITAL ENVIRONMENT.

John Atchison, Brenda Costa-Scorse

PARAMEDIC DIAGNOSIS OF STROKE: EXAMINING USE OF THE MELBOURNE AMBULANCE STROKE SCALE (MASS) IN THE FIELD

Bill Barger, Janet E Bray, Kelly Coughlan, Melissa Wright, Chris Bladin

STROKE – A NATIONAL SYSTEM.

Bill Barger, Romesh Markus, Chris Price, Christopher Levi, Christopher Bladin, Kevin Masci

THE EPIDEMIOLOGY OF ANALGESIC USE WITHIN A LARGE AUSTRALIAN AMBULANCE SERVICE.

Jason Bendall, Paul Simpson, Mark Goodger, Paul Middleton

OPERATIONAL EPIDEMIOLOGY OF AMBULANCE RESPONSES IN SYDNEY: IMPLICATIONS FOR PARAMEDIC EDUCATION AND MODELS OF CARE

Jason Bendall

PAIN SEVERITY IN ADULTS IS NOT A PREDICTOR OF AMBULANCE RESPONSE PRIORITY.

Jason Bendall, Paul Simpson, Mark Goodger, Paul Middleton

THE ACCURACY OF UNDERGRADUATE PARAMEDIC STUDENTS IN TAKING A BLOOD PRESSURE – A PILOT STUDY.

Maxwell Bidstrup, Malcolm Boyle, Brett Williams

AN ASSESSMENT OF UNDERGRADUATE PARAMEDIC STUDENTS' EMPATHY LEVELS: ATTITUDES TO PATIENTS' MEDICAL CONDITIONS.

Malcolm Boyle, Brett Williams

THE FIRST SEVEN YEARS OF THE METROPOLITAN FIRE BRIGADE EMERGENCY RESPONDER PROGRAM.

Malcolm Boyle, Colin Bibby, Brett Williams, Chris Huggins, Allan Morton, David Shugg

IS IT TIME TO CHANGE THE PREHOSPITAL TRAUMA TRIAGE GUIDELINES?

Malcolm Boyle

A REVIEW OF THE FIRST SEVEN YEARS OF THE METROPOLITAN FIRE BRIGADE RESPONSE TO CARDIAC ARRESTS.

Malcolm Boyle, Colin Bibby, Brett Williams, Chris Huggins, Allan Morton, David Shugg

ENHANCING SUPPORT AND WELLBEING WITHIN AMBULANCE SERVICES.

Steve Brake, Brenda Costa-Scorse

THE IMPLEMENTATION OF NON-INTUBATED CAPNOGRAPHY INTO THE AMBULANCE SERVICE.

Scott Carstens, Brenda Costa-Scorse

PRE-HOSPITAL THROMBOLYTIC THERAPY: TO USE OR NOT TO USE?

Vivien Cessford, Brenda Costa-Scorse

THE FEASIBILITY OF ESTABLISHING EMERGENCY CARE PRACTITIONERS IN NEW ZEALAND

Jackie Clapperton, Shane Clapperton

MANAGING PAIN IN THE PRE-HOSPITAL SETTING WITH INTRANASAL OPIOIDS.

Stuart Cook, Brenda Costa-Scorse

CHEST INJURIES ATTENDED BY PARAMEDICS IN RURAL VICTORIA – A SIX MONTH REVIEW.

Bart Cresswell, Malcolm Boyle

A CONCEPTUAL FRAMEWORK FOR CONTINUING EDUCATION IN AMBULANCE SERVICES.

Cheryl Deslandes, Brenda Costa-Scorse

SWINE FLU – COUGHS, COLDS AND (BUSINESS) CONTINUITY.

Justin Dunlop, Paul Holman, Peter Swan

HOW DO PARAMEDIC SYRINGE MEDICATION ERRORS OCCUR AND WHAT SOLUTIONS ARE AVAILABLE?

Sharon Duthie, Brenda Costa-Scorse

ARE WE ROLLING WITH THE PUNCHES IN THE FRONTLINE MANAGEMENT OF INTIMATE PARTNER VIOLENCE?

Alexander Edlin, Brett Williams, Angela Williams

INFECTION CONTROL PRACTICES OF RE-USEABLE ITEMS IN PARAMEDIC PRACTICE IN NEW ZEALAND.

Joanne Gallagher, Brenda Costa-Scorse

IMPROVING ACCESS TO ACUTE STROKE THROMBOLYSIS FOR RURAL COMMUNITIES VIA TRANSPORTATION AND PRE-HOSPITAL ASSESSMENT SYSTEMS.

Ashley Garnett, Di Marsden, Allan Loudfood, Paul Middleton, Mark Parsons, Christopher Levi

PRE-HOSPITAL AIRWAY MANAGEMENT: AMBULANCE SERVICE OF NSW EXPERIENCE SINCE THE INTRODUCTION OF THE LARYNGEAL MASK AIRWAY

Mark Goodger, Jason Bendall, Paul Simpson, Paul Middleton

THE TASMANIAN AMBULANCE SERVICE “VOLUNTEER GATEWAY PROJECT”- HOW VGATE IS TRANSFORMING THE WAY VOLUNTEER AMBULANCE OFFICERS LEARN, COMMUNICATE AND MANAGE THEIR TIME.

David Godfrey-Smith

RESCUER FATIGUE IN CARDIOPULMONARY RESUSCITATION: A REVIEW OF THE LITERATURE.

Hendrik Gutwirth, Brett Williams, Malcolm Boyle

**EMBEDDING STUDY AND INFORMATION LITERACY SKILLS (SAILS)
INTO YOUR PARAMEDIC CURRICULUM**

Leanne Hamilton

**A FRAMEWORK FOR DECIDING SUITABLE EXTRAGLOTTIC AIRWAY DEVICES FOR
PARAMEDICS TO USE**

Cindy Hein, Harry Owen, John Plummer

THE PRIMARY HEALTH BUS – AN URBAN ADVENTURE

Jan Hiebert, Sheila Achilles.

THE SUMMER OF 2009: HEAT AND FIRE – AMBULANCE VICTORIA'S RESPONSE.

Paul Holman, Justin Dunlop

**THE WORST HEADACHE OF MY LIFE: THE PREHOSPITAL DIAGNOSIS OF NON-TRAUMATIC
SUBARACHNOID HEMORRHAGE.**

Laurence Ioannou

THE NURSING TO PARAMEDIC SHIFT: WHAT MOTIVATES THE CHANGE?

Tina Ivanov, Kim Savige

PARAMEDIC ATTITUDES TO PREHOSPITAL RESUSCITATION.

Tina Ivanov, Paul Jennings, Linton Harriss, Kim Savige, Tony Walker

**EMERGENCY CARE PROVIDERS PERCEPTIONS OF CPR MEASUREMENT, RECORDING AND
FEEDBACK – IDENTIFYING POTENTIAL BARRIERS FOR IMPLEMENTATION.**

Paul Jennings, Cindy Hein, Tony Walker, Dave Garner, Hugh Grantham, Rob Elliot, Ian Jacobs, Garry Wilkes, Jennifer Rabach

**SUCCESSFUL PAIN REDUCTION IN THE PREHOSPITAL SETTING: A DETAILED ANALYSIS OF
85,000 PATIENTS.**

Paul Jennings, Peter Cameron, Stephen Bernard

**FIREFIGHTER FIRST RESPONDERS ATTENDING CARDIAC ARRESTS - A REVIEW OF THE
ECG DATA.**

Simon Jensen, Carly Woodd, Malcolm Boyle, Colin Bibby, Brett Williams,
Allan Morton²

**ENHANCING THE FIRST YEAR PARAMEDIC STUDENT EXPERIENCE WITH THE USE OF
FORMATIVE ASSESSMENT AND SUPPORT MATERIALS IN ONLINE LEARNING**

Steve Johnston, Richard Brightwell

**METHODS FOR IMPROVING PARAMEDIC DIFFERENTIAL DIAGNOSIS AND CLINICAL
DECISION MAKING SKILLS.**

Sandra Kerse, Brenda Costa-Scorse

**SMUDGED SIGNATURES: HAVE WE PUT EVERYTHING WE NEED IN THE SCHOOL BAG FOR
PARAMEDIC HIGHER EDUCATION?**

Ann Lazarsfeld Jensen

**THE KIDS ARE GETTING BIGGER, BUT ARE THE WEIGHT CALCULATION FORMULAS
KEEPING PACE?**

Nadine Longridge, Brett Williams, Malcolm Boyle

DO THE NUMBERS ADD UP? QUANTIFYING THE AMBIGUOUS EXPERIENCE OF PAIN.

Bill Lord

THE UTILITY OF VITAL SIGNS IN VERIFYING PAIN IN ADULTS.

Bill Lord, Malcolm Woollard

PAST (PRE-HOSPITAL ACUTE STROKE TRIAGE) IMPROVING ACCESS TO ACUTE STROKE THERAPIES – A CONTROLLED TRIAL OF ORGANISED PRE-HOSPITAL AND EMERGENCY CARE

Allan Loudfoot, Debbie Quain, Mark Parsons, Neil Spratt, Malcolm Evans, Michelle Russell, Angela Royan, Leonnie Moor, Ferdi Miteff, Carolyn Hullick, Christopher Levi

MOBILE INTENSIVE CARE PARAMEDICS ATTITUDE AND PERCEPTION OF TRAUMATIC PAIN MANAGEMENT IN A SMALL REGIONAL COMMUNITY.

Terry Marshall

AMBULANCE RESEARCH INSTITUTE.

Paul M Middleton, Suzanne Davies, Mark Goodger, Paul Simpson, Sowmya Anand, Jason Bendall

INQUIRY INTO THE OPTIMUM FORMAT FOR THE PREPARATION AND EDUCATION OF PARAMEDICS LEADING TO WORK READINESS FOLLOWING GRADUATION.

Graham G Munro

EXAMINING APPROACHES TO THE INTEGRATION OF VOLUNTEERS INTO AUSTRALASIAN AMBULANCE SERVICES.

Peter O'Meara, John Rae, Vianne Tourle

THE IDENTIFICATION, ASSESSMENT, AND MANAGEMENT OF PSYCHIATRIC PRESENTATIONS BY PARAMEDICS WITHIN THE COMMUNITY.

Louise Roberts

IMPROVING PAEDIATRIC PAIN MANAGEMENT WITH FENTANYL LOLLIPOPS.

Dan Roberston, Brenda Costa-Scorse

WHEN PRESSURE IS POSITIVE: A LITERATURE REVIEW OF THE PREHOSPITAL USE OF CONTINUOUS POSITIVE AIRWAY PRESSURE.

Nicole Robertson, Coco Giddings, Brett Williams, Malcolm Boyle

PREHOSPITAL MANAGEMENT OF ACUTE PAIN IN CHILDREN: A RETROSPECTIVE OBSERVATIONAL STUDY COMPARING THE EFFECTIVENESS OF INTRAVENOUS MORPHINE, INTRANASAL FENTANYL AND INHALED METHOXYFLURANE.

Paul Simpson, Jason Bendall, Mark Goodger, Paul Middleton

PARAMEDICS AND PUBLIC HEALTH EMERGENCIES: IS THERE A “DUTY TO RESPOND”?

Erin Smith, Frederick Burkle Jr, Carly Woodd, Simon Jensen

A CROSS-SECTIONAL STUDY OF VICTORIAN MOBILE INTENSIVE CARE AMBULANCE PARAMEDICS KNOWLEDGE OF THE VALSALVA MANOEUVRE.

Gavin Smith, Malcolm Boyle

CAN A SYRINGE PROVIDE THE REQUIRED PRESSURE FOR THE VALSALVA MANEUVER TO TERMINATE A SUPRAVENTRICULAR TACHYCARDIA?

Gavin Smith, Malcolm Boyle

GUIDELINES FOR TREATING CYSTIC FIBROSIS (CF) PATIENTS PRESENTING WITH HAEMOPTYSIS IN THE EMERGENCY HEALTHCARE SETTING.

Sarah Sofianopoulos, Brett Williams, Frank Archer

S.M.A.S.H IS ONE HOUR ENOUGH TIME TO PROVIDE SKILLS AND KNOWLEDGE TO PREVENT THE PREVENTABLE?

Danni Spencer, Harry Owen, Leanne Rogers, Deb Stone, Cindy Hein, John Plummer

HOW DOES AMBULANCE SERVICES UTILISATION IMPACT DEMAND FOR EMERGENCY DEPARTMENTS IN QUEENSLAND, AUSTRALIA?

Sam Toloo, Vivienne Tippet, Gerry FitzGerald, Kevin Chu, David Eeles, Ann Miller, Joseph Ting, David Ward

THE ROLE OF AN AED REGISTRY IN IMPROVING SURVIVAL FROM OUT-OF-HOSPITAL CARDIAC ARREST

Tony Walker, Geoff Harvey

STANDARD CLINICAL GUIDELINES - ARE THERE A BROADER RANGE OF CONDITIONS THAT WOULD BENEFIT FROM MEDICINES COMMONLY USED BY PARAMEDICS?

Fraser Watson, Brenda Costa-Scorse

BRAIN TRAUMA: DO PARAMEDICS OVER MANAGE CERVICAL SPINE AND UNDER MANAGE AIRWAY?

Helen Webb

PRE-HOSPITAL AIRWAY ADJUNCTS AND RESPIRATORY INFECTION

Helen Webb

“AS YOU FIND IT” – CLINICAL SIMULATION AS AN ASSESSMENT TOOL IN PARAMEDIC EDUCATION.

Sarah Werner, Nigel Bryant

BLOGGING PARAMEDIC STYLE.

Sarah Werner

PAIN MEASUREMENT AND ALLEVIATION IN AUCKLAND.

Sarah Werner, Jane Koziol-McLain

CLINICAL TEACHING AND LEARNING IN PARAMEDIC EDUCATION: IS THERE A LINK BETWEEN CLASSROOMS AND CLINICAL PLACEMENTS?

Brett Williams Ted Brown

PARAMEDIC GRADUATE ATTRIBUTES: USING EXPLORATORY FACTOR ANALYSIS TO INFORM NATIONAL CURRICULUM

Brett Williams, Andrys Onsman

UNDERGRADUATE PARAMEDIC STUDENTS' ATTITUDES TO E-LEARNING: FINDINGS FROM FIVE UNIVERSITIES

Brett Williams, Malcolm Boyle, Richard Brightwell, Graham Munro, Melinda Service, Sarah Werner, Ted Brown

THE EFFICIENCY OF FIRE FIGHTERS IN ATTENDING TO CARDIAC ARRESTS.

Carly Woodd, Simon Jensen, Malcolm Boyle, Colin Bibby, Brett Williams, Allan Morton

KEEPING THE BEAT: DOES MUSIC IMPROVE THE PERFORMANCE OF CHEST COMPRESSIONS BY LAY PERSONS?

Malcolm Woollard, Lettie Rawlins, Phil Hallam, Julia Williams

ACAP EDUCATION SPECIAL INTEREST GROUP (VICTORIAN BRANCH)

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Background – The establishment of the ACAP Education Special Interest Group (SIG) (Victorian Branch) has a number of broad aims. Firstly, to provide an opportunity for educators in Higher Education and industry to identify gaps and synergies in the emerging body of paramedic pedagogy. Secondly, the group will attempt to foster leadership and guidance in paramedic education and training, offering opportunities for early-career researchers and clinical educators to develop skills in teaching and educational research. Finally, the group will provide greater opportunities for collaboration between universities, industry and external peak bodies.

Objectives The following topics will make up the educational interests of this SIG:

Simulation:

- Definition of simulation
- What does simulation provide us e.g. technical vs. non-technical skills?
- How is it currently used? Undergraduates/Postgraduates?
- Relationship between simulation and clinical placements?
- What fidelity fits what?
- Development of simulation policy.
- Undertake simulation research.
- Linkage to educational theory.
- Linkage to professional outcomes ie. Student self-confidence.

e-learning/online teaching and learning:

- Distance – blended – what model works best?
- Educational theory supporting pedagogy.
- Principles of good teaching practice.
- Digital natives versus digital immigrants, what are the teaching and learning implications?
- Do learning styles/attitudes change in elearning modes?
- Are digital natives more e-savvy – ePCRs and e-health informatics?
- Are there implications using social networking, wikis, blogs etc.?

Clinical placement education/work-readiness/job-readiness:

- Where does simulation sit?
- What are the objectives or purpose of clinical placements – ambulance and hospital settings?
- No consistent approach or expectations between universities and industry.
- Are there implications with reduced or no hospital placements?

- Pre-employment students upon graduation are not intended to be work-ready – why is this notion still opaque?

Interprofessional education/double-degrees/extended scope

- Are issues surrounding clinical placements (hospital and health services) likely to impede IPE/IPL and notion of generic worker?
- What are the implications of physician assistants/practitioner models for the Australian context?
- Occupational encroachment = turf war = potential loss of our ‘professional’ status without national registration/regulation.

Curriculum and evaluation

- National educational standards and nationally-accredited curricula need to be implemented to ensure the educational topics discussed above enhance the development of Ambulance Paramedic educators and researchers in the future.

THE CHANGING NATURE OF EMS DELIVERY: POTENTIAL MODELS FOR THE FUTURE!

