

The Joseph Epstein Centre for Emergency Medicine Research

10th Anniversary Report 2011

EDUCATION

PARTNERSHIPS

RESEARCH



Western Health

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10th Anniversary Report



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Executive Summary

The Joseph Epstein Centre for Emergency Medicine Research is located at Sunshine Hospital in St Albans, Melbourne, Australia.

The aim of the Centre is translating evidence into better health care by:

Performing high quality clinical research in the areas of emergency medicine and prehospital care

Developing partnerships for research, both across regions (national and international) and across disciplines (ambulance, medical, nursing and community)

Providing education and support to workers in prehospital care and emergency medicine in order to develop research that will improve outcomes for patients and

Demonstrating the translation of evidence into improved practice

History

The Joseph Epstein Centre for Emergency Medicine Research was established by Western Health in 2001 and opened by the then Health Minister, the Hon. John Thwaites on 13 February 2001. The Centre focuses on clinical research directly related to improving clinical practice in emergency departments. Our approaches are multi-disciplinary and collaborative and our projects address questions in prehospital, nursing, emergency medical and critical care domains.

The Centre works closely with the Department of Emergency Medicine of Western Health, which has three emergency department campuses located in the western suburbs of Melbourne treating in excess of 125,000 patients annually; 25% of them children.

With a permanent staff of three (average 1.5 EFT, comprising a director, research manager and research officer) supplemented by research students and a small but dedicated band of casual research officers and clinical staff, the Centre has developed a national and international reputation from both the quality and volume of its research output. Since its inception, 139 papers have been published in refereed journals and staff have contributed 20 book chapters.

The team have spoken at conferences in Europe, North America and Asia as well as Australasia. The Centre has the distinction of being the only non-North American group to have their work selected for presentation at the prestigious and highly competitive Society for Academic Emergency Medicine (US) Annual Scientific Meeting every year since the Centre's inception.

Highlights

- Co-supervised 2 completed PhD
- Edited 2 books
- Contributed 20 books chapters
- Contributed 11 editorials or position statements
- Published 25 review articles
- Published 103 original research papers



- ▶ Supervised 22 Advanced Medical Science/ Bachelor of Medical Science students from The University of Melbourne and Monash University; resulting in 18 publications in scientific journals.
- ▶ Supervised 23 completed research projects by Emergency Medicine registrars.
- ▶ Silver Award Winner, Victorian Public Healthcare Awards. Effectiveness and safety of intranasal naloxone for the treatment of heroin overdose by paramedics. (2008)
- ▶ Morson Taylor Research Award, Australasian College for Emergency Medicine. Determining the value of intermediate troponin values with respect to short and medium term prognosis. (2008)

Messages



Clinical excellence is always built on the pillars of quality clinical service, dedicated research and enthusiastic educational activities. Outstanding clinical leadership not only recognises this, but understands the importance of nurturing key clinicians, developing departments and infrastructure and enshrining excellence in the systems that support activities now and into the future.

As the General Manager of Western Hospital it was an honour to work with Professor Epstein. He was (and is) an outstanding leader in Emergency Medicine who delivered clinical excellence and aspired to ensure that the ongoing benefits would flourish at his hospital, within his profession and integrated into the University and Health Care systems. His vision was to ensure that clinical excellence would always be embedded on sound clinically focused research and a commitment to educational strengths. The establishment of the Joseph Epstein Centre for Emergency Medicine Research progressed this vision and was fittingly named in his honour.

Looking at the achievements of the Centre after ten years, it is impressive that his vision has survived and flourished and the Centre has grown not only in capacity but as an internationally recognised centre of excellence.

Well done to the team and all the best for ongoing success.

- David Hills

The staff who founded and shaped the JECEMR for the last ten years have been committed to the notion that emergency medicine will only finally take its place in the “house of medicine” when it can lay claim to sustained, quality intellectual productivity that reflects the unique opportunities afforded to emergency medicine in the chain of care provided to patients who need and deserve quality emergency medical care. I was delighted when it was first suggested to me that my name be attached to the Centre and I have watched it develop and produce under the stewardship of Professor Kelly with admiration, profound pride and respect.

It was imagined that the JECEMR would provide a home for those interested in furthering research in Emergency Medicine and that these people could team up with each other and form the vanguard of emergency medicine research in the Western suburbs of Melbourne. The Centre has also made a special effort of participating in collaborative research – this has been a success story!