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Background: Emergency Medical Services (EMS) internationally are under pressure from increasing demand. Australian demand for EMS is increasing 8-16% per annum, with similar trends occurring internationally. Increasingly, policy makers are exploring alternative models to the long standing service delivery philosophy traditionally based on, “if we get called we go, if we go we transport, if we transport we transport to the nearest public hospital facility”.

Objective: The aim of this paper is to stimulate discussion on a range of potential models to contextualise contemporary thinking on EMS delivery for the future.

Methods: A literature review identifying new and emerging models for EMS delivery.

Findings: The following models have been identified: Current EMS model; public sector model; private sector model; mixed public/private sector model; chain of survival model; public safety model; public health model; social support/welfare model; primary care model; continuity of care model; shared care model; “treat and leave” model; alternate dispositions models; professional autonomy model; WHO Global model; and, emergency preparedness and disaster health model. The review suggests that policy makers are attempting to achieve the goals of an EMS system through a range of emerging models. However, the evidence base of their effectiveness and efficiency is yet to be established.

Conclusions: This review suggests a range of emerging diversity in EMS models which may provide useful input into discussions in various EMS systems who are finding themselves under threat from an increasing work load. One key question is proposed as an outcome of this review, namely, “is EMS delivery a new mono-discipline, or is it multi-disciplinary”?

FORMATION OF THE WADEM OCEANIA REGIONAL CHAPTER: AN OPPORTUNITY FOR PARAMEDICS IN THE REGION

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Background: The World Association for Disaster and Emergency Medicine (WADEM) Oceania Regional Chapter is the first WADEM Chapter to be formed.

Objectives: To describe the journey experienced in the formation of this Chapter and identify opportunities for paramedics.

Methods: A descriptive historical review.

Findings: The Chapter had its origins in WADEM's 13th World Congress in Melbourne (2003). In Edinburgh (2005), the WADEM General Assembly approved the establishment of Chapters to promote both the discipline and WADEM activities. WADEM Vice President, Professor Frederick (Skip) Burkle Jr, led the development of guidelines for establishing WADEM Chapters, which were considered by the WADEM Board in Amsterdam (2007) and subsequently approved by the WADEM Officers in August 2007.

Three "Chapter co-sponsors", later expanded to a steering group of 5 to include members from Australia, New Zealand and the Pacific Island Nations, lead the process. Three constituting meetings were conducted by teleconference, the general geography of the Oceania region defined, draft Chapter Charter and Chapter bylaws were distributed for input from WADEM members in the region. The Chapter was launched in November 2008.

An election for the inaugural Chapter Council has been conducted and the new Chapter Council had its first meeting in May 2009. The Council has a list of activities proposed in the constituting meetings, upon which to base an initial strategy plan for the young Chapter. One state ambulance authority is represented on the Chapter Council.

Conclusion: The WADEM Chapter guidelines have been most useful and the concept of Chapter co-sponsors has proved essential. Enthusiasm in the region has been promoted by the formation of the Chapter and membership in WADEM Increased. Experience to date would suggest that WADEM Chapters are viable, achievable and useful in promoting WADEM and its members and provides a rich professional opportunity for paramedics.

A MODEL FOR EMERGENCY PREPAREDNESS AND DISASTER HEALTH – THE UNDERPINNING DOMAINS

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Background: The conceptual framework for Disaster medicine is weak and lacks structure. There is a need to underpin Disaster medicine education and research with appropriate conceptual models.

Objective: This paper outlines the development and structure of one such model - a "work-in-progress".

Methods: Literature review of contemporary education programs in disaster medicine was undertaken and used to enhance the outcomes of the WADDEM Education Committee's evolving framework.

Findings: The literature review of contemporary education programs in disaster medicine identified some consistent themes representing a "new" thinking on conceptualizing the field of Disaster Medicine.

Four domains were constructed to develop a new framework for conceptualizing Disaster Medicine, namely: an expanded Disaster Health framework developed by the WADDEM Education Committee, which includes the primary disciplines of public health (the collective), emergency and risk management (the organisational), the clinical and psychosocial (the individual), secondary disciplines, the community, and, the socio-political-cultural context; a contemporary view of the Disaster Cycle; the health needs and disaster epidemiology of the region; and the generic personal attributes expected of the humanitarian professional.

The consequent model demonstrates the relationships between these domains.

Conclusions: As a "work-in-progress", this model has been used to successfully guide the development of undergraduate and graduate programs in emergency preparedness and disaster health. The model provides a framework for common communication and subsequent modification in the light of further research and discussion.

RECOVERY – THE FORGOTTEN STAGE OF PANDEMIC PLANNING

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Background: Pandemic planning has attracted much energy and international interest in recent years. There are international peak agency plans, national plans, regional plans, local community plans and organisational operational plans. These plans may be holistic or focus on specific needs and interests, eg general practice perspectives, or on business recovery etc. As a component in preparing for the delivery of a unit on disaster recovery in a Graduate Certificate in Emergency Preparedness and Disaster Health program, a range of these plans were reviewed. The outcome is surprising and unsettling.

Objectives: To review selected International, Australian and Australian State and Territory pandemic plans for their content on “Recovery”.

Methods: A literature review of selected pandemic plans.

Findings: The review is difficult to quantify because of the different nature and structure of the various plans. Compared to the preparedness and response phases, little content relating to “recovery” exists in the plans reviewed.

The WHO Global Influenza Preparedness Plan on the post pandemic period refers back to the pre pandemic phase with no specific consideration of recovery issues. The New Zealand Pandemic Plan includes only 3 pages of a 196 page document on “recovery”, but includes a framework and refers to business continuity.

The Victorian state plan defined recovery and included reference to: material and financial assistance; psychosocial and community recovery; economic recovery; and, ongoing recovery. This framework was common to other state’s plans. One surprising result was the identification of the complexity and multiple layers of responsibility within these plans.

Conclusions: The basis of this apparent deficiency in pandemic planning remains unclear. The multiple plans and competing responsibilities may be the cause for operational concern. Hopefully, as these plans are updated, the next versions may include a greater guide to recovery issues.

THE TREATMENT OF POSTPARTUM HAEMORRHAGE WITH OXYTOCIN IN THE PRE-HOSPITAL ENVIRONMENT

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Background: St John Ambulance Service in New Zealand presently has no pharmacological intervention for post partum haemorrhage (PPH). In developed countries 5 – 10% of obstetric cases develop PPH.

Objectives: To ascertain exposure by ambulance staff to at risk obstetric cases, and levels of staff confidence in managing post partum haemorrhage. To establish current best practice with a view to improving the clinical management of birthing mothers that are in ambulance service care.

Methods: Searches of databases were performed for studies in English related to post partum haemorrhage. The computer data bases provided access to biomedical journals, serial publications, books, theses and related research published since 1980. Literature was extracted by one systematic reviewer using key words. The key words used were: post partum haemorrhage, oxytocin, ergometrine, syntometrine, and misoprostol. Ambulance data was analysed to ascertain the number of ProQA #24 code pregnancy, birth or miscarriage patients treated and transported in New Zealand between 1 July 2007 – 30 June 2008. A pilot study of 11 frontline ambulance staff was also undertaken using a questionnaire.

Findings and Conclusions: Transport statistics indicate a strong likelihood of ambulance crews managing post partum haemorrhage. There were 2,955 patients transported under ProQA code #24. Data indicated 24% of these patients were either bleeding post partum or in the high risk category. PPH is defined as more than 1000 mls of blood loss after child birth. This obstetric emergency is one of the top five causes of obstetric death worldwide. The severity of bleeding can be missed in an obstetric patient because of the increased blood volume and initial compensatory mechanisms. Survey data indicated 54% of respondents reported that the current ambulance procedures required improvement. Oxytocin is a cheap effective solution for stimulating uterine contraction and preventing PPH.

PARAMEDIC DIAGNOSIS OF STROKE: EXAMINING USE OF THE MELBOURNE AMBULANCE STROKE SCALE (MASS) IN THE FIELD

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Introduction

Victorian paramedics used the Melbourne Ambulance Stroke Scale (MASS) to assist in identifying stroke in the field. Recent field evidence suggests a similar scale (Cincinnati Prehospital Stroke Scale (CPSS), otherwise known as FAST-face, arm, speech) was ineffectively utilized and lacked sensitivity and specificity. The aim of this study is to review use of the MASS in the field.

Methods: Patients, transported by ambulance to Box Hill Hospital (BHH) between January and May 2008, for whom the MASS assessments were performed were compared to the BHH stroke patient registry. The sensitivity and specificity of paramedic diagnosis, MASS and CPSS were calculated.

Results: Of 5286 emergency transports to BHH, MASS were performed for 861 (16%) cases. Of the 861 MASS, 199 (23%) has a discharge diagnosis of stroke/TIA. Paramedic diagnosis of stroke had a sensitivity of 93% (95%CI: 88% to 96%) and specificity of 87% (95%CI: 84% to 89%). The MASS had a sensitivity of 83% (95%CI: 77% to 88%) and specificity of 85% (95%CI: 83% to 88%), whereas the CPSS had a sensitivity of 88% (95%CI: 83% to 92%) and specificity of 78% (95%CI: 74% to 81%).

Conclusion: Paramedics have successfully incorporated MASS into the assessment of neurologically compromised patients. The MASS has equivalent sensitivity and greater specificity than CPSS/FAST. Paramedic diagnosis of stroke is higher than the use of MASS or CPSS/FAST alone, indicative of a successful stroke education program.

STROKE – A NATIONAL SYSTEM

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Background: There is growing evidence that good early stroke management can reduce damage to the brain and minimize the effects of stroke. In the hyper acute phase of care Ambulance provides a central coordinating role

The Australian Stroke Coalition, co-chaired by the National Stroke foundation and Stroke Society of Australasia, brings together leading organizations and networks, including the Council of Ambulance Authorities, that have an impact on the delivery of stroke care across Australia. One of the goals of the coalition is to develop national standards for pre-hospital care.

Objectives: To develop Australian standards for pre-hospital management of acute stroke based on the Australian clinical guidelines. These standards would include:

- Education of the recognition of stroke emphasizing that stroke is a medical emergency.
- Ambulance dispatch response protocols, stroke given a high priority.
- Use of a validated stroke assessment in the field
- Transfer to hospitals with stroke units

Methods: The Australian Stroke Coalition is a collaboration of the many aspects of stroke care and will bring together the evidence that will support a national approach.

For example research and current practice in Metropolitan Melbourne and the Hunter Region of NSW have proven that these specific elements lead to improved care of patients that suffer from stroke.

Findings and Conclusions: National Consistency in pre-hospital stroke management is one of the key outcomes.

The Clinical Guidelines for Acute Stroke Management, local and international research has proven that a systematic approach to pre-hospital care improves outcomes for stroke patients. National standards for the prehospital response to stroke are required to ensure consistent and equitable systems throughout Australia.

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The Ambulance Service of New South Wales (ASNSW) is one of the largest ambulance services in the world, responding to over a million calls annually. Similar to all other jurisdictions, much of our current practice and interventions have limited or no supporting evidence demonstrating improved outcomes for patients. Callaham (1997)¹ termed this the 'scanty science of pre-hospital emergency care' – the dearth of rigorous studies into out-of-hospital medical interventions.

On May 11, 2009 the NSW Minister for Health, The Honorable John Della Bosca MLC, announced the provision of funding to establish the Ambulance Research Institute (ARI), a timely response to the urgent need for high-quality pre-hospital research. The funding has been allocated to staff ARI and to provide research scholarships to operational paramedics. ARI is engaging a network of collaborators including universities, research centres and professional bodies.

An integral part of the Institute's strategy to undertake research that is both scientifically valid and measures meaningful outcomes, and this rests on the establishment of the Distributed Research in Emergency and Acute Medicine (DREAM) network – a network of collaborative co-investigators in medical, nursing and allied health fields, drawn from all hospitals in NSW. ARI research will address questions arising from six areas; community needs/expectations, ambulance clinical practice, medical retrieval operations, systems modeling and analysis, operational research and workforce education and culture.

In addition to these broad research activities, ARI has a commitment to fostering a culture of evidence-based research and practice within the ASNSW. A key step in this process has been the implementation of the Pre-hospital Research and Evidence-based Practice (PREP) course - an ARI developed online course affording paramedics the opportunity to acquire an understanding of evidence based practice, literature searching, critical appraisal and the basic principles and practice of research.

The establishment of a research institute within an ambulance service will be a key driver in redressing the paucity of evidence to guide pre-hospital emergency care.

References:

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THE EPIDEMIOLOGY OF ANALGESIC USE WITHIN A LARGE AUSTRALIAN AMBULANCE SERVICE

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Background: The comparative effectiveness of commonly used analgesics in the pre-hospital arena has been previously reported. Methoxyflurane has been shown to be inferior to both morphine and fentanyl.¹ Patterns of analgesic use are less well described in the literature.

Objectives: This study aims to describe the epidemiology of analgesic administration within a large tiered emergency medical system that uses morphine, fentanyl and methoxyflurane for managing acute pain.

Methods: A retrospective analysis was conducted using data extracted from Patient Health Care Records (PHCR). All cases between July 1, 2007 and June 30, 2008 in which morphine, fentanyl or methoxyflurane was administered (alone or in any combination) to patients aged between 2 and 99 years of age were included.

Findings: A total of 96,963 cases were identified that met the eligibility criteria. Single-agent analgesia occurred in 87% of cases (methoxyflurane 47.9%; morphine 22.6%; and fentanyl 16.5%). Co-analgesia occurred in 12.9% of cases. There was very strong evidence that children were less likely to receive opiates compared to adults (RR 0.55; 99%CI 0.52-0.57; $p<0.0001$). When children did receive opiate analgesia, they were more likely to be administered intranasal fentanyl than parenteral morphine (RR 1.79; 99%CI 1.72-1.86; $p<0.0001$).

Conclusion: Pain in our setting is most commonly managed using a single agent. Methoxyflurane is the most commonly administered agent with opiates used for less than 40% of patients. Combinations of analgesic agents are infrequently used. Children are less likely to receive opiate analgesia than adults but when administered, intranasal fentanyl was used more than morphine.

References:

1. Middleton P, Bendall J, Simpson P, Sinclair G, Dobbins T. Efficacy of out-of-hospital administration of morphine, fentanyl and methoxyflurane in adults: a single centre observational comparative study of over 38,000 patients. *Journal of Emergency Primary Health Care (JEPHC)*, Vol.6, Issue 3, 2008

OPERATIONAL EPIDEMIOLOGY OF AMBULANCE RESPONSES IN SYDNEY: IMPLICATIONS FOR PARAMEDIC EDUCATION AND MODELS OF CARE

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Demands on modern ambulance services are forever increasing. It is well known that pressures include increasing demand, an ageing population, reduced access to general practitioners (especially after hours), non-emergency use of triple zero and delays at emergency departments.

In a sample of data from 22/12/07 to 31/10/08 (305 days) comprising 284,337 triple zero cases across Sydney Division, 52% of all cases were categorised into one of five Medical Priority Dispatch System (MPDS) problem descriptions ('Breathing Problems', 'Falls', 'Person ill', 'Chest pain' and 'Unconscious/Fainting') and 90% into one of fifteen problem descriptions.

Paramedics respond to 70% of cases as 'urgent' or 'lights and sirens' responses (1A, 1B and 1C) with the balance 'cold' (2A, 2B and 2C). Over 80% of cases occur between the hours of 0800 and 0000. Almost 24% of cases where paramedics arrive on scene do not result in transport to hospital. The highest non-transport rate (excluding 1A responses) was in 2C and 1C cases. The lowest non-transport rate was observed in 2B cases.

Our jurisdiction recently introduced an Extended Care Paramedic (ECP) program where a small group of paramedics were trained specifically in the assessment and management of patients with sub-and non-acute health care needs. Central to the program were clinical decision making, clinical risk management and being authorised to recommend alternatives to the Emergency Department (ED). The overall non-transport rate for ECPs was significantly higher (39% vs 24% $p < 0.0001$). There was very strong evidence that ECPs had significantly higher non transport rates for 1C, 2A, 2B, and 2C cases ($p < 0.0001$).

It is hypothesised that the observed increase in ECP non-transport rate was a direct consequence of the ECP course and program philosophy. It is unclear what precise elements of the ECP course or program are responsible for the observed changes.

Better understanding the nature of contemporary ambulance practice is likely to assist ambulance jurisdictions better meet current challenges. It appears that education focused on common presentations and decision making can have a favorable impact on reducing presentations to EDs.

PAIN SEVERITY IN ADULTS IS NOT A PREDICTOR OF AMBULANCE RESPONSE PRIORITY

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Background: Most ambulance jurisdictions use some form of medical priority dispatch system (MPDS) to allocate the response priority for the ambulance resource tasked to the incident. Pain severity is not commonly a determinant of the priority of dispatch. Lord et al. (2009)¹ recently reported that pain severity had no influence on the priority (urgency) of the dispatch response.

Objectives: The aim of this quality assurance activity was to investigate the relationship between pain severity and ambulance response priority.

Methods: A search was conducted of our Patient Health Care Record (PHCR) data base for adult patients (16-99) who were administered either morphine, fentanyl or methoxyflurane (alone or in combination) between 1st July 2007 and 30th June 2008. Those who had an initial pain score recorded (1⁺), had a response time within 60 minutes and had a GCS of 14⁺ were included in the analysis.

Findings: During the study period there were 22,645 patients identified. There was no evidence that increasing pain severity increases the odds of a “hot” response (Table 1). The mean response time for “hot” (urgent) and “cold” (non-urgent) cases was 15 ± 9 min (90th percentile 27 min) and 19 ± 11 min (90th percentile 34 min). Whilst this difference was significantly different (p<0.0001) the difference of 4 min (95% CI 3.7–4.2) is of questionable clinical significance.

Conclusion: Pain severity does not significantly influence ambulance dispatch priority in patients administered analgesia by paramedics. In our jurisdiction, being triaged as “cold” (non-lights and sirens response) has only a small impact on the time taken for an ambulance to arrive.

Table 1: Univariate and multivariate logistic regression model results for the influence of pain severity on the odds of a ‘lights and sirens’ response

Pain severity	Crude OR (95% CI)	Adjusted[#] OR (95% CI)
Mild (Pain Score 1-3)	1.00	1.00
Moderate (Pain Score 4-7)	1.20 (0.99-1.45)	1.05 (0.85-1.31)
Severe (Pain Score 8-10)	0.90 (0.75-1.08)	0.96 (0.77-1.19)

[#]Adjusted for age, sex, main-condition, response time, age*sex, sex*main-condition

References:

1. Lord B, Cui J & Woollard M. Emerg Med J. 2009; **26**: 123-127

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Background: Measurement of a blood pressure (BP) in the prehospital setting is one of many basic skills required of a paramedic. Assessment of BP is also one of several clinical measures that determine the patient's treatment and possibly the receiving hospital. To date there have been no studies of undergraduate paramedic students and their accuracy in BP measurements.

Objectives: The aim of this study was to determine the accuracy of undergraduate paramedic students in taking a BP in a non-clinical setting.

Methods: This was a prospective observational study using the Laerdal VitalSim mannequin with the BP volume and strength set at mid range values to test the accuracy of BP measurement. 62 third year Monash University paramedic students were available for inclusion. We used three different BP ranges, a low, normal and high BP. Each student was randomly assigned the first and second BP by the student choosing a number between 1 and 3. Two mannequins were used, one had a thin, the other a thick, piece of clothing under the BP cuff. Each student was permitted one practice BP prior to the study commencing. Ethics approval was granted.

Findings: A convenience sample of 26 (42%) third year undergraduate paramedic students participated. 69% were female, with 46% being between 21 and 25 years of age. Two students had previous BP measurement experience. There was a statistical significant difference between the actual and student measured BP for the high systolic BP ($p=0.004$), normal systolic BP ($p=0.023$), and low systolic ($p=0.019$) and diastolic ($p=0.004$) BP. There was no statistical difference between the student's BP measurements for the thin or thick clothing.

Conclusions: This pilot study has highlighted that third year Monash University paramedic student's lack BP measurement accuracy in a non-clinical setting. This pilot study has highlighted the need for review of BP measurement in the curriculum.

AN ASSESSMENT OF UNDERGRADUATE PARAMEDIC STUDENTS' EMPATHY LEVELS: ATTITUDES TO PATIENTS' MEDICAL CONDITIONS

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Background: Paramedics rely on establishing a health provider-patient relationship with patients they attend thereby promoting two-way communication and patient satisfaction in delivering appropriate patient assessment and treatment. Paramedics must also have an ability to empathise with the patient and their family members in order to understand a patient's perspective when developing a successful health provider-patient relationship.

Objectives: The objective of this study was to assess the extent of empathy in paramedic students at Monash University.

Methods: A cross-sectional study consisting of two paper-based questionnaires using a convenience sample of first, second and third year undergraduate paramedic students studying at Monash University. Student empathy levels were measured using two standardised self-reporting instruments; first was the Jefferson Scale of Physician Empathy (JSPE), and second, the Medical Condition Regard Scale (MCRS).

Findings: A total of 94 students participated in the study of which 63% were females. The maximum JSPE score was 140. Males had greater mean JSPE empathy scores than females, 113.25 v 107.5, $p=0.042$. The JSPE also identified that first year undergraduate paramedic mean empathy levels were the lowest, 107.53 with second years the highest at 110.4, and student age having no significant affect on empathy scores. The MCRS maximum score was 66. The MCRS produced low mean scores in relation to student compassion for a patient with substance abuse, 46.42, and non-English speaking background patients, 49.17. Mean MCRS scores decreased significantly from first year to third year.

Conclusions: This study suggests that Monash University undergraduate paramedics improve their empathy towards patients over the duration of the course and that they lack compassion for some patients in certain situations. These results are significant in the emerging paramedic discipline and provide educators with important information for the improvement of the health provider-patient relationship in curriculum development.

THE FIRST SEVEN YEARS OF THE METROPOLITAN FIRE BRIGADE EMERGENCY RESPONDER PROGRAM

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Background: The Melbourne Metropolitan Fire and Emergency Services Board (MFESB) was the first fire service in Australia to implement a service wide emergency medical response (EMR) program in 2001. No additional scientific analysis of the first responder program has been reported since the pilot program.

Objectives: The objective of this study was to review the first seven years of responses by firefighters as first responders.

Methods: The MFESB have three separate datasets with cardiac arrest information: i) callout record; ii) patient care record; and iii) cardiac arrest record, including data from the automatic external defibrillator (AED). Descriptive statistics were used to summarise the demographic and specific outcome data. Ethics approval was granted.

Findings: A total of 8,227 incidents were attended over the first seven years, with a low of 879 incidents in year 5 to a high of 1,485 in year 7. The most incidents attended were cardiac arrest 54% (n=4,450) followed by other medical 19% (n=1,579), and drug overdose 11% (n=908), the remainder, trauma, drowning/near drowning, suffocation, electric shock, gas/smoke inhalation and burns were < 10% each. 63% of incidents involved males. Average age was 57.2 years, median age 63 years, range from < 1month to 101 years. Average response time was 6.1 minutes, median response time 5.6 minutes, range from 9 seconds to 31.7 minutes, 90 percentile response time was 8.7 minutes. Firefighters provided “initial care” in 54% and assisted in 25% of the incidents. Firefighters spent on average 4.8 minutes with the patient before handing over to paramedics, median 3.9 minutes, range a few seconds to 39.2 minutes.

Conclusions: This study suggests that the MFESB EMR program is providing firefighter first responders to emergency situations in an acceptable timeframe to assist the ambulance service.

IS IT TIME TO CHANGE THE PREHOSPITAL TRAUMA TRIAGE GUIDELINES?

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Background: Current Victorian and USA prehospital trauma triage guidelines have a cascading approach using physiological status, pattern of injury and mechanism of injury to determine prehospital potential major trauma. Current components of the Victorian Prehospital Trauma Triage guidelines have a > 90% overtriage rate.

Objectives: The objective of this study was to determine if a change to the trauma triage guidelines makes them more predictive of hospital defined major trauma.

Methods: Twelve months of prehospital trauma data was linked to the Victorian State Trauma Registry to determine patient outcomes. Positive Predictive Values were calculated for each of the prehospital trauma triage criteria and for combinations of the triage criteria.

Findings: For adult patients, when using physiological status only, patients with respiratory distress or GCS < 13 or BP < 90mmHg only, had a 21%, 30% and 22% chance of having hospital defined major trauma. Patients with a penetrating chest or abdominal injury only, had a 16% and 25% chance of having hospital defined major trauma. Patients with a blunt head or chest or abdominal injury only, had a 5%, 8% and 11% chance of having hospital defined major trauma. When combining penetrating chest or abdominal injury with BP < 90mmHg, patients had a 50% and 55% chance of having hospital defined major trauma. When combining blunt head injury with GCS < 13, blunt chest injury with respiratory distress and BP < 90mmHg, and blunt abdominal injury with BP < 90mmHg, patients had a 34%, 40%, and 30% chance of having hospital defined major trauma. The paediatric criteria demonstrated similar changes to the adult criteria.

Conclusions: When using prehospital trauma triage criteria, combining positive pattern of injury and physiological criteria, instead of using positive individual criteria, increases the predictability of hospital defined major trauma.

A REVIEW OF THE FIRST SEVEN YEARS OF THE METROPOLITAN FIRE BRIGADE RESPONSE TO CARDIAC ARRESTS

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Background: The Melbourne Metropolitan Fire and Emergency Services Board (MFESB) was the first fire service in Australia to implement a service wide emergency medical response (EMR) program in 2001. The aim of the program was to decrease the response time to code 0 cases in the MFESB area of operation.

Objectives: The objective of this study was to review the first seven years of cardiac arrest responses by fire fighters as first responders.

Methods: The MFESB have three separate datasets with cardiac arrest information: i) callout record; ii) patient care record; and iii) cardiac arrest record, including data from automatic external defibrillators (AED). Descriptive statistics were used to summarise the demographic and specific outcome data. Ethics approval was granted.

Findings: A total of 4,450 cardiac arrest incidents were attended over the first seven years, with a low of 526 in year 5 and a high of 765 in year 7. 67% of males were in cardiac arrest. Average age was 67.5 years, median age 72 years, range from several weeks to 101 years. Average response time was 6.31 minutes; median response time 5.73 minutes, 90 percentile time was 8.9 minutes, range 9 seconds to 31.5 minutes. Following application of the AED, “shock advised” occurred for 288 (26%) of the 1,090 incidents where the AED was used. Fire fighters provided “initial care” in 46% of the cardiac arrests. The crude survival was 2% for all cardiac arrests attended and 30% when the patient was defibrillated. Bystander CPR was relatively static in the first 5 years, approximately 25%, but significantly increased in year 6 and 7 to 44%.

Conclusions: This study suggests that the MFESB EMR program is providing fire fighter first responders to cardiac arrests in an acceptable timeframe and has assisted in increasing the survival from cardiac arrest in the MFESB area of operation.

ENHANCING SUPPORT AND WELLBEING WITHIN AMBULANCE SERVICES

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Background: Research has shown that a large percentage of ambulance staff exhibit signs and symptoms of Post Traumatic Stress Disorder (PTSD). Staff may be unaware of the signs of PTSD that may develop due to chronic or acute exposure to work place stress. In the current health and safety legislative environment employers could be challenged. Developing a better understanding of how to remain healthy is essential to ensure a good quality of life and maintain optimum performance on the job.

Objectives: To investigate whether ambulance officers and paramedics work in a psychologically toxic environment, quantify what percentage of staff within one region have stress related concerns, and to establish if further staff training is required to compliment the Peer Support System in St John Ambulance Service, New Zealand.

Methods: Searches of Medline, ProQuest and Ovid were performed for studies related to stress disorders in emergency services personnel published since 1980. Literature was extracted by one systematic reviewer using key phrases. The key phrases used were: Post Traumatic Stress Disorder, chronic stress, exposure to tragedy, risk of serious injury or death at work, and peer support. Frequency data on peer support contacts was extracted from Midland region ambulance records and a pilot study of 20 frontline staff was undertaken using a questionnaire.

Findings and Conclusions: Results indicated that staff had been frequently been exposed to stressful events, verbal abuse, and physical assault. Of those that had been physically assaulted on the job, 95% had not reported the assault or filled in the service incident forms. All respondents indicated that they wanted more training on how to deal with personal stress due to job related factors.

THE IMPLEMENTATION OF NON-INTUBATED CAPNOGRAPHY INTO THE AMBULANCE SERVICE

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Background: Capnography is the measurement of exhaled carbon dioxide with each breath over time. Capnography is displayed by a wave form of the end-tidal carbon dioxide value (ETCO₂). Monitoring carbon dioxide levels is of value when confirming endotracheal tube placement as well as assessing circulatory and ventilatory status, airway obstruction and restriction.

Objectives: To investigate ambulance personnel's current knowledge and understanding of non-intubated capnography, specifically what conditions they perceive it to be useful for and what factors would affect its accuracy. To determine the suitability of non-intubated capnography in the pre-hospital setting.

Methods: Searches of databases were performed for studies in English related to non-intubated capnography. The computer data bases provided access to biomedical journals, serial publications, books, theses and related research published since 1988. Literature was extracted by one systematic reviewer using key words. The key words used were: non-intubated, intubated, capnography, carbon dioxide, monitoring, pulse oximetry, paramedic and pre-hospital. A pilot study of 20 frontline ambulance staff was also undertaken using a questionnaire.

Findings and Conclusions: Survey data indicated that 55% of ambulance staff had a basic knowledge of capnography. Opinion varied as to what status of patient this measurement device would be best suited to. Training of staff and cost of product was identified as a possible barrier to introduction.

Non-intubated capnography has benefits in the pre-hospital setting as it does not rely heavily on patient compliance, is relatively non-invasive, does not interrupt oxygen or drug treatment, and provides a real time graphic display of end tidal carbon dioxide levels. Non-intubated capnography has merit for use in the continuous assessment of patients with poor perfusion or ventilation. However, the wave forms are not as precise as intubated capnography.

PRE-HOSPITAL THROMBOLYTIC THERAPY: TO USE OR NOT TO USE?

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Background: In acute myocardial infarction the longer the damaged portion of myocardium remains under-perfused, the less likely it is that tissue can be salvaged and that normal function can be restored. Both pharmacological reperfusion and catheter based interventions have markedly improved clinical outcomes. St John at the time of this study, were considering trialing a new protocol in selected regions.

Objectives: To investigate the suitability of administering thrombolytic therapy to patients' suspected of suffering from an acute myocardial infarction in the pre-hospital setting, and to analyze whether this practice should be instigated as a new national protocol in St John Ambulance Service, New Zealand.

Methods: Searches of Medline, ProQuest and Ovid were performed for studies related to thrombolysis. Literature was extracted by one systematic reviewer using key words. The key words used were: ST elevation, myocardial infarction, thrombolysis, fibrinolysis, reperfusion, pre-hospital, and paramedics. St John Ambulance protocols, Wellington Free Ambulance Service, and United Kingdom Ambulance Service Clinical Practice Guidelines were also reviewed.

Findings and Conclusions: The key factor to improving mortality and morbidity has been reported to be the speed of pharmacological reperfusion and catheter based intervention. The call to needle time set by the United Kingdom National Health Service is transport times of over 60 minutes, these timeframes are common in regional New Zealand and urban settings during peak time traffic. Time is myocardium. The inclusion and exclusion criteria for Tenecteplase are stringent and straightforward for application by suitably qualified Paramedics. For example: ST elevation of 2 mm in two contiguous leads, and no severe uncontrolled hypertension. The evidence supports the introduction of Tenecteplase.

THE FEASIBILITY OF ESTABLISHING EMERGENCY CARE PRACTITIONERS IN NEW ZEALAND

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Background: Emergency Care Practitioners (ECPs) currently work within the United Kingdoms' National Health Service (NHS). An ECP is a healthcare professional who works to a medical model, with the attitude, skills and knowledge base to deliver holistic care and treatment within the pre-hospital, primary and acute care settings with a broadly defined level of autonomy. There are increasing demands and inequalities identified in the present New Zealand Health System. This indicates the need for research to investigate and to question how the emergency ambulance services of New Zealand, could contribute to enhancing our communities' safe and effective access to, and affordability of primary health care.

Aim: The aim of this dissertation is to investigate if ECPs could be a suitable practitioner to establish within the New Zealand emergency ambulance services and the New Zealand health system. Advanced Paramedics and Stakeholders views on professional registration and regulation for the emergency ambulance services have also been investigated within the research.

Methods: This is a mixed methods project involving New Zealand Advanced Paramedics employed by an emergency ambulance service in New Zealand and Stakeholders of organisations considered to have a vested interest in emergency ambulance service operations, both directly and indirectly.

Results: The Advanced Paramedic questionnaire showed that 38% of the respondents strongly agreed that ECPs could be a realistic option for the New Zealand emergency ambulance services (95% confidence interval = 29.1% to 47.4 %). Stakeholder organisation respondents 15/15 (100%) unanimously considered ECPs to be a realistic option for the New Zealand emergency ambulance services (95% confidence interval – 81.90% to 100%).

Conclusions: The concept of introducing ECPs into New Zealand was considered feasible by both Stakeholder respondents who said yes (100%) and Advanced Paramedic respondents who said definitely yes (38%) using a Likert-type response scale.

Simultaneously Advanced Paramedic respondents expressed a desire to be professionally registered and regulated. All Stakeholder respondents supported the concept of ECPs for the New Zealand emergency ambulance services.

MANAGING PAIN IN THE PRE-HOSPITAL SETTING WITH INTRANASAL OPIOIDS

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Background: Intranasal drug administration is an easy well tolerated route that provides a highly vascular surface for absorption that avoids first pass metabolism in the liver. Intramuscular injection or an intravenous cannula can cause further pain, venous access may be limited, intramuscular absorption may be delayed in some patients, and some patients may be scared of needles and refuse needed pain relief. This study explores the painless option of opioid administering medication via the nasal cavity.

Objectives: To provide a critical review of intranasal pain relief.

Methods: Searches of EBSCO and Pubmed databases were performed for studies in English related to pain management published since 1993. Literature was extracted by one systematic reviewer using key words. The key words used were: opioids, Fentanyl, Morphine, analgesia, intranasal, pre-hospital, elderly, and children. A pilot study was also undertaken using a questionnaire. The survey of 8 frontline ambulance staff looked to establish indicators of current issues surrounding pre-hospital analgesia.

Findings and Conclusions: Morphine is poorly absorbed from the nasal cavity. Studies comparing intranasal Fentanyl with intravenous Morphine noted no statistical difference in patient reporting of pain relief using a visual analogue scale. In one study intranasal Fentanyl was found to be clinically acceptable in 85% of patients and provided rapid pain relief. Poor tolerance was noted in a small minority.