Yet, in common with other research institutions, funding remains a challenge – this continues to present a special challenge in building on the excitement and energy that people feel when they first contemplate undertaking research in this specialty. Ironically, although our colleagues in other specialties understand the potential of emergency

medicine research the Joseph Epstein Centre for Emergency Medicine Research has had to face the reality that clinical research is a competitive enterprise and there will always be competition for funding and support from other specialties and from research workers in our own specialty – this reality both energises and frustrates – in this regard ‘twas ever thus’.

In the end intellectual productivity stands or falls on its intellectual output. The paths chosen by the Centre have not always been trouble free but the Centre’s achievements have, considering the resources available, been truly impressive.

I congratulate Professor Kelly and her staff on a genuinely prodigious achievement.

- Joseph Epstein

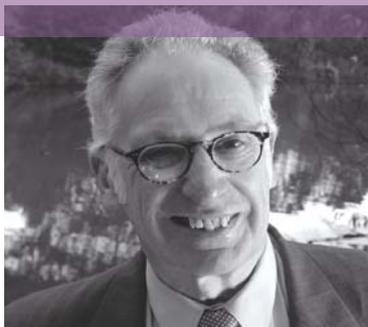
David Hills

Former General Manager Western Hospital



Joseph Epstein AM FIFEM

Senior Consultant and Former Director



Department of Emergency Medicine, Western Hospital;
Executive Manager, Field Emergency Medical Officer Program, Health Displan Victoria and Former President, Australasian College for Emergency Medicine

Research is inseparable from quality clinical care. Finding new and better ways to manage patients and their illness improves patient care and the efficiency of health services.

This year the Joseph Epstein Centre for Emergency Medicine Research celebrates its tenth anniversary. This initiative of Western Health recognised the importance of good emergency care to the outcomes of patients and the passion and talents of the Emergency Medicine academic team. Western Health's investment has had excellent returns. The Centre's research has changed clinical practice not just within our hospitals but around the world. It is recognised as a world leader in several areas of research, attracting considerable research funding and visiting academic fellows.

Congratulations to the Centre's team on their achievements and good wishes for its continued success.

- Kathryn Cook

It is with great pleasure that I congratulate the Joseph Epstein Centre for Emergency Medicine Research on the occasion of their 10th Anniversary. This comes at an auspicious time when the physical location of the Centre is about to be upgraded and enhanced with its resiting in the new Western Health Centre for Health Education and Research at Sunshine Hospital planned for June 2011.

Over the last ten years, the aims of the Centre in translating evidence into better health care have been attained by performing high quality clinical research in the areas of emergency medicine and acute hospital care. In the Centre's key areas of particular research interest, it has been highly productive with 71 publications in peer-reviewed journals over the last five years. The Centre has also provided educational opportunities and support in research methods to those involved in pre-hospital care and emergency medicine. Additionally, the Centre has fostered research by the University of Melbourne Advanced Medical Science students, who have clearly benefited from their exposure to critical thinking in clinical research methods and clinical trial interpretation. Finally and most importantly, Professor Anne-Maree Kelly is to be congratulated for the continuing success of the Centre and its enviable high national and international profile in Emergency Medicine research over the last decade.

I wish the Joseph Epstein Centre for Emergency Medicine Research continuing success over the next 10 years in its new location in the Western Health Centre for Health Education and Research at the Sunshine Hospital.

- Peter Ebeling

It has been a privilege to lead the Joseph Epstein Centre for Emergency Medicine Research over the last ten years. With a focus on issues directly relevant to emergency care, we have worked across a range of themes in response to evolving clinical questions. This flexibility and responsiveness is one of the strengths of the Centre's research model. It is particularly pleasing to see the changes in practice that have resulted, not just in local emergency departments but around the world. I would like to thank the researchers who have worked in our team, the organizations with whom we have collaborated and the doctors and nurses of Western Health's emergency departments for their commitment to advancing emergency care through research. Thanks also to the Board and executive of Western Health for their vision in establishing the centre and their ongoing support. With their continued support, the Centre will continue to go from strength to strength.