Survey results indicated that 37.5% of respondents believed the procedures did not provide sufficient options for pain management in children.

Costs of intranasal Fentanyl are 59 cents per ampoule higher than Morphine Sulphate; however, the pain relieving benefits may be worth more than the fiscal considerations.

A CONCEPTUAL FRAMEWORK FOR CONTINUING EDUCATION IN AMBULANCE SERVICES

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Background: Continuing clinical education of emergency medical service (EMS) personnel within operational settings is disparate. Some ambulance services have extensive in-service education and other services have very little. Often the only form of education a person receives is whilst acquiring qualifications. Ongoing inquiry and reflection on one's own clinical practice needs to be fostered. The challenge for achieving clinical excellence is immense.

Objectives: To contribute to continuing clinical education strategies for the Order of St John, New Zealand.

Methods: Searches of databases were performed for studies in English related to clinical education in EMS. The computer data bases provided access to education journals, serial publications, books, theses and related research published since 1983. Literature was extracted by one systematic reviewer using key words. The key words used were: ongoing, continuing, education, clinical, models, ambulance, paramedic, inter-professional, reflective, learning styles, and evidence based practice.

Findings and Conclusions: In this increasing litigious society there is an emerging hegemony of terms such competency, scope of practice, consumer, ethics, and audit. Ongoing education strategies in ambulance service need to support clinical excellence by developing a culture where continual learning is the accepted norm. Clinical educators need to ensure that their role is to facilitate ongoing education that reduces the attrition of knowledge and skill, and that maintain the gold standard of optimum patient care. The role of clinical standards personnel is not purely that of an auditor. Constructive critique of cases is needed where intellectual curiosity is fostered rather than the focus resting on the performance gaps. Continuing clinical education can build experience based problem solving and can enhance personal responsibility through reflective practice.

CHEST INJURIES ATTENDED BY PARAMEDICS IN RURAL VICTORIA – A SIX MONTH REVIEW

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Background: The Victorian Prehospital Trauma Triage Study identified that rural paramedics see 28% of the states trauma and that a rural Victoria paramedic would, on average, see 1.6 physiologically distressed trauma patients every two years. Three educational based reports in the early 2000's suggested on-going trauma simulation for all paramedics based on perceived low trauma exposure.

Objectives: The objective of this study was to determine the number and severity of chest injured patients seen by rural Victorian paramedics.

Methods: Six months of rural prehospital chest trauma data was collected from Patient Care Records for 2002. The prehospital data was linked to the Victorian State Trauma Registry to determine patient outcomes. Ethics committee approval was obtained.

Findings: There were 604 trauma patients with chest injuries, 581 blunt and 23 penetrating, accounting for 7.7% of all rural trauma incidents. 62% were males, average age was 39.1 years, median 36 years, range several months to 91 years. 64% (n=387) were chest injuries alone with 7% (n=43) of all patients being physiologically distressed. 29% (n=172) received pain relief with 24% (n=41) receiving both Penthrane and Morphine. 17% (n=60) had fluid administered, with an average of 735mls, median 500mls, maximum of 4,750mls. For patients with a suspected tension pneumothorax one needle test was performed with no result and three chest decompressions, with two having a resultant air escape. 46 (7.6%) patients had hospital defined major trauma, 15 (35%) were physiologically distressed, and 2 had a penetrating injury. 7 (1.2%) patients died, 1 with a penetrating injury.

Conclusions: This study has highlighted that rural Victorian paramedics manage few trauma patients with chest injuries and even less who are physiologically distressed. Patients with traumatic tension pneumothorax requiring decompression are rare. These results suggest on-going trauma simulation is required to ensure optimal clinical decision making and management for chest injured patients.

SWINE FLU – COUGHS, COLDS AND (BUSINESS) CONTINUITY

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Ambulance Victoria (AV) has had a Pandemic Influenza Plan since 2004. The plan has three key principles: staff protection, demand management and business continuity. It is based on the practices established in the Ambulance Victoria Emergency Response Plan.

Ambulance Victoria was made aware of the emergence of a novel strain of H1N1 influenza in April 2009. In order to engage the entire organization rapidly, it was clear that both the Emergency Management Department would be the focal point of all activities related to the incident, particularly operational response. The Business Continuity Team concentrated on non-operation functions.

A key feature of the plan is the importance of communications with staff. Ambulance Victoria released many internal communications regarding the novel virus which outlined the case definition and personal protection precautions to be undertaken.

Changes were made in the call taking script for ambulance '000' operators to identify potential cases from the point of call. As a result paramedics are alerted to all potential cases of H1N1 Influenza 2009 prior to their arrival. The Ambulance Victoria Telephone Referral Service also commenced providing a specific telephone triage for potential cases based on the National call taking script. The Referral Service can also direct callers to the various diversion "flu" clinics as appropriate.

Ambulance Victoria also undertook pre-planning for further escalation of planning or severity of disease. This includes both demand management and staff protection activities.

A key finding during this event was that the progression of the disease did not match those expected by pandemic plans at any level. As a result only selected components of the Ambulance Victoria plan were implemented immediately, while others prepared for later implementation if required.

At the time of writing, Ambulance Victoria has responded to close to 500 cases that met the case definition on telephone triage. A more detailed report will be presented with progression of the outbreak.

HOW DO PARAMEDIC SYRINGE MEDICATION ERRORS OCCUR AND WHAT SOLUTIONS ARE AVAILABLE

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Background: Medication errors occur in all fields of medicine including Prehospital care. The consequences of such errors can lead to patient morbidity or mortality. How errors occur and possible solutions to aid Paramedics can be found in research studies on allied health professions.

Objectives: To define medication errors, establish errors made in clinical practice and determine systemic failures that lead to syringe medication errors. The findings from this literature review will then be used to promote methods to mitigate medication errors made by Paramedics.

Methods: Searches of Ovid, Science Direct, Blackwell Synergy and ProQuest databases were performed for studies related to errors in medications administered by syringe and prevention strategies for these types of errors. The research criteria focus was narrowed to anesthetic errors as similar key causes found in Paramedic practice were strongly identified by the reviewer. The findings were then examined and critiqued for their practicability as possible prevention methods in the Prehospital setting.

Findings and Conclusions: Medication errors by Paramedics has been under investigated. Factors contributing to syringe medication errors in allied health fields identified included emergency situations, stress, fatigue, multiple preparation steps, incorrect equipment, ampoule misidentification, poor lighting and working alone. Simple but effective risk management techniques were identified as being useful in the prevention of medication errors in Paramedic practice. As there is usually more than one precursor to syringe based errors occurring, the identification of situations when errors are more likely to occur enables Paramedics to use preventative strategies to reduce the chances of these medication errors occurring. These preventative measures can significantly reduce patient morbidity and mortality. Future research into the prevalence of medication errors in Paramedic practice would benefit the Paramedic practitioners and their patients.

ARE WE ROLLING WITH THE PUNCHES IN THE FRONTLINE MANAGEMENT OF INTIMATE PARTNER VIOLENCE?

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Background: The leading risk factor of morbidity and mortality in Victorian women aged between 15-45 years is intimate partner violence (8 times than that of smoking).¹ This has an extremely high cost to the individual, the community and the burden of disease. Paramedics are frequently the first point of contact for victims of intimate partner violence (IPV), being called to the setting generally post-incident and often instead of law enforcement. Due to this unique viewpoint, paramedics have the advantage of potentially identifying and reporting IPV, which can then result in early intervention. How paramedics report IPV via screening tests has yet to be formally addressed across Australia.

Objectives: To review the literature regarding prehospital provider knowledge of IPV and reporting ability.

Methods: Nine computerized databases were searched to the end of April 2009. Inclusion criteria included intimate partner violence, domestic violence, sexual assault, physical assault relating to either out-of-hospital or in-hospital sectors. The search involved reviewing the Cochrane Database of Systematic Reviews, Ovid MEDLINE, EMBASE, CINAHL, ProQuest, and PubMed.

Findings: The initial search located over 3000 articles. Using the inclusion criteria a total of 21 articles were deemed relevant. The findings suggest that prehospital providers are limited in their knowledge of, and ability to identify IPV.²⁻⁴ Prehospital reporting of IPV also showed inconsistencies between EMS and independent assessor documentation.³ The majority of research is limited to the United States; there was no Australian prehospital-related literature.

Conclusions: Several recommendations have been made by the authors following the literature review. Studies need to be conducted within Australia to determine the capability of prehospital providers in identifying and reporting IPV effectively, whilst acknowledging the international differences in prehospital training. Research should determine barriers to successful identification and reporting of IPV. Finally, a recommendation to verify the quality of IPV screening by paramedics in the prehospital setting will be made.

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INFECTION CONTROL PRACTICES OF RE-USEABLE ITEMS IN PARAMEDIC PRACTICE IN NEW ZEALAND

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Background: Ambulance Officers and Paramedics are exposed to infectious diseases on a daily basis. Suboptimal adherence to infection control procedures occur. Poor infection control practices unduly place patients and staff at risk. Non-compliance relates to perceptions of risk, workload, availability of personal protection equipment, and time. Emergency medical service personnel should limit their exposure to biological secretions and eradicate contamination by using appropriate disinfection and sterilisation procedures.

Objectives: To critically examine current paramedic practice in relation to reusable equipment and further define best infection control practices for Ambulance Officers and Paramedics.

Methods: Searches of Medline, ProQuest and Ovid were performed for studies related to cleaning and decontamination of laryngoscopes, bag masks, and stethoscopes. Government and ambulance standards and service policies were also accessed. Literature was extracted by one systematic reviewer using key words. The key words used were: laryngoscope, stethoscope, bag valve mask, Ambu-bag, pre-hospital, ambulance, disinfection, decontamination, sterilisation, and infection control. A pilot study was undertaken to ascertain current paramedic practice that may contribute to the increased risk of cross contamination.

Findings and Conclusions: International studies on ambulance service microbial colonization, contamination, and disease transmission are limited. Nosocomial infections pose a hazard for all patients especially those who are immuno-compromised. Hand washing and barrier protection remains the most important and simplest form of infection control. With the transmission of microorganisms from equipment to patients, effective cleaning policies and procedures of re-usable items is imperative. Survey results indicated that paramedics rarely cleaned stethoscopes. Stethoscopes are a basic paramedic tool that may be a vector of infection due to contact with numerous people. This study identified areas for improvement in ambulance service infection control.

IMPROVING ACCESS TO ACUTE STROKE THROMBOLYSIS FOR RURAL COMMUNITIES VIA TRANSPORTATION AND PRE-HOSPITAL ASSESSMENT SYSTEMS

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Background: Australian thrombolysis (tPA) rates for acute ischaemic strokes are <3%.¹ To date, rural stroke patients have virtually no access to this powerful and cost effective therapy. Implementation of the Pre-hospital Acute Stroke Triage (PAST) protocol, a systems re-design project in the Lower Hunter region in 2006, resulted in dramatic improvements to patient access to tPA therapy (from 4.7% to 21.4%).²

Aim: To increase access to tPA for acute stroke patients in an expanded rural catchment via innovative pre-hospital clinical assessment methods and facilitated urgent transport.

Methods: The Rural PAST Protocol was developed collaboratively with the Ambulance Service of NSW. It includes a new pre-hospital assessment tool and a Transport Decision Matrix, utilising road and combined road/air transfers to expedite patients to JHH. Paramedic education was undertaken including an overview of stroke and protocol implementation. Quantitative evaluation will compare tPA rates pre and post protocol implementation, tPA yield of the rural protocol versus the existing metropolitan protocol² and inter-rater reliability of the new pre-hospital stroke assessment tool. Qualitative analysis will examine acceptability of the protocol for stroke survivors, friends/relatives/carers of stroke patients and paramedics implementing the protocol.

Results: A workshop involving the JHH stroke team and senior ASNSW members developed a 'cutdown' NIHSS for pre-hospital assessment. The protocol was implemented on 06/04/2009. In the pre-implementation phase, no rural catchment stroke patients had received tPA in the preceding 12 months. To June 19th 2009, 5 patients have undergone transport from the rural catchment, 4 of the patients with confirmed cerebrovascular event and 2 have received tPA within 3 hours from stroke onset. Detailed results will be provided at time of presentation.

Conclusions: This innovative project integrates pre-hospital emergency services with hyper-acute Stroke Team care via novel transport mechanisms and in-the-field assessment to increase access to tPA for rural patients.

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PRE-HOSPITAL AIRWAY MANAGEMENT: AMBULANCE SERVICE OF NSW EXPERIENCE SINCE THE INTRODUCTION OF THE LARYNGEAL MASK AIRWAY

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Background: The Laryngeal Mask Airway (LMA) was introduced into the Ambulance Service of New South Wales (ASNSW) in 2005. Skill levels in the ASNSW that are qualified to insert an LMA include Qualified Paramedics, Advanced Life Support Paramedics and Intensive Care Paramedics. Past research shows paramedics in the field have an overall LMA insertion success rate in the order of 70%¹ while paramedics inserting an LMA in an operating theatre setting have a success rate closer to 90%.²

Objectives: This retrospective quality improvement initiative aims to examine the usage of and the success rate of LMA insertion by paramedics in NSW.

Methods: A search of the Patient Health Care Records (PHCR) was undertaken to determine the success rates of LMA insertion. All cases between July 1, 2007 and June 30, 2008 that had an LMA insertion attempt were included. These data were analysed using simple descriptive statistics.

Results: There were 795 attempted LMA insertions during the study period. The median age of patients was 67 years (IQR 49-78 years). The overall LMA insertion success rate was 64%. Of the LMA attempts, 71% of patients were for patients in cardiac arrest. Success rates were significantly higher in cardiac arrest patients (67%) compared to non-cardiac arrest patients (55%) (RR 1.17 95% CI 1.01-1.36 p= 0.001).

Conclusion: LMA insertion rates during this period were 63%. Success rates were significantly highest when attempted for patients in cardiac arrest. The results suggest strategies to improve LMA insertion success rates are needed.

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THE TASMANIAN AMBULANCE SERVICE “VOLUNTEER GATEWAY PROJECT”- HOW VGATE IS TRANSFORMING THE WAY VOLUNTEER AMBULANCE OFFICERS LEARN, COMMUNICATE AND MANAGE THEIR TIME

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Summary: The Tasmanian Ambulance Service Volunteer Gateway Project ("vGate") is web-based software for Volunteer Ambulance Officers. It provides online rosters, training schedules and skill development modules. Given the high level of user acceptance and enthusiasm, vGate can be considered a model for supporting VAOs in other jurisdictions.

Background: The vGate Project began in October 2008, arising from a need to give Tasmania's 500+ VAOs access to contemporary training resources, easily updated treatment protocols, and improved operational support. The project has also streamlined the way the Tasmanian Ambulance Service manages and acknowledges its volunteers.

Project Methodology: The vGate website is unique in several ways. First and foremost the project is volunteer-driven and is built by volunteers, for volunteers.

Secondly, it's free. So far, and for the foreseeable future, there is no direct cost to the Tasmanian Ambulance Service. By avoiding the budget process, the project has taken less than 12 months from inception to full roll-out.

Thirdly, the system was designed using content-management principles, with everything parameter-based and scalable. That means the site can be quickly modified to add stations and new users without intervention from software developers.

Lastly, it's open source. Under a GNU General Public License, anyone can use the source code for non-commercial purposes, including creating new versions for other jurisdictions.

Achievements: Through vGate, the Tasmanian Ambulance Service has its VAO rosters online, keeps volunteers informed through an online "notice board" and publishes and updates all VAO training materials, treatment guidelines and drug protocols on the web. It is also working on interactive "e-learning" versions of 20 of the 22 VAO courses, and other strategies to recruit, recognize and reward volunteers.

Conclusions: vGate has transformed volunteer management in the TAS, and can be considered a model for supporting VAOs throughout Australia and New Zealand.

RESCUER FATIGUE IN CARDIOPULMONARY RESUSCITATION: A REVIEW OF THE LITERATURE

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Background: Provision of adequate chest compressions remains a standard of care for optimal outcome in cardiopulmonary arrest. Inadequate chest compressions due to fatigue may result in insufficient blood flow. Following the changes to the ILCOR resuscitation guidelines in 2005, which required a faster compression rate, there is a need to establish when fatigue may occur, and which factors may exacerbate fatigue to inform prehospital care providers and educators.

Objectives: The objective of this study is to determine the extent of fatigue associated with CPR.

Methods: This study is a literature review that searched the Cochrane Database of Systematic Reviews, Ovid MEDLINE, EMBASE, and CINAHL electronic databases from their commencement to the end of April 2009. Inclusion criteria were, CPR-related fatigue or exhaustion pertaining to either prehospital or in-hospital settings. There were no specific exclusion criteria. References of the included articles were also reviewed.

Findings: Searching located just over 800 articles, 21 articles met the inclusion criteria, with three of these papers being from the prehospital setting. Currently, there is low level evidence determining the most appropriate length of time in providing quality chest compression before rescuer fatigue occurs. Overall, the quality of chest compressions decreases after 1 minute. Chest compressions were shallower at least half of the time, and the mean compression rate was found to be higher than recommended.

Conclusions: The evidence suggests that the quality of chest compressions deteriorates soon after commencing CPR and that there is a lack of high quality prehospital studies.

EMBEDDING STUDY AND INFORMATION LITERACY SKILLS (SAILS) INTO YOUR PARAMEDIC CURRICULUM

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This paper presents a teaching and learning model applied within a first year core subject taught within the Prehospital Care Course at Charles Sturt University. In this model both Study and Information Literacy Skills (SAILS) are embedded within a core first year subject*.

The aim of the SAILS model is to improve the quality of the first year student learning experience, and facilitate the development of graduate attributes that improve learning outcomes and address paramedic occupational needs.

The SAILS module assists paramedic students to engage critically with content, extend their research skills, become more self-directed, and assume a greater control over their own learning. The model achieves this through a process of 'contextualisation' and 'embedding.' Contextualisation and embedding involve aligning learning skills, learning processes and assessment tasks with paramedic graduate attributes, and then linking those graduate attributes to paramedic professional practice. When students see the linkages between learning process and professional practice, tasks become more meaningful, students become more motivated and engaged with the subject content, and a deeper level of learning is achieved. Embedding also implies that the SAILS components be 'interwoven' into the subject and not just used as an 'adjunct' (drop in).

The SAILS model is best integrated into a key first year entry subject in your course. It can be used as a stand-alone entity, but works best when the underlying concepts are expanded and scaffolded across your entire course.

*The SAILS model supersedes a previous design that involved the embedding of information literacy (IL) skills alone, and arose out of a process of critical reflection by the author.

A FRAMEWORK FOR DECIDING SUITABLE EXTRAGLOTTIC AIRWAY DEVICES FOR PARAMEDICS TO USE

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Background: The paramedic's primary role is resuscitation of the critically ill or injured, often under challenging circumstances and so when an airway device is required, it should be safe, reliable and easy to use. The Laryngeal Mask Airway (LMA) had been successfully used in this area and is recommended by resuscitation councils world-wide, but recently there have been an increase of new Extraglottic Airway Devices (EADs) onto the market, each seemingly offering something more beneficial. However not all devices act the same therefore when choosing a device for paramedics to use, guidance should be sought. Currently there are no predetermined criteria for ambulance services to base decisions on and this may lead to inappropriate choices and risk to patient safety.

Objectives: To provide a list of desirable characteristics that suggest an EAD is suitable for use in the prehospital setting.

Methods: The primary author is an intensive care paramedic who has studied EADs extensively to fulfil the requirements of a doctor of philosophy (PhD). Drawing from clinical experience and this original research, three main areas emerged as being fundamental to selection of suitable devices: 1) patient safety; 2) teaching, learning and skill retention; and 3) features that suggest a device is easy to use. From these areas and previous suggestions within the literature, a comprehensive list of preferred design features has been devised.

Findings and Conclusions: The list of desirable characteristics of an EAD provides ambulance services, teachers and developers of resuscitation guidelines, with a framework to base clinical practice and future recommendations upon. This ensures that utilisation of these devices is optimum and patient safety is not compromised.

THE PRIMARY HEALTH BUS – AN URBAN ADVENTURE

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Background: The Primary Health Bus is a joint initiative of the Saskatoon Regional Health Authority (RHA), MD Ambulance and the community. Initially begun as a 6 month pilot on August 28, 2008, it became an ongoing service on February 26th, 2009.

It is part of an overall strategy as a venue to close the disparity gap of those who are socially, geographically, economically, and/or culturally isolated, such as populations including aboriginal, the homeless, elderly, immigrant, refugees, children, and those living with chronic diseases.

This project aligns the RHA's Strategic Plan 2007-10 and the recommendations arising from the report, "Health Disparity by Neighborhood and Income" (2004) as well as the Emergency Medical Services Chiefs of Canada (EMSCC) 2006 "White Paper" Defining the Road Ahead – Mobilized Health Care.

Objectives: An RN (NP) and Paramedic team work in an interprofessional dyad. Flu immunizations, wound care, suturing, diagnosis and treatment of diabetes including blood sugars, referrals, general assessment, listening and health education (talking, pamphlets, etc) are some of the services provided.

A number of clients have been diagnosed and treated for previously undiagnosed chronic diseases such as hypertension or diabetes. The interventions have prevented complications and the resulting costly interventions that result from untreated hypertension or diabetes.

Methods: Since the Health Bus's inception, staff has been collecting data, both quantitative and qualitative. Quantitative data have been in the form of client demographics, volumes by location and time of day, initial presenting problems and treatment interventions, amongst other data. Qualitative data in the form of client satisfaction surveys and "stories from the bus" from the staff regarding their daily experiences.

Findings and Conclusions: Performance measurement and evaluation continues with the Primary Health Bus. An evaluation framework, utilizing a logic model format, has been generated and the information continues to be collected. As the project moves forward additional performance measurement and evaluation will be completed. In less than one year, the Health Bus has seen over 2200 clients.

The Primary Health Bus is presently preparing to do a randomized control trial to evaluate appropriate treatment venues related to the Canadian Trauma Acuity Scale (CTAS) scoring system.

THE SUMMER OF 2009: HEAT AND FIRE – AMBULANCE VICTORIA'S RESPONSE

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Since 2003, Ambulance Victoria (AV) has had a well developed Emergency Response Plan (ERP) which has been under constant review. The plan has three key principles: protection of normal '000' business, appropriate response to the incident, and utilizing the resources of the whole organization. Key features of the plan include: defined levels of response, triggers for escalation, notification of key internal stakeholders and specifications for every key role throughout the organization in response to a major incident.

Ambulance Victoria implemented its Emergency Response Plan in preparation for the Victorian Heat Wave in January 2009. As a result, a range of special measures were put in place including extensive additional resources, changes to call taking and dispatch, increased staff welfare and media messages to the community. The organization experienced a significant increase in workload and an increased rate of cardiac arrest calls. Response performance, however, was not significantly impacted. Of note was the poor outcomes reported for cardiac arrest patients, and the impact on the chronically ill.

The Emergency Response Plan was also implemented in response to the catastrophic "Black Saturday" bushfire event of February 2009. While a range of special measures were put in place, the long duration of the incident impacted heavily on resources, particularly management. Despite this impact, the organization's response performance was not impacted. Of note in the bushfire event, was the low number of time critical patients compared to the large number of low acuity, "primary care" style patients, and the need for a specialist primary care plan.

This presentation will outline the principles and key features of the Ambulance Victoria Emergency Response Plan in addition to its application for these two sentinel events. We will present the pre-event information that was available, how Ambulance Victoria prepared for each event utilizing its plan, and the outcomes and lessons learned from each event.

THE WORST HEADACHE OF MY LIFE: THE PREHOSPITAL DIAGNOSIS OF NON-TRAUMATIC SUBARACHNOID HEMORRHAGE

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Background: Non-traumatic subarachnoid hemorrhage (SAH) is a disease with a high morbidity and mortality rate. Approximately 10-15% of patients die before reaching the hospital and 40% die within the first week. The specific signs and symptoms associated with SAH are characteristic and can be used by pre-hospital care clinicians to provide a possible early diagnosis and ensure rapid transport to definitive care.

Objectives: To raise awareness of the signs and symptoms associated with non-traumatic SAH in the pre-hospital care environment, with the aim to reduce on scene times and ensure the patient is taken to the nearest hospital able to definitively treat SAH.

Methods: A review of current literature and case study.

Findings and Conclusions: SAH occurs in approximately 1 in 10,000 people annually, generally affecting women more than men. Even with recent advances in medical treatment the prognosis for patients with SAH is still quite poor. Of the patients who survive hospitalization, more than a quarter will have a significant restriction in their lifestyle, and less than one fifth will have no residual symptoms. An improved patient outcome is highly dependent on early diagnosis and aggressive intervention which pre-hospital clinicians can play a vital role in. Almost all patients with SAH will complain of a severe headache with rapid, immediate onset (this can be referred to as a thunderclap headache). This headache is often described by patients as “the worst headache of my life”. Vomiting and neck stiffness are other common symptoms, but will commonly only manifest themselves hours after the initial onset. Decreased levels of consciousness and seizures are also possible, however occur less frequently. Pre-hospital clinicians need to ensure a high-index of suspicion is maintained on all patients with severe headaches. Decreasing scene times and ensuring transport to hospitals capable of managing SAH patients will ensure an increased chance of improved patient outcomes.

THE NURSING TO PARAMEDIC SHIFT: WHAT MOTIVATES THE CHANGE?

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Background: This project has been designed to explore why nurses are leaving the field of nursing specifically to become Ambulance Paramedics. The level of interest from nurses in becoming paramedics has not waned in recent years, possibly contributing to the reduction in available nurses for the health system. Such is the demand that alternative approaches such as double-degrees with Paramedicine and Nursing have been created, and are proving popular choices for undergraduates, with the number of degree conversion opportunities increasing.

Objectives: This research explores the reasons for the shift, specifically looking at why nurses are leaving their profession and how does this compare to other workforces, why nurses are choosing Paramedicine as their preferred profession, a comparison of the education and work experiences of nurses and paramedics, and if working as a nurse or paramedic has an impact on accepting a rurally located job position.

Methods: An online survey was offered to all past and present students of the University of Ballarat Graduate Diploma of Paramedicine, a one-year Graduate Diploma for Division 1 Registered Nurses to complete a recognised qualification in Paramedicine. The detailed survey presented a range of questions seeking respondents reasons for entering and leaving nursing, entering Paramedicine, the associated education programs and clinical experiences and their influence on career choice, and the potential effect this may have on accepting rural employment.

Findings and Conclusions: It is anticipated that the results of this research may inform future training programs, and better understand the reasons why nurses left nursing to enter Paramedicine. This may help inform the recruitment and retention strategies for both nursing and Paramedicine, and may promote potential cooperative approaches to health education between disciplines.

PARAMEDIC ATTITUDES TO PREHOSPITAL RESUSCITATION

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Background: Prehospital resuscitation research is often limited to skills practice or appropriateness of family presence during resuscitation with little research exploring the attitudes of paramedics. Anecdotal evidence suggests that factors such as age, location of arrest, family presence, resource availability, demographics and past medical history may influence whether resuscitation is attempted or ceased.

Objectives: This research examined key factors that influence paramedic decisions regarding resuscitation of patients suffering out-of-hospital cardiac arrest.

Methods: An online survey was offered to all ambulance paramedics and ambulance community officers employed by Ambulance Victoria. The detailed survey presented a range of ethical, operational and clinical situations to paramedics as the frontline health professionals attending patients suffering sudden cardiac arrest in the community.

Findings and Conclusions: The findings included similarities between groups in their attitudes to commencing resuscitation. In particular, there was no significant difference between rural and metro paramedics in the majority of responses. Other findings suggest that location of arrest and age of patient do affect attitudes to commencing resuscitation in the prehospital setting. The results of this research may inform future training programs; guiding decision making for first responders and health care professionals and improving outcomes for patients requiring resuscitation in the prehospital setting.

EMERGENCY CARE PROVIDERS PERCEPTIONS OF CPR MEASUREMENT, RECORDING AND FEEDBACK – IDENTIFYING POTENTIAL BARRIERS FOR IMPLEMENTATION

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Background: Studies suggest that real-time feedback and continuous CPR monitoring result in improved CPR performance. The challenge for all health sector managers and educators is to derive an implementation strategy that ensures full uptake and confidence in this emerging technology by all clinicians. Until the barriers and concerns of clinicians are fully understood, successful implementation of such technology will not be possible. The perceptions of clinicians to this ‘culture shift’ and barriers to uptake have yet to be established.

Objectives: This multicentre study aims to gauge the extent of acceptance and identify potential barriers to the implementation of CPR – Measurement, Recording and Feedback (CPR-MRF) by emergency care providers, including junior doctors and paramedics in Australia.

Methodology: A multicentre study employing both qualitative and quantitative methods, that included:

- structured questionnaires to establish demographic data and specific clinician perceptions and
- focus groups to explore potential barriers and enablers relating to CPR-MRF.

A convenience sample of 90 participants will be selected from Paramedic and Emergency Medical staff across three Australian states; Victoria, South Australia and Western Australia.

Results: This presentation reports on the results of the Victorian site. 16 paramedics participated in two focus groups and each completed two questionnaires. The make up of the participants was diverse with roles ranging from operational duties to senior management. The group was very experienced (mean 17.6 years; range 1-35 years) and allowed for valuable information to be gleaned from the participants, specifically informing the benefits, potential barriers, suggested modifications and general perceptions of CPR feedback and measurement.

Findings and Conclusions: The results of this research have the potential to make a major contribution to the selection of CPR measurement, recording and feedback technology, drive change in the management of cardiac arrest and are likely to inform future training programs.

SUCCESSFUL PAIN REDUCTION IN THE PREHOSPITAL SETTING: A DETAILED ANALYSIS OF 85,000 PATIENTS

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Background: Pain is a common presenting symptom in the prehospital setting yet there is a dearth of literature relating to this phenomenon. Whilst there has been some recent focus on barriers to prehospital pain management, little has been done to identify the various factors associated with those patients who achieve successful pain management in this specialised setting.

Objectives: This presentation will report the findings of a 12 month retrospective electronic Patient Care Record review representing one of the largest epidemiologic studies of its kind. The study considered inclusion of all patients who presented having reported a verbal numeric pain rating scale (0-10) to the metropolitan region of a busy Emergency Medical System (Ambulance Victoria). Metropolitan Melbourne is home to more than 3.6 million people and the EMS responds to over 300,000 emergency cases per year.

Results: 108,853 patients presented with pain to the EMS during 2008. Demographic and clinical data of over 85,000 patients who met inclusion criteria was analysed to identify the specific characteristics associated with successful pain management in this cohort. Of specific interest, was the association of patient demographic features, ambulance resourcing factors and prehospital assessment and management, with the likelihood of successful pain reduction prior to hospital handover.

Findings and Conclusions: The results of this research have the potential to make a major contribution to the early management of those with acute pain, drive change in the development of Clinical Practice Guidelines and are likely to inform future training programs.

FIREFIGHTER FIRST RESPONDERS ATTENDING CARDIAC ARRESTS - A REVIEW OF THE ECG DATA

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Allan Morton²**

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Background: The Melbourne Metropolitan Fire and Emergency Services Board (MFESB) was the first fire service in Australia to implement a service wide emergency medical response (EMR) program in 2001. Only data from the pilot study has previously been reported.

Objectives: The objective of this study was to review automatic external defibrillator ECG data from the first seven years of the MFESB response to cardiac arrests.

Methods: The MFESB have three separate datasets with cardiac arrest information: i) callout record; ii) patient care record; and iii) cardiac arrest record, including ECG data from the automatic external defibrillator (AED). All ECGs were reviewed by one researcher with a random sample reviewed by a second researcher to determine accurate rhythm interpretation, discrepancies were resolved by discussion, and where necessary, consensus with the aid of a third researcher. Descriptive statistics were used to summarise the specific outcome data. Ethics approval was granted.

Findings: There were 1,069 ECG sets available for analysis. Following application of the AED, 23% of patients were in VF, 64% in asystole, 5% in sinoatrial initiated rhythms, and 8% in junctional or other ventricular rhythms. After the first shock 29% patients were in VF, 54% in asystole, 6% in sinoatrial initiated rhythms, and 11% in junctional or other ventricular rhythms. On handover to paramedics 8% of patients were in VF, 75% in asystole, 9% in sinoatrial initiated rhythms, and 8% in other junctional and ventricular rhythms. For the patients who were defibrillated by firefighters, 59% had 1 shock, 22% had 2 shocks, and 8% had 3 shocks, with 30 shocks being the most for 1 patient.

Conclusions: This study demonstrates that asystole is the most common arrhythmia following application of AEDs and on handover to paramedics. The number of shockable and potentially salvageable rhythms is small with most patients receiving only one shock.

ENHANCING THE FIRST YEAR PARAMEDIC STUDENT EXPERIENCE WITH THE USE OF FORMATIVE ASSESSMENT AND SUPPORT MATERIALS IN ONLINE LEARNING

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Paramedic students at Edith Cowan University come from a diverse background the demographics of which are described. A number of interventions have been employed with these students to create a sense of well being and confidence during their first year. Interventions include; early meetings with second year students and peers, peer mentoring and the formation of a student society. Traditionally, science instruction has focused on creating an interactive, intrinsically motivational approach to teaching, i.e., "delivery," but there is a need to be paying just as much attention to empower students with the ability to "receive" the science. Some of the keys to this recipe include the use of self-assessment tests; activities that require the interpretation of case studies; peer instruction interactions; online and multimedia lessons which encourage top-down/bottom up science processing strategies to decipher meaning; and simulations that test all of the science skills in action. Online materials foster autonomous learners in a science practice. The end goal progresses students to function outside a passive classroom environment so they may, without the aid of an external evaluator, shift the process of learning from the teacher to the student. This paper addresses critical issues in Anatomy and Physiology education; how to better motivate students and help them make the connection to what is important to learn; how to get students to see the whole topic rather than minute details; how to help students who lack study skills and how to instill critical thinking skills from entry to the course so as to succeed in learning attribution to efficacy. Within this philosophical framework, formative assessment techniques provide students with the knowledge and detail that is needed to move forward in their careers, through an emphasis on critical thinking, conceptual understanding, and relevant application of knowledge.