- Anne-Maree Kelly



Kathryn Cook

Chief Executive, Western Health



Peter Ebeling

Professor of Medicine:



Chair, NorthWest Academic Centre and Assistant Dean, The University of Melbourne

Anne-Maree Kelly

Founding Director



Staff

Current Staff



Director
Professor Anne-Maree Kelly (2001-)

Professional Fellow,
 The University of Melbourne
 Adjunct Professor,
 Queensland University of Technology
 Senior Clinical Advisor,
 Emergency Care Improvement and
 Innovation Clinical Network,
 Dept of Health (Victoria)

- MBBS Melbourne 1983
- MClined UNSW 1996
- MD Melbourne 1999
- FACEM 1990
- FCCP 2010



Sharon Klim (2009-)
 Research Manager

- BN
- Grad Dip Acute Care Nursing
- Cert Nursing Management



Kerrie Russell (2003-)
 Research and Administration
 Officer

- Dip Health Science Nursing
- Cert Critical Care Nursing

Honorary Fellows

David Krieser FRACP
 Tony Walker ASM

(Western Health)
 (Ambulance Victoria)

Past Staff

Debra Kerr	Research Officer/Research Manager	2001-9
Megan Clooney	Research Officer	2004-8
Karen Enno	Research Officer	2009-10

Visiting International Research Fellow

Stephen Goodacre
 School of Health and Related Research, University of Sheffield, United Kingdom

Beng Leong Lim
 Tan Tock Seng Hospital, Singapore

Collaborations

The Centre has been highly successful in its aim of developing partnerships for research; bringing together organisations and health services across Australia to work on important clinical questions.

Organisations

Ambulance Victoria
Australian National University
Accident and Emergency Medicine Academic Unit
Chinese University of Hong Kong
CSIRO
Heart Foundation
London School of Hygiene and Tropical Medicine
Ottawa Health Research Institute/ University of Ottawa, Canada
The Burnett Institute
The University of Sheffield, United Kingdom
Turning Point Drug and Alcohol Service



CSIRO



Health Services

Albury Hospital	Ipswich Hospital	Royal Children's Hospital (Vic)
Alice Springs Hospital	Joondalup Hospital	Royal Darwin Hospital
Auburn Hospital	Launceston Hospital	Royal Melbourne Hospital
Austin Hospital	Lismore Hospital	Royal Prince Alfred Hospital
Bankstown-Lidcombe Hospital	Logan Hospital	Shell Harbour Hospital
Ballarat Hospital	Lyell McEwin Health Service	Sir Charles Gairdner Hospital
Bendigo Hospital	Mackay Hospital	St Vincent's Hospital, Melbourne
Box Hill Hospital	Maroondah Hospital	St Vincent's Hospital, Sydney
Caboolture Hospital	Mater Misericordiae Hospital	Sunshine Hospital
Calvary Hospital	Mater Children's Hospital	Sutherland Hospital
Canberra Hospital	Monash Medical Centre	Sydney Children's Hospital
Canterbury Hospital	Mona vale Hospital	Tamworth Base Hospital
Coff's Harbour Hospital	Newcastle Hospital	Townsville Hospital
Dandenong Hospital	Port Macquarie Hospital	Tweed Hospital
Epworth Hospital	Queen Elizabeth Hospital	Wagga Wagga Hospital
Flinders Medical Centre	Rockhampton Hospital	Western Hospital
Fremantle Hospital	Rockingham-Kwinana Hospital	Wimmera Hospital
Gold Coast Hospital	Royal Adelaide Hospital	Wollongong Hospital
Goulburn Valley Health Service	Royal Brisbane and Women's Hospital	Women's and Children's Hospital (SA)
Hornsby-Ku-Ring-Gai Hospital	Royal Children's Hospital (Qld)	



Research Program Highlights

Blood Gas Analysis

Blood gas analysis is an important tool for the assessment of acid-base status and ventilatory function. Traditionally, arterial samples were used, but they are painful and carry a risk of serious complications. Venous samples were an alternative, however little was known about agreement between arterial and venous values of key parameters. Through a series of studies, beginning in 2001, we have established how venous and arterial values relate to one another in a variety of clinical conditions. Current work is looking at whether changes in venous pH and carbon dioxide tension accurately reflect changes in the arterial values in patients undergoing non-invasive ventilatory support. This research has changed clinical practice internationally with many arterial punctures replaced by venous samples with less discomfort for patients, less exposure to complications and improved staff safety.

Estimating Children's Weight in Emergencies

Drug doses in children are usually weight-based. In emergency situations it is not always practical to weigh a child in order to calculate the correct dose. There have been several formulae proposed to estimate a child's weight in these circumstances but they had not been validated on Australian children. This series of work, principally by Kevin Nguyen (a research student from The University of Melbourne) and Dr. David Krieser, has examined the available formulae, establishing which is most accurate in Australian children. They also explored parents' accuracy in weight estimation finding that it was more accurate than any of the formulae. This work has changed practice in paediatric emergency departments and recommendations in clinical guidelines about estimation of children's weight in emergencies.