In doing so the resources provided help students to:

- come to class better prepared for lectures
- get immediate feedback and context-sensitive help on assignments and quizzes; and
- track their progress throughout the course

METHODS FOR IMPROVING PARAMEDIC DIFFERENTIAL DIAGNOSIS AND CLINICAL DECISION MAKING SKILLS

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Background: Moving from a training technical base teaching model in the ambulance service to university degree education is challenging paramedics to review what has informed their clinical decisions in the past, and to change their patient assessment practices and clinical reasoning.

Objectives: To develop strategies that could improve advanced clinical decision making and clinical reasoning.

Methods: Searches of Medline, ProQuest and Ovid were performed for studies related to clinical decision making and clinical reasoning. Literature was extracted by one systematic reviewer using key words. The key words used were: intuition, pattern recognition, differential diagnosis, patient assessment, decision making, reasoning, deduction, induction, and reflective practice.

Findings and Conclusions: The science of para-medicine is based on the ability to analyse and evaluate data. Intuitive recognition and experience form the art of paramedic practice. Intuition is underpinned by pattern recognition that identifies and compares the patient's presentation with known disease criteria. To be effective in pattern recognition strong links to disease pathology, progression and clinical presentation are needed. Clinical reasoning is about knowledge and attitude. There is a requirement for tolerance of ambiguity, curiosity, reflection, self confidence, and personal motivation. Evidence based practice demands a continual pursuit of knowledge to stay abreast of the changes in medicine. Introduction to clinical reasoning is needed in the basic in service curriculum to ensure novices can frame the information gathered and build their problem solving abilities. Clinical reasoning is also needed throughout the continuing education program in ambulance services to ensure paramedic competencies to test information remain current, and that clinical judgment is continually refined.

SMUDGED SIGNATURES: HAVE WE PUT EVERYTHING WE NEED IN THE SCHOOL BAG FOR PARAMEDIC HIGHER EDUCATION?

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*A signature pedagogy*¹ describes the characteristic way a profession transmits its core values, culture and key skills, to the next generation. An attempt to identify the signature of paramedic education was part during a National collaborative research program that involved nine universities in Australia in 2008. It became clear, through focus groups and personal interviews, that in the move to university based education, the signature had become somewhat smudged.

Graduates were described as failing in the areas of interpersonal relations and teamwork. These skills were not a priority for curriculum heavy in clinical skills. Yet this failure touched two issues that were recognised by Shulman in his Carnegie Institute work that developed the concept of signature pedagogies.^{1,2}

Firstly, locating professional education within universities creates two masters and a predictable struggle for authenticity. Paramedics who become academics must immerse themselves in the university's processes and standards, while trying to avoid isolation from their previous profession. It is difficult to communicate authentic standards for each, simultaneously.

Secondly, the nuances of professional practice are moral and ethical. Paramedics, like all professionals, act in the service of others. In their public role paramedics exercise altruism, empathy perseverance and tolerance. These are not easy topics for a lecture theatre filled with twenty-somethings who, more than previous generations, may lack exposure to cultural complexity.

This paper will argue that the smudge in paramedic education is at the intersection of graduation and autonomous practice. Apprenticeship or mentoring is handled inconsistently around Australia, and little support is provided for the paramedics who formally lead graduates into their new world of practice.

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THE KIDS ARE GETTING BIGGER, BUT ARE THE WEIGHT CALCULATION FORMULAS KEEPING PACE?

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Background: Weight estimation in prehospital paediatric emergencies is often required for the calculation of drug dosages, fluid therapy and defibrillation. Actual weighing is impossible with parent estimates highly regarded but not always available so other methods must be utilised. The currently accepted estimation method is the Advanced Paediatric Life Support (APLS) formulae used for children from 1 to 10 years of age. However as children now weigh more on average there is a need to assess whether this formula is still accurate.

Objectives: The objective of this study is to identify the most accurate weight estimation formula for paediatric drug calculations.

Methods: We performed a review of specific electronic databases from their beginning until the end of May 2009. We use the following search terms: weight estimation, drug calculation, drug dosage, formula, paediatric, children, EMS, EMT, prehospital, and paramedic. Articles were included if they described the development or evaluation of a paediatric weight calculation in the prehospital or hospital setting. References of relevant articles were also reviewed.

Findings: We located 56 articles with 19 meeting the inclusion criteria with no prehospital based studies located. Weight estimation methods include length-based measures such as the Broselow tape, age-based measures such as APLS and Argall formulas, and modified age-based measures like the Best Guess formula. The commonly used APLS weight estimation formula significantly underestimates a child's weight. Additionally, the Broselow Tape has also been shown to underestimate a child's weight. The Best Guess formula is more accurate at estimating the weight of Australian children. Children of certain ethnic groups and those who were large for their age were poorly correlated with the formulas results in some studies.

Conclusion: This study suggests that the Best Guess formula is the most accurate for the Australian paediatric population and that further studies are required to define most accurate formula for the prehospital sector.

DO THE NUMBERS ADD UP? QUANTIFYING THE AMBIGUOUS EXPERIENCE OF PAIN

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Background: Patient assessment involves the collection and interpretation of relevant data to guide clinical decisions regarding an individual's health problems. Pain management decisions depend on an assessment of the patient's report of their symptoms, including the dimension of severity. The patient's self-report is considered the gold standard for establishing presence of pain and pain severity, and several pain scales have been designed to quantify the patient's symptom to guide care decisions. Some ambulance services have set benchmarks for the reduction of pain, and performance against these benchmarks may be considered a surrogate for quality of pain relief or patient satisfaction. However, problems associated with pain scales, which include agreement on scale properties, may limit the validity of pain score changes as a measure of clinical effectiveness.

Objectives: To identify evidence of valid, reliable and practical means of measuring clinical effectiveness of pain relief in acute care settings that include measures of patient satisfaction, in order to evaluate the utility of these methods in the paramedic practice setting.

Methods: A review of the literature was undertaken to answer the question: "In adult patients experiencing acute pain, what measures are available to measure and evaluate patient satisfaction with interventions designed to relieve their pain."

Findings and Conclusions: Perception of pain involves the patient encoding and expressing the noxious stimulus in a way that is modified by factors including context, cultural norms, age, gender, past pain experience, coping styles, expectations, duration of the pain and the nature of the nociception. These variables can produce considerable inter-patient variability in pain-related behaviours, so that two patients with identical numerical reports of pain severity may present with markedly different responses to their pain and to pain relief interventions. While the minimum clinically significant change in pain score has been well researched, the achievement of a predetermined numerical change in score is not necessarily synonymous with adequate pain relief. These issues call into question the practice of measuring the quality of care through the establishment of clinical benchmarks for pain score changes. Measurement of patient reported outcomes such as the efficacy of their analgesic interventions may be a better expression of outcome than measures of numerical difference in severity.

THE UTILITY OF VITAL SIGNS IN VERIFYING PAIN IN ADULTS

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Background: Pain is a commonly encountered complaint in paramedic practice. When this symptom is reported in the absence of obvious injury or pain-related pathology the paramedic may seek other evidence to verify the presence and severity of the pain. An association between pain and increased sympathetic activity such as pallor and sweating appears reasonable. However, it is conceivable that an absence of findings may influence pain management decisions.

Objectives: To determine the utility of vital sign changes as an aid to assessing pain severity in the prehospital setting by examining the correlation between initial pain severity score and systolic blood pressure, heart rate and respiratory rates among adults reporting pain.

Methods: This study is part of a larger project investigating the epidemiology of pain in the prehospital setting that involved a retrospective study of all adult patient care records (PCR) over a seven day period. Cases were included if paramedics documented pain severity using a 0-10 numeric rating scale (NRS) and if heart rate, blood pressure and respiratory rate were also recorded. Data were analysed using descriptive statistics and tests of correlation to identify any relationships between initial pain severity scores and vital signs.

Findings and Conclusions: A report of pain was noted in 1766 cases, with 1286 (73%) having a NRS recorded. Mean heart rate was 85 (95% CI 84 to 86), mean systolic blood pressure was 139 mm Hg (95% CI 138 to 141), and mean respiratory rate was 18 (95% CI 18 to 18). There was no significant correlation between NRS and heart rate ($\rho = 0.002$, $p=0.61$, 95% CI -0.007 to +0.011) or blood pressure ($\rho = -0.0007$, $p=0.81$, 95% CI -0.007 to +0.005). A statistically significant correlation between pain score and respiratory rate was not clinically significant ($\rho 0.058$; $p=0.001$; 95% CI = 0.024 to 0.093). The lack of correlation between pain scores and vital signs in this study reveals that an absence of vital sign changes cannot be used to authenticate the patient's report of pain severity.

PAST (PRE-HOSPITAL ACUTE STROKE TRIAGE) IMPROVING ACCESS TO ACUTE STROKE THERAPIES – A CONTROLLED TRIAL OF ORGANISED PRE-HOSPITAL AND EMERGENCY CARE

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Background: The purpose of this study was to investigate our ability to improve access to acute stroke therapies. Organised acute stroke care, including therapy with intravenous tissue plasminogen activator (tPA) is of proven benefit in some patients. However, systems to facilitate rapid access to acute stroke services remain limited across Australia.

Objectives: The Ambulance Service of New South Wales (ASNSW) in collaboration with Hunter New England Area Health Service (HNEAHS) redesigned the clinical pathway of patients with a pre-hospital diagnosis of acute stroke in the Hunter region.

Methods: System barriers to tPA therapy were identified and resolved by the development of the PAST protocol. A pre-hospital assessment tool GAS-T (Glucose, Arm, Speech, Time) was adapted from FAST (Face, Arm, Speech, Test) for use by ambulance paramedics. A hospital by-pass protocol for tPA eligible patients was implemented including pre-notification of the Acute Stroke TeamT at JHH.

Quantitative Statistical analysis was performed comparing relative process of care times and tPA administration rates.

Findings and Conclusions: During the six month intervention period of the 140 patients with a final diagnosis of ischemic stroke (IS) presenting to the ED, 30 received tPA (21%). This compared to only five of 107 patients with a final diagnosis of IS receiving tPA during the control period (5%). All process of care times were improved compared to baseline measures.

This study showed that the introduction of a recognition, transport and treatment strategy can be implemented across a geographical area served by a single stroke centre. In tPA eligible patients not only did more patients receive tPA but the time from onset to administration was also reduced, which we believe should show benefits in terms of the avoidance of resultant disability, and improve functional outcomes in this group of patients.

MOBILE INTENSIVE CARE PARAMEDICS ATTITUDE AND PERCEPTION OF TRAUMATIC PAIN MANAGEMENT IN A SMALL REGIONAL COMMUNITY

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Background: Pain is a common presenting symptom for emergency patients, yet it often remains undertreated, under researched and under reported, particularly within the prehospital setting. Little is known of the attitudes and perceptions of those responsible for the first line management of people in pain; the paramedics.

Objectives: To evaluate the attitudes and perceptions of Mobile Intensive Care Ambulance (MICA) Paramedics in a regional setting.

Methods: A convenience sample of 15 Intensive Care paramedics were selected to complete a brief survey consisting of nineteen questions.

Findings and Conclusions: 87% of MICA paramedics surveyed felt that pain management was a high priority within their workplace. Only 13% of MICA paramedics believed that the Clinical Practice Guideline at the time, was sufficient to enable them to effectively manage traumatic pain; the majority believed that it was either not sufficient or only sometimes sufficient.

Eighty percent of paramedics surveyed indicated that they did not believe the current splinting techniques to be adequate enough to manage long bone fractures.

Almost half (46%) of paramedics believed that administering pain relief to the paediatric patient can sometimes be more painful than the injury itself. Three quarters of MICA paramedics indicated that the child was best able to assess their pain with the remainder believing that the parent was best able to judge. Significantly more MICA paramedics (90%) believed that the adult patient was the most accurate judge of pain intensity, yet a small but significant proportion (25%) insisted a paramedics experience, knowledge and judgment allowed them to make a more accurate assessment of the patients pain than the patient themselves.

More work needs to be done to enhance the current traumatic pain Clinical Practice Guideline and to educate paramedics with respect to contemporary pain assessment and management principles

AMBULANCE RESEARCH INSTITUTE

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Abstract

The Ambulance Service of New South Wales (ASNSW) is one of the largest ambulance services in the world, responding to over a million calls annually. Similar to all other jurisdictions, much of our current practice and interventions have limited or no supporting evidence demonstrating improved outcomes for patients. Callaham¹ termed this the ‘scanty science of pre-hospital emergency care’ – the dearth of rigorous studies into out-of-hospital medical interventions.

On May 11, 2009 the NSW Minister for Health, The Honorable John Della Bosca MLC, announced the provision of funding to establish the Ambulance Research Institute (ARI), a timely response to the urgent need for high-quality pre-hospital research. The funding has been allocated to staff ARI and to provide research scholarships to operational paramedics. ARI is engaging a network of collaborators including universities, research centres and professional bodies.

An integral part of the Institute’s strategy to undertake research that is both scientifically valid and measures meaningful outcomes, and this rests on the establishment of the Distributed Research in Emergency and Acute Medicine (DREAM) network – a network of collaborative co-investigators in medical, nursing and allied health fields, drawn from all hospitals in NSW. ARI research will address questions arising from six areas; community needs/expectations, ambulance clinical practice, medical retrieval operations, systems modeling and analysis, operational research and workforce education and culture.

In addition to these broad research activities, ARI has a commitment to fostering a culture of evidence-based research and practice within the ASNSW. A key step in this process has been the implementation of the Pre-hospital Research and Evidence-based Practice (PREP) course - an ARI developed online course affording paramedics the opportunity to acquire an understanding of evidence based practice, literature searching, critical appraisal and the basic principles and practice of research.

The establishment of a research institute within an ambulance service will be a key driver in redressing the paucity of evidence to guide pre-hospital emergency care.

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INQUIRY INTO THE OPTIMUM FORMAT FOR THE PREPARATION AND EDUCATION OF PARAMEDICS LEADING TO WORK READINESS FOLLOWING GRADUATION

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Background: The question of what constitutes “workreadiness” of paramedic graduates from education programs is a controversial one. There is growing concern that based on recent research into adolescent brain development, we are perhaps graduating paramedics (or nurses) that are not physiologically, psychologically, or emotionally prepared to deal with the roles and responsibilities of their profession at a novice level. Do students with limited life experience (those entering their paramedic education at 17 or 18 years of age) and those with limited or no previous work experience have a disadvantage when it comes to their ability to transition into a profession with relatively high levels of responsibility and stress?

Objectives: I propose to conduct a series of studies using a mixed-methods approach to determine if there is any effect on the assessment outcomes of a series of evaluation tools used to compare those graduates under 25 years of age entering the paramedic workforce with those that are over the age of 25.

Methods: As part of my process towards finalizing my Ph.D research question, it will need to be determined which existing tests can be used and which will need to be created. Initially, I will be conducting a cohort study that compares the first-year student groups at universities in Australia with community college students at paramedic training programs in Ontario, Canada. This will lead to a possible inclusion of data obtained from the UK and the USA at a later date.

Findings and Conclusions: A preliminary literature search has shown that the adolescent brain develops from the back to the front, with the prefrontal lobes being the last to mature at around age 25. The prefrontal lobes are responsible for decision-making, the appreciation of consequences of decision-making and the development of empathy for others. How does this affect performance?

EXAMINING APPROACHES TO THE INTEGRATION OF VOLUNTEERS INTO AUSTRALASIAN AMBULANCE SERVICES

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Background: Volunteerism in Australasian ambulance services is robust and diverse in application. Some 10,000 volunteer ambulance officers and almost 1,000 first responders regularly provide a range of ambulance functions. In three Australian state services, the number of volunteers outweighs the number of paramedics.

Objective: This study aimed to identify factors associated with the integration of volunteer ambulance officers and first responders within ambulance services.

Methods: Senior executives of ambulance services from one region of New Zealand and seven states of Australia were surveyed and interviewed. Quantitative data from surveys were collated, verified and compared. Interviews were recorded, transcribed and analysed thematically using both N-VIVO and Leximancer. The multiple sources of data and methodological approaches facilitated triangulation of results with the available literature, and assisted with model development.

Findings and Conclusions: Approaches to integration vary across jurisdictions. Some jurisdictions reported that mixed volunteer and paid crews are the norm, with common management processes for volunteers and paramedics alike, common communication processes, and defined processes for the inclusion of volunteers in decision making. Other jurisdictions report a low level of reliance on volunteers, with limited management structures for them, limited provision of organisational information and limited scope for volunteer input into decision making. Some jurisdictions report tension between paramedics and volunteers and clashes with industrial unions regarding volunteerism.

Facilitative or non-facilitative organisational and human factors emerged as key themes. Based on this, a volunteer-service integration model has been developed. The model outlines the centrality of ambulance volunteers within community, their relation to the ambulance service, and provides a mechanism for exploring the multiple approaches to integration around entry, support, collaboration and working environment.

THE IDENTIFICATION, ASSESSMENT, AND MANAGEMENT OF PSYCHIATRIC PRESENTATIONS BY PARAMEDICS WITHIN THE COMMUNITY

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Background: *We do not treat mental health patients – our only role is to ensure safe transport to hospital for further care (quoted from survey research by Roberts 2007).*

The interaction and communication between pre-hospital providers, the patient and hospital care for people with a mental illness affects the quality and continuity of health care delivery. This paper outlines research that explores paramedic clinical practices and the rationales that influence and drive clinical decisions when attending psychiatric presentations.

There is little research regarding paramedic clinical practice in the area of mental health, mental illness, or mental health assessments. The accounts given by paramedics describe mentally ill patients as presenting with violent, suicidal, drug-induced, overdose, or overtly psychotic behaviour. The need for care and access to community-based mental health services is continuing to grow. The ambulance service, as one of the first lines of the health care system, is finding that they are attending an increasing number of psychiatric presentations due to the current lack of community, general and acute care services for this particular group in the community.

Objectives & Methods: The objective of the research is, through ethnographic methods (interviews, non-participant observation, document analysis and focus groups) to address the lack of knowledge within this area. Essential to ongoing care for people suffering a mental illness is the communication and transfer of key information from paramedics to medical staff within the hospital system. The research aims to identify what information is considered important, how paramedics gather that information and the strategies paramedics use to assess and manage psychiatric presentations.

By providing a voice to paramedics and exploring how they go about their everyday work and exploring their culture, this research provides insight into the ‘on-road’ experience when attending psychiatric presentations.

The presentation will focus on current themes and interaction identified through the data collection to date.

IMPROVING PAEDIATRIC PAIN MANAGEMENT WITH FENTANYL LOLLIPOPS

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Background: Paediatric pain relief is sometimes overlooked in the pre-hospital setting, often as a result of failure to recognize severity of pain in the child due to their limited communication skills. Another barrier to ensuring adequate pain relief is the reticence to inflict pain when administering IM injections or gaining IV access.

Objectives: To provide a critical review on pain relief options for children using the oral transmucosal route.

Methods: Searches of databases were performed for studies in English related to pre-hospital analgesia. The computer data bases provided access to biomedical journals, serial publications, books, theses and related research published since 1989. Literature was extracted by one systematic reviewer using key words. The key words used were: Fentanyl, pre-hospital, lollipop, analgesia, and children. A pilot study was also undertaken surveying Advanced Paramedic views on current pain relief procedures and scope the potential for inclusion of an oral transmucosal pain relief.

Findings and Conclusions: Fentanyl is a potent synthetic opioid. Onset of action is rapid, reaching peak effect in 2 to 3 minutes. All studies involving children reported significant decreases in pain, less anxiety, and no clinically significant respiratory depression. The evidence on oral transmucosal Fentanyl is compelling. It is a safe, non-traumatic, and non-noxious option. Trialing this additional pain relief modality in the management of children's pain in the pre-hospital setting is warranted.

Survey results indicated that 87% believed that children are not consistently provided with appropriate analgesia. Presenting children with a pleasant tasting, painless, fast acting, and potent analgesic holds promise. The barrier of the blocked runny nose for the intranasal option is also negated. The lollipop may be perceived as a welcome diversion and assist in reducing anxiety.

WHEN PRESSURE IS POSITIVE: A LITERATURE REVIEW OF THE PREHOSPITAL USE OF CONTINUOUS POSITIVE AIRWAY PRESSURE

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Background: Heart failure poses a significant burden of disease, resulting in 2,225 Australian deaths in 2005, and was listed as an associated cause of death in a further 14,466 cases.¹ Common in the hospital setting, continuous positive airway pressure (CPAP) is a non invasive ventilation technique used to prevent airway collapse and manage acute pulmonary oedema (APO). In the hospital setting CPAP has been known to decrease the need for endotracheal intubation in patients with APO.

Objectives

The objective of this study was to identify the effectiveness of CPAP in the prehospital environment.

Methods

A review of selected electronic databases was conducted from their commencement to the end of May 2009. Inclusion criteria were any study type reporting the use of CPAP in the prehospital environment, specifically in the treatment of heart failure, and acute pulmonary oedema. References of relevant article were also reviewed.

Findings

The search located approximately 3000 articles, 29 articles met the inclusion criteria. The majority of studies found that the use of CPAP in the prehospital environment reduces mortality as well as the need for endotracheal intubation, while improving vital signs during transport. A small number of studies found that the use of CPAP can reduce myocardial damage and resulted in a lower treatment cost by reducing the ICU and hospital length of stay.

Conclusion

The evidence suggests that the use of CPAP in the prehospital environment is beneficial to patients with APO by decreasing the need for endotracheal intubation and may decrease hospital length of stay.

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**PREHOSPITAL MANAGEMENT OF ACUTE PAIN IN CHILDREN: A
RETROSPECTIVE OBSERVATIONAL STUDY COMPARING THE
EFFECTIVENESS OF INTRAVENOUS MORPHINE, INTRANASAL FENTANYL
AND INHALED METHOXYFLURANE**

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Background: Management of paediatric patients presenting with acute pain is challenging for pre-hospital clinicians. Paramedics in most ambulance services need to choose which agent is the most appropriate to use in any given clinical situation, however there are limited studies that describe and compare analgesic use in the pre-hospital setting.

Objectives: To compare the effectiveness of intravenous morphine, intranasal fentanyl and inhaled methoxyflurane for managing moderate to severe pain in paediatric patients in the prehospital setting.

Methods: For this quality improvement initiative, we searched the Patient Health Care Record database for patients aged between 5 and 15 (inclusive) with an initial pain score of ≥ 5 who received morphine, fentanyl or methoxyflurane (alone or in any combination) between January 1, 2004 and November 30, 2006. The primary outcome measure of effective analgesia was defined as a $\geq 30\%$ reduction in initial pain score. Multivariate logistic regression was used to compare the effectiveness of each agent after adjusting for confounders.

Findings: There were 3,942 eligible patients. Morphine (n=423), fentanyl (n=371) and methoxyflurane (n=2438) was effective in 86%, 88% and 72% of patients respectively. After adjusting for confounders there was strong evidence that methoxyflurane was inferior to both morphine (OR 0.62 95% CI 0.46-0.84 $p=0.002$) and fentanyl (OR 0.48 95% CI 0.34-0.67 $p<0.0001$). There were no significant differences observed between intra-nasal fentanyl and parenteral morphine. More than one analgesic agent (compared to morphine alone) was associated with increased odds of effective analgesia ($p<0.05$) but this was not found when compared to fentanyl alone.

Conclusion: Intranasal fentanyl and intravenous morphine were the most effective analgesic agents for moderate to severe pain in this population. Methoxyflurane is inferior to both morphine and fentanyl. Considering the non-invasive nature of the intranasal route and its effectiveness, fentanyl appears to be the most suitable analgesic for paediatric patients with moderate to severe pain.

PARAMEDICS AND PUBLIC HEALTH EMERGENCIES: IS THERE A “DUTY TO RESPOND”?

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Background: During normal operating procedures, paramedics understand their “duty of care” to individual patients. However, during a public health emergency when the point of care moves from the individual patient to the greater population, is there a “duty to respond”? As evidenced by Toronto’s experience with Severe Acute Respiratory Syndrome (SARS), paramedics provide an integral role during a public health emergency, potentially risking exposure to infection, illness, and death. Given that a range of serious risks are associated with response to a public health emergency paramedics may be unwilling to work. As the paramedic workforce is not an unlimited resource, consideration must be given to this issue by disaster planners, with a specific focus on “duty to respond”.

Objectives: The objective of this study was to investigate Australian paramedic obligations and professional responsibilities to respond during public health emergencies.

Methods: An extensive search of relevant publicly available state and national legislation and Australian ambulance services regulations was conducted to examine the concept of “duty to respond” in the Australian context.

Findings and Conclusions: There is no clear focus on paramedic “duty to respond” or the ramifications of refusal to work in any publicly available document. As Australia is a Common Law Country the issue would likely be managed through individual employment contracts, with failure to respond managed through pre-existing standard terms and conditions of employment. Under such circumstances, the ambulance services would need to demonstrate that the direction to respond was appropriate. The outbreak of H1N1 Influenza (Swine Flu) in 2009 provided disaster planners with a brief glimpse at what a public health emergency could potentially do to Australia’s health care system. While this wave of H1N1 influenza was not associated with a high case-fatality rate, it demonstrated how a more virulent public health agent could cripple an unprepared system.

A CROSS-SECTIONAL STUDY OF VICTORIAN MOBILE INTENSIVE CARE AMBULANCE PARAMEDICS KNOWLEDGE OF THE VALSALVA MANOEUVRE

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Background: The Valsalva Maneuvre (VM) is a primary method for terminating haemodynamically stable supraventricular tachycardia (SVT) in the prehospital and hospital emergency department setting. Knowledge about the VM recommended standard; supine position, pressure of 40mmHg, for a period of 15 seconds, has not been investigated to date in prehospital care providers.

Objectives: The objective of this study was to determine Victorian Mobile Intensive Care Ambulance (MICA) Paramedics knowledge of the VM recommended standard.

Methods: We used a cross-sectional study in the form of an interview with data collection to determine Victorian MICA Paramedic's understanding of the VM recommended standard. A comparison was conducted between the MICA Paramedic results and those of a Victorian emergency physician cohort.

Findings: A convenience sample of 46 (20%) Melbourne MICA Paramedics agreed to participate in the study from 230 eligible for participation in the study. One MICA Paramedic correctly identified the three recommended criteria, 12 (26.1%) identified the correct position, 23 (50%) the correct pressure, and 7 (15.2%) the correct duration. These results suggest an incomplete understanding of the mechanism for maximising vagal tone by Victorian MICA Paramedics. The MICA Paramedics demonstrated better knowledge of the correct rates for individual elements of the VM recommended standard compared to the Victorian emergency physician cohort with 5 (9.6%) identifying the correct position, 20 (38.5%) the correct pressure, and 5 (13.4%) for the correct duration.

Conclusions: Victorian MICA Paramedics require additional education to improve their understanding of the VM recommended standard. The results also demonstrate a better understanding of the VM recommended standard compared to a Victorian emergency physician cohort. Both results suggest an inadequate knowledge of the VM recommended standard in the broader emergency care setting.

CAN A SYRINGE PROVIDE THE REQUIRED PRESSURE FOR THE VALSALVA MANEUVER TO TERMINATE A SUPRAVENTRICULAR TACHYCARDIA?

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Background: The Valsalva Maneuvre (VM) continues to represent the primary treatment mode for managing haemodynamically stable Supraventricular Tachycardia (SVT) in the prehospital setting. The 10ml syringe has evolved as one method of achieving the required intrathoracic pressure to optimize the effectiveness of the VM by paramedics, yet its effectiveness, to date, has not been tested.

Objectives: The objective of this study was to identify if blowing into a syringe to move the plunger was able to produce the required 40mmHg of pressure.

Methods: This was a two part experimental study testing the pressure required to move the plunger in a standard syringe. Part 1, was to identify which syringe size, randomly selected from a freshly opened box of 100, would produce the required 40mmHg of pressure. Part 2, tested the selected syringe multiple times to ascertain if a pressure reduction occurred after multiple uses. 20 syringes were tested, four randomly selected from five previously unopened boxes. A sphygmomanometer was attached to the syringe via a 10cm length of tubing. The rubber bulb was removed from the sphygmomanometer with a length of rubber tubing attached to enable an investigator to blow into the syringe.

Findings: In part 1, the 10ml syringe was the only syringe to provide the required 40mmHg pressure to move the plunger. In Part 2, the mean pressure for each of the three tests per syringe varied between 37mmHg and 39.6mmHg. There was a statistically significant fall in the pressure generated over three uses of the same syringe.

Conclusions: This study identified that the required 40mmHg of pressure to terminate a SVT in the prehospital setting is possible by the patient blowing into a 10ml syringe to move the plunger, and that a new syringe should be used for each attempt.

GUIDELINES FOR TREATING CYSTIC FIBROSIS (CF) PATIENTS PRESENTING WITH HAEMOPTYSIS IN THE EMERGENCY HEALTHCARE SETTING

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Background: It has been identified that many CF (the most common genetically inherited, life threatening disease amongst Caucasians) patients suffer from haemoptysis. This haemoptysis can be anything from minor blood streaks to major bleeds, which is associated with a higher rate of mortality and a notable cause of morbidity in CF patients. To date, no protocol exists for the treatment of these patients by prehospital personnel.

Objectives: The paper will explore the current status of hospital-based emergency protocols both conservative and more aggressive treatment plans, thus providing a framework for developing a prehospital protocol for CF patients suffering from haemoptysis. The development of such a protocol will offer prehospital personnel with a management plan to treat CF-related haemoptysis, ultimately providing more efficient, and appropriate health care management.

Methods: This protocol will be developed based on a review of current literature and current practices within the hospital setting.

Findings and Conclusions: This paper will present a contemporary management plan for clinicians working in the prehospital setting when faced with CF-related haemoptysis patients. This management plan will provide a basic framework for prehospital personnel allowing for the most appropriate and effective management and care for CF patients.

SMASH:ⁱ IS ONE HOUR ENOUGH TIME TO PROVIDE SKILLS AND KNOWLEDGE TO PREVENT THE PREVENTABLE?

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Background: Motor-vehicle accidents are a leading cause of serious injury and death for young people worldwide having serious social and economic consequences for both those involved in the accidents and their loved ones.ⁱⁱ Deaths due to upper airway obstruction and uncontrolled haemorrhage can be prevented with early intervention. Currently, formal first aid training is not a requirement for holding a driving licence in Australia, even though it has been recommended. This project investigates a novel approach (SMASH), by examining whether drivers can be taught to manage the airway and stop haemorrhage effectively in an hour.

Methods: The researchers developed a training program that could be delivered within a one-hour time frame to provide skills through theory and hands-on training that will assist to prevent further injury or preventable deaths from airway obstruction, c-spine control and hemorrhage. Following ethics approval, training sessions were conducted with forty Year 12 high school students to investigate retention of skills and to assess confidence and competence to assist at a vehicle accident. A whole-body patient simulator was used in an authentic setting with a crashed car. The students' time-based skill demonstrations were recorded using manual assessment sheets with skills graded as "competent" or "not competent".

Results: The project's quantitative and qualitative data analyses the extent to which participants retained the (SMASH) skills taught via the first-responder training one month earlier. All of the students (n=31) achieved a competency grading with the majority (93%) of students achieving this within three minutes. A large portion of the students stated they felt confident to manage an airway (96%) and control a haemorrhage (90%) at a vehicle accident.

Conclusion: The one-hour SMASH course developed demonstrates effectiveness in initial management of life saving manoeuvres during a simulated road accident. This study has important implications for first-aid training and has a potential relationship to driver training.

ⁱ SMASH (Scene safety; Medics; Airway support; Stop bleeding; other Help)

ⁱⁱ 'Anyone can save a life—Road Accidents and First Aid'

<http://www.grsroadsafety.org/themes/default/pdfs/British%20Red%20Cross.pdf>

HOW DOES AMBULANCE SERVICES UTILISATION IMPACT DEMAND FOR EMERGENCY DEPARTMENTS IN QUEENSLAND, AUSTRALIA?

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Background

There are indications that pre-hospital emergency care and management of patients can help reduce the demand for hospital emergency departments (EDs). Ambulance services play a significant role at this stage of care. In 2003, the Queensland Government introduced a Community Ambulance Cover (CAC) levy in return for a free ambulance service at the point of access to all Queenslanders. This may have led to the impression in consumers of an entitlement to free ambulance services under any circumstances regardless of the urgency of the matter which may have in turn contributed to the crowding of EDs in Queensland.

Objectives

This paper aims to answer the following questions:

- How many patients arrive at hospital EDs by ambulance in Queensland, compared to other modes of arrival?
- How has this changed over time, particularly after the CAC introduction in 2003?
- What percentage of ambulance arrivals are urgent ED patients?
- Has the perceived free ambulance services created extra demand for EDs in Queensland, compared with other Australian jurisdictions that charge patients for ambulance services.

Methods

We will secondary analyse the data from sources such as Queensland Ambulance Services, Department of Health and Australian Bureau of Statistics to answer the research questions.

Findings and Conclusions

Queensland has the highest utilization rate of ambulance services (about 18% in 2007-08) and the highest annual growth rate in demand for these services (7.7% on average since 2000-01), well above the population growth. On the other hand, the proportion of ED patients arriving by ambulance in Queensland has increased by about 4% annually. However, when compared with other states and territories with charge at the point of access, it seems that the growth in demand for EDs cannot be explained solely or mainly by CAC or ambulance utilisation in Queensland.

THE ROLE OF AN AED REGISTRY IN IMPROVING SURVIVAL FROM OUT-OF-HOSPITAL CARDIAC ARREST

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Background: Out of Hospital cardiac arrest is a major cause of morbidity and mortality in the community. Early defibrillation is the cornerstone in the management of cardiac arrest due to Ventricular Fibrillation with a 10% reduction in survival for every minute that defibrillation is delayed. The development of Automated External Defibrillators (AEDs) has made the concept of community based response feasible and their ease of use with minimal or no training and increasing affordability has resulted in a widespread introduction of these devices in public locations and workplaces. There is, however, no direct linkage of these devices with the ambulance emergency response system.

Objectives: Ambulance Victoria (AV) has developed and implemented an AED Registry which enables AED owners to register their device so that its location can be included within the ambulance Computer Aided Dispatch system. This enables ambulance dispatchers to identify the nearby availability of an AED in the event of a suspected cardiac arrest and guide bystanders on its use.

Findings and Conclusions: The Registry has been well accepted by AED purchasers and provides an opportunity to further enhance and strengthen the Chain of Survival for management of cardiac arrest.

STANDARD CLINICAL GUIDELINES - ARE THERE A BROADER RANGE OF CONDITIONS THAT WOULD BENEFIT FROM MEDICINES COMMONLY USED BY PARAMEDICS?