Intranasal Naloxone for Heroin Overdose

Heroin overdose is potentially fatal. Reversal of heroin's effects with the antidote, naloxone, is life-saving. Previously naloxone was given by injection, either into a vein or muscle. However, as those needing help may be in confined spaces and commonly carry viruses (such as hepatitis C or HIV), administration by injection was awkward and carried risks for rescuers. This research program, much of it forming Debra Kerr's PhD thesis, found that administration into the nose via an atomiser was effective and a viable alternative to injection. This work has changed practice in a number of ambulance services around the world. It was a winner of a Victorian Public Healthcare Award in 2008.



Pain Management

Pain management is a key quality indicator in emergency departments, as most patients present with pain as part of their symptom complex. Through a series of studies starting in 2001, we have researched pain measurement, processes for improving the delivery of pain relief and the impact of workload on pain management. Our work in processes facilitating nurse-initiated pain treatment has been widely disseminated and changed practice both in Australia and throughout the world. The protocols and educational materials developed by the team have been requested by, and shared with, countries in North America, Asia and Europe.



Joseph Epstein Centre for Emergency Medicine Research has broad research interests, but our over-arching aim is the translation of research into better clinical care. These are some examples of how that aim is being achieved.

Implementation of the Canadian C-spine rule

With any significant accident there is the risk of an injury to the cervical spine. Ambulance services place patients at risk in hard collars to protect their spine until a fracture can be ruled out. These collars are however very uncomfortable and many patients were spending long periods in them awaiting xrays. Work emanating from Canada established a process to safely and rapidly clear cervical spines in selected patients. Through a series of studies, co-ordinated by Luke Bradshaw (a research student from The University of Melbourne) we were able to report successful implementation of the rapid rule-out process in Australia with lower xray rates and less time spent in hard collars. Luke's work was also the first to report successful implementation of the process by nurses.

Research Students

Joseph Epstein Centre for Emergency Medicine Research has:

- Co-supervised two completed PhD
 - ▶ 2006-9: Debra Kerr.
Intranasal naloxone for the treatment of acute opioid overdose in the prehospital setting.
Monash University.
 - ▶ 2005-8: Kean Soon.
The role of multi-slice CT in the investigation of coronary arteries.
The University of Melbourne.
- Supervised 22 Advanced Medical Science/ Bachelor of Medical Science students from The University of Melbourne and Monash University; resulting in 18 publications in refereed scientific journals.
- Supervised 23 completed research projects fulfilling the research component of specialist training for the Australasian College for Emergency Medicine.

Grants and Awards

Selected Grants

Joseph Epstein Centre for Emergency Medicine Research is lead agency unless otherwise stated.

Granting Body	Project Title	Amount
Medical Research Council [UK]. Lead agency: MCRU, ScHARR, University of Sheffield	The DAVROS Study: Development and Validation of Risk-adjusted Outcomes for Systems of emergency care	£951,554
Commonwealth Department of Health and Aging/ ACEM	Improving asthma discharge from Emergency departments	AUD\$310,866
National Health and Medical Research Council. Lead agency: Ambulance Victoria	Randomised trial of core cooling versus surface cooling in comatose survivors of prehospital cardiac arrest.	AUD\$295,000
Department of Human Services (Victoria).	Intranasal naloxone for suspected opiate overdose.	AUD\$141,000
MBF Trusts	Improving call-to-needle times for thrombolysis of eligible acute myocardial infarcts in Victoria: Pilot projects.	AUD\$80,000
University of Melbourne-CSIRO Collaboration Grant.	Is there a relationship between local concentrations of PM2.5, PM10, SO2, O3 and NO2 and the frequency of emergency department presentations for asthma in children?	AUD\$25,000
Perpetual Trustees Philanthropic Trust.	Improved identification of osteoporosis in elderly patients with fractures.	AUD\$21,000
William Buckland Foundation.	Intranasal versus intramuscular naloxone for the treatment of acute opiate overdose in the prehospital setting.	AUD\$15,000
Morson Taylor Research Award, Australasian College for Emergency Medicine.	Determining the value of intermediate troponin values with respect to short and medium term prognosis.	AUD\$10,000

Prizes and Awards

2008: Silver Award Winner, Victorian Public Healthcare Awards. Effectiveness and safety of intranasal naloxone for the treatment of heroin overdose by paramedics.