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Background: In exceptional circumstances New Zealand Advanced Paramedics may administer treatment that is not described in the St John Authorised Patient Care Procedures. This paper explores a range of exceptional circumstances.

Objectives: To critically ?examine the exceptional circumstances where patients may benefit from the administration of Atropine, Salbutamol, or Glucagon.

Methods: Searches of Medline, CINAHL and EBM reviews were performed that related to atypical indications for using Atropine, Salbutamol, and Glucagon. Literature was extracted by one systematic reviewer. In general preference was given to meta-analyses of the topic, prospective randomized trials, studies involving human subjects, and pre-hospital management.

Findings and Conclusions: Extensive use of organophosphates is relatively common in agriculture based economies. Organophosphate poisoning is life threatening and leads to excessive accumulation of acetylcholine at nicotinic and muscarinic synapses causing cholinergic toxidrome. Atropine is a competitive inhibitor of muscarinic aCh receptors and regarded as a primary treatment.

Serum potassium levels in excess of 7.5 mmol/L can cause life threatening cardiac arrhythmias. Salbutamol promotes the intracellular uptake of potassium by binding to beta 2 receptors. Salbutamol is an effective way to lower serum potassium levels and reduce the risk of arrhythmias secondary to hyperkalaemia.

Severe beta blocker overdose is potentially fatal. Concurrent or inadvertent use of beta blockers in life threatening asthma or anaphylaxis may lead to no effect when treating with conventional adrenergic pharmacotherapy. Glucagon is an endogenous hormone that has a positive inotropic, chronotropic, and bronchodilatory action by mechanisms which bypass the beta adrenergic cellular surface receptor.

There is robust evidence for expanding the range of conditions where Atropine, Salbutamol, and Glucagon are administered.

BRAIN TRAUMA: DO PARAMEDICS OVER MANAGE CERVICAL SPINE AND UNDER MANAGE AIRWAY?

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Background: Application of rigid cervical collar is routine in cases in severe head trauma in Australia. The application of a rigid cervical collar may lead to an increase in morbidity and mortality in trauma patients. Adverse effects of rigid cervical collar application in pre-hospital spinal immobilisation include the development of airway obstruction, increased intracranial pressure and increased risk of aspiration. Aspiration and respiratory compromise can lead to increased incidence of preventable death from asphyxiation. Therefore, as airway obstruction is a major cause of preventable death in trauma patients, spinal immobilisation may increase mortality and morbidity. The value of pre-hospital spinal immobilisation remains uncertain.

Objectives: A retrospective cohort study of 326 patients with severe traumatic brain injury was undertaken to investigate the relationship between pre-hospital management of severe TBI and patient outcome.

Methods and Results: Descriptive, correlation and regression analysis were used to determine the relationship between airway obstruction, cervical collar application and the use of suction in the pre-hospital setting. Of the 326 patients, 24.8% (81) were determined to have an airway obstruction on arrival at the emergency department. Cervical collars were applied to 97.5% of those patients with airway obstruction. Hypoxaemia was a common finding amongst the 81 patients with airway obstructions. In 33.3% (27) of those patients, oxygen saturation was determined to be less than 95%. Airway clearance using suction was documented in only 42.0% (34) of patients. A significant correlation was found between airway obstruction and the failure to use suction in the pre-hospital setting (Spearman coefficient $r = 0.262$, $p = 0.034$). Pre-hospital suction is a predictor of outcome ($p = 0.001$).

Conclusions: The application of a rigid cervical collar inhibits airway clearance using suction. Paramedics may be hesitant to aggressively manage the airway in cases of severe brain trauma for fear of exacerbating a possible spinal injury.

References

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PRE-HOSPITAL AIRWAY ADJUNCTS AND RESPIRATORY INFECTION

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Background: Various studies have been undertaken to determine the incidence of hospital acquired nosocomial infection, however, little research has been done into the incidence of pre-hospital acquired infection. Eckert, Davis, Reed et al. (2004) found in a retrospective study of 571 patients, pre-hospital intubation was associated with the development of nosocomial pneumonia after trauma. Pre-hospital intubation was associated with significantly higher incidence of pneumonia (35% versus 23%, $p = 0.048$) and that pneumonia was directly related to increased length of intensive care unit stay and total hospital stay ($p < 0.0001$). In some Australian paramedic services, removal of airway adjuncts from sterile packaging prior to use is common. Adjuncts may be carried for several weeks in non-sterile conditions prior to insertion into the airway of a patient.

Objectives: A retrospective cohort study of 326 patients with severe traumatic brain injury was undertaken to investigate the relationship between the use of airway adjuncts in the pre-hospital setting and the incidence of respiratory infection.

Methods and Results: Descriptive and regression analysis were used to determine the relationship between the pre-hospital use of airway adjuncts and respiratory infection. Airway adjuncts were used in 58% (189) of the 326 patients and respiratory infection occurred in 41.7% (136) of patients. In those patients with respiratory infection 29% had an airway obstruction on arrival at hospital, 23.5% patients had $SpO_2 < 95\%$, 22% died, 10.4% remained in a persistent vegetative state, 35.3% were severely disabled, 13.2% were moderately disabled and 19.1% had a good recovery. Pre-hospital airway adjunct use is a significant predictor on the incidence of respiratory infection ($p = 0.049$).

Conclusions: The use of pre-hospital airway adjuncts is associated with the development of respiratory infection in brain trauma patients. Airway adjuncts should only be removed from the sterile packaging immediately before use.

References

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“AS YOU FIND IT” – CLINICAL SIMULATION AS AN ASSESSMENT TOOL IN PARAMEDIC EDUCATION

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AUT University has been using clinical simulation as a summative assessment tool for the final year three practice paper in the BHSc in Paramedic programme since 2004. As clinical placements become increasingly hard to be accommodated, the need for clinical simulation increases. Progression through a stepped clinical simulation programme is essential for simulation to work as an assessment tool. Students and educators alike need to concede the value of, as well as the limitations of clinical simulation. This paper is ‘our story’, the lessons learned, and issues that have arisen.

BLOGGING PARAMEDIC STYLE

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Weblogs (blogs) have been used in education settings in recent years. Paramedic students on clinical placement experience a range of learning opportunities, often in an emotionally charged setting. This paper explores an innovative way of reflective journaling for third year BHSc (Paramedic) students at AUT University by using blogs for this purpose. This paper examines the reasons for introducing blogs, their purpose, as well as the advantages, disadvantages and issues highlighted by using blogs in the course.

PAIN MEASUREMENT AND ALLEVIATION IN AUCKLAND

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Background: Pain is anecdotally reported to be the most common complaint encountered by ambulance officers. The US National Association for Emergency Medical Service (EMS) Physicians advocates pain assessment with all patients. Relief from discomfort has been reported by some to be the most important task EMS providers perform. Yet few studies have been published addressing pain in the prehospital setting. In one US study (McLean, Maio, & Domeier, 2002) of 14.5million patients who arrived in ED by ambulance, 52% had no documentation of presenting pain level and 20% reported moderate to severe pain. Whether pain is routinely assessed, documented or treated in the New Zealand prehospital setting is currently unknown.

Objectives: The objective of this quantitative descriptive study is to estimate the incidence of pain assessment and pain alleviation practices of ambulance officers in Auckland. A retrospective review of ambulance officer report forms from Auckland stations (St John Northern Region) will be undertaken. Data will be abstracted from patient report forms using a standardized data abstraction form.

Methods: Data collected will include working diagnosis, pre-and post-pain measurement scores if available, and interventions including pharmacological and non-pharmacological.

Conclusions: This study will provide evidence of ambulance officers' pain measurement and alleviation practices in Auckland, New Zealand. It will also provide baseline data for future pain intervention studies. Since 2007, ambulance officers in New Zealand have been able to utilise more pharmacocological interventions than previously, providing greater analgesia options. We need to study the utilisation of these newer interventions alongside those already in existence to gather data about use and efficacy. By conducting a retrospective, descriptive study, this provides a beginning point for further research.

CLINICAL TEACHING AND LEARNING IN PARAMEDIC EDUCATION: IS THERE A LINK BETWEEN CLASSROOMS AND CLINICAL PLACEMENTS?

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Background: Undergraduate students enrolled in paramedic programs attend both academic classes at university and also complete clinical placements in a variety of health care locations as components of their professional education. Both settings offer different and varied learning opportunities for students.

Objectives: This paper has two objectives: 1) to determine how paramedic students view their academic learning environment compared to clinical placement learning; and 2) to investigate if the links between the two learning contexts are correlated.

Methods: A prospective cross-sectional survey of students enrolled in 1st and 2nd year levels of paramedic studies at Monash University was conducted via a paper-based questionnaire. Using a convenience sample, students were asked about their perceptions of two learning environments, those being the academic classroom context and the clinical placement setting as their course progressed. The student's views of the two linked learning environments were measured by three validated scales, the Dundee Ready Education Environment Measure (DREEM), the Clinical Learning Environment Inventory (CLEI) and the Clinical Teaching Effectiveness Instrument (CTEI).

Findings: A total of 60 1st year (n=38) and 2nd (n=22) year paramedic students participated in this study with the majority of students (88%; n=53) under 25 years of age. Findings from the CLEI suggest there are differences between what students *prefer* versus what *actually* occurs in clinical placements learning contexts. In particular, students felt they should be offered more opportunities to interact with clinical teachers (p=0.000), and be given more opportunities to interact with patients (p=0.000). Most of the students were satisfied with their teachers, DREEM (M=143.4/200, SD=1.39) and CTEI (M=3.60/5, SD=0.63). Moderate correlations existed between the academic and clinical placement environments (r=0.153 – 0.329, p=0.000), suggesting both environments are pedagogically linked.

Conclusions: It is hoped that the results from this research will inform the development of a best practice education model linking the academic and clinical placements learning environments embedded within paramedic education and training.

PARAMEDIC GRADUATE ATTRIBUTES: USING EXPLORATORY FACTOR ANALYSIS TO INFORM NATIONAL CURRICULUM

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Background: The Australian paramedic discipline has seen a remarkable change in a number of areas including education, training, health care identity, research, and clinical practice particularly over the past three decades. The move into the Higher Education sector has meant that questions such as benchmarking Australian undergraduate paramedic bachelor programmes to specific graduate attributes and competencies have yet to be empirically based.

Objectives: The objective of this study was to establish construct validity on the most important graduate attributes using exploratory factor analysis.

Methods: Data generated from a pilot study (n=63 content experts) rated the importance of 50 graduate attribute items. Exploratory factor analysis was then performed on the 50 items. Principal Component Analysis was applied to identify the number of factors followed by Orthogonal Varimax Rotation.

Findings: Three different factor extraction techniques were used: Eigenvalue > 1 rule, Scree Test, and Explained Variance (70.3% - items with loadings greater than $\pm .40$). The best fit from the pilot data generated a 10-factor solution. The ten factors were labeled as follows: personal characteristics, clinical reasoning skills, interpersonal and team skills, professionalism, continuing professional development, social awareness, flexible learning, accountability, evidence base practice, and self-directed practice. The overall ten-factor solution demonstrated good internal consistency with a Cronbach's α (0.83).

Conclusions: It is critical that empirically-based paramedic graduate attributes are agreed upon between industry and university groups, however, until this occurs, the national standardisation, accreditation, and benchmarking of education programmes will not be possible. In addition, it will leave the paramedic discipline vulnerable and uncertain in relation to its own identity and professional role.

UNDERGRADUATE PARAMEDIC STUDENTS' ATTITUDES TO E-LEARNING: FINDINGS FROM FIVE UNIVERSITIES

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Background: Computers and computer-assisted instruction are being used with increasing frequency in the area of undergraduate paramedic education. Paramedic students' attitudes towards the use of e-learning technology and computer-assisted instruction have received limited attention to date.

Objectives: The objective of this study was to determine paramedic students' attitudes towards e-learning.

Methods: A cross-sectional study using a paper survey with a convenience sample of undergraduate paramedic students studying at five Universities in semester 1, 2009. Student attitudes to e-learning were elicited using three standardised instruments: "*Computer Attitude Survey*" (CAS), "*Online Learning Environment Survey*" (OLES), and The Attitude Toward CAI Semantic Differential Scale (ATCAISDS). An ANOVA with post-hoc test (Tukey HSD) was used to determine the relationship between the three scales and each university.

Findings: There were 339 students who participated. Most students were from MU and QUT (n=116). 75% (n=257) of students were < 25 years of age with 57% (n=195) female. The CAS produced significant findings in each of its subscales, e.g.: "I use the computer to take part in online discussions with other students" was statistically significant, *Actual* mean=2.70, SD=1.25 and *Preferred* mean=2.27, SD=0.89), $p < 0.001$. The OLES also produced significant findings: "I would feel more independent learning from a computer than learning from a teacher" $F(4, 328) = 1.1, p < 0.001$. Post-hoc comparisons found: ECU (mean=4.30, SD=.55) and QUT (mean=4.13, SD=1.0) was significantly different from MU (mean=3.34, SD=1.1) and AUT (mean=3.35, SD=1.1). The ATCAISDS "I would feel more independent learning from a computer than learning from a teacher" $F(4, 320) = 2.1, p < 0.001$. Post-hoc comparisons found: CSU (mean=4.12, SD=1.5) and AUT (mean=3.97, SD=1.5) was significantly different from ECU (mean=2.23, SD=1.1) and QUT (mean=2.96, SD=1.3).

Conclusions: As paramedic-orientated degree programs continue to emerge and develop, careful consideration should be given to the usability and utility of e-learning approaches.

THE EFFICIENCY OF FIRE FIGHTERS IN ATTENDING TO CARDIAC ARRESTS

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Background: The Melbourne Metropolitan Fire and Emergency Services Board (MFESB) was the first fire service in Australia to implement a service wide emergency medical response (EMR) program in 2001. The efficiency of firefighters in responding to a cardiac arrest has only been reported in the pilot study.

Objectives: The objective of this study was to determine the efficiency of firefighters in attending cardiac arrests over the first seven years of the emergency responder program.

Methods: The MFESB have three separate datasets with cardiac arrest information: callout record; patient care record; and cardiac arrest record, including ECG data from the automatic external defibrillator (AED). All ECGs time intervals were reviewed by one researcher with a random sample reviewed by a second researcher to determine accurate extraction. Descriptive statistics were used to summarise the specific outcome data. Ethics approval was granted.

Findings: There were 1,069 ECG sets available for analysis. The average response time was 6.31 minutes, median 5.73 minutes, range 9 seconds to 31.5 minutes. Average time from receiving the 000 call to the first shock was 5.9 minutes, median 6.2 minutes, range 30 seconds to 10.5 minutes. Average time from arriving at the incident to first shock was 2.1 minutes, median 2.2 minutes, range 6 seconds to 6.5 minutes. Average time from AED application to time of first shock was 0.6 seconds, median 0.3 seconds, range 6 to 22 seconds. Average time from arming the AED time of first shock was 0.2 seconds, median 0.5 seconds, range 0 to 22 seconds. Firefighters spent on average 4.6 minutes with the patient before handing over to paramedics, median 3.7 minutes, range 6 seconds to 36.5 minutes.

Conclusions: This study demonstrates that firefighter response times to a cardiac arrest are acceptable and that the firefighters are expedient at initiating the first shock.

KEEPING THE BEAT: DOES MUSIC IMPROVE THE PERFORMANCE OF CHEST COMPRESSIONS BY LAY PERSONS?

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Background: Early bystander cardiopulmonary resuscitation (CPR) increases survival from out-of-hospital cardiac arrest. Simplifying training can improve skill retention and confidence. A recent pilot study suggested music may help health professionals perform CPR. The song 'Nellie the Elephant' (tempo 100bpm) is sometimes used to encourage compression rates in accordance with Resuscitation Council guidelines.

Objectives: This study investigates whether music helps lay persons perform compressions at 100 per minute.

Methods: This randomised cross-over trial opportunistically recruited lay volunteers who performed three sequences, pre-randomised for order, of one minute of continuous chest compressions on a recording manikin accompanied by no music (NM) and repeated choruses of 'Nellie the Elephant' (Nellie), and 'That's The Way (I Like It)' (TTW).

Findings and conclusions: Of 130 participants, 62% were male, median age was 21 (IQR 20 to 25), 72% had no previous CPR training. Mode and IQR for compression rate were NM 111 (93 to 119); Nellie 106 (98 to 107), (TTW) 109 (103 to 110). Within-groups differences were significant for Nellie vs. NM and Nellie vs. TTW ($p < 0.001$) but not NM vs. TTW ($p = 0.055$). A compression rate of 95 to 105 was achieved with NM, Nellie, and TTW for 15/130 (12%), 42/130 (32%) and 12/130 (9%) attempts respectively. Differences in proportions were significant for Nellie vs. NM and Nellie vs. TTW ($p < 0.0001$) but not for NM vs. TTW ($p = 0.55$). Relative 'risk' for compression rate between 95 and 105 was 2.8 for Nellie vs. NM (95%CI 1.66 to 4.80), 0.8 for TTW vs. NM (95%CI 0.40 to 1.62), and 3.5 for Nellie vs. TTW (95%CI 1.97 to 6.33).

'Listening to Nellie' (vs. TTW or no music) significantly increased the proportion of lay persons achieving compression rates close to the 100bpm guideline. Playing it during training and 'real' CPR may help rescuers deliver correct compression rates.