2008: Morson Taylor Research Award, Australasian College for Emergency Medicine. Determining the value of intermediate troponin values with respect to short and medium term prognosis.

2008: Winner, best paper. Australian College of Ambulance Professionals 2008 Annual Conference. Effectiveness and safety of intranasal naloxone for the treatment of heroin overdose by paramedics.

2007: Best Poster Prize, Paediatric and Child Health Section, RACP Annual Congress. Parental weight estimation of their child's weight is more accurate than other weight estimation methods for determining children's weight in an emergency department.

2002: Best free paper by a Fellow, Australasian College for Emergency Medicine Annual Scientific Meeting, Sydney, November 2002. Is severity assessment after one hour of treatment better than initial assessment at predicting the requirement for hospital admission for acute asthma?

Publications

Since the inception of The Joseph Epstein Centre for Emergency Medicine Research, staff have:



- Edited 2 books;
- Contributed 20 books chapters;
- Contributed 11 editorials or position statements;
- Published 25 review articles and
- Published 103 original research papers

Acute Cardiology and Resuscitation

Original Research Publications

1. Delaney B, Loy J, Kelly AM. The Relative Efficacy of Adenosine versus Verapamil for Treatment of Stable Paroxysmal SVT in Adults: A Meta-analysis. *Eur J Emerg Med* Epub ahead of print 2010 Oct 5.
2. Bernard SA, Smith K, Cameron P, Masci K, Taylor D, Cooper DJ, Kelly AM for RICH Investigators. Induction of therapeutic hypothermia by paramedics following resuscitation from out-of-hospital ventricular fibrillation cardiac arrest: A randomized, controlled trial. *Circulation* 2010 Aug 17;122(7):737-42. Epub 2010 Aug 2.
3. Hamid S, Bainbridge F, Kelly AM, Kerr D. What Proportion Of Rule Out Acute Coronary Syndrome Patients Are Potentially Suitable For Multi-slice CT Coronary Angiography? *Am J Emerg Med* 2010;28(4):494-8. Epub 2010 Feb 25.
4. Lee HM, Kerr D, O'h Ici D, Kelly AM. Clinical Significance Of Initial Troponin I In The Intermediate Band In Emergency Department Chest Pain Patients: A Pilot Study. *Emerg Med J* 2010;27(4):302-4.
5. Kerr D, Jennings P, Kelly AM, Walker T, Edington J. Case report: Trial of prehospital thrombolysis in ST elevation myocardial infarction. *JEPJC* 2008 www.jephc.com/uploads/DK990277.pdf
6. Soon KH, Chaitowitz I, Selvanayagam J, Kelly AM, Zajhem B, Nguyen M, Bell KW, Lim YL. Comparison of fluoroscopic coronary angiography and multi-slice CT coronary angiography in the characterization of anomalous coronary arteries. *Int J Cardiol* 2008; 130:96-8.
7. Lin A, Kerr D, Kelly AM. Is Cardiac Monitoring during Transport of Low-risk Chest Pain Patients from the Emergency Department Necessary? *Emerg Med Australas* 2007; 19:229-233.
8. Hoi K, Chan A, Kerr D, Kelly AM. Is cardiac monitoring necessary for intermediate risk acute coronary syndrome patients who have a normal ECG and cardiac biomarkers in the emergency department? *Hong Kong J Emerg Med* 2007; 14:6-9.
9. Soon KH, Kelly AM, Cox N, Chaitowitz I, MacGregor L, Bell KW, Lim YL. Practicality, Safety and Accuracy of Computed Tomography Coronary Angiography in Stratifying Low TIMI-Score Chest Pain Patients: A Pilot Study *Emerg Med Australas* 2007; 19:129-35.
10. Kerr D, Holden D, Bunker S, Kelly AM, Smith J, Kelly AM. Predictors of ambulance use in patients with acute myocardial infarction in Australia. *Emerg Med J* 2006;23:948-52.
11. Peska E, Kelly AM, Kerr D. One-handed versus two-handed chest compressions in paediatric cardio-pulmonary resuscitation. *Resuscitation* 2006; 71:65-9.
12. Elder C, Kerr D, Kelly AM, Davey RFX. Is routine lipid testing for patients presenting to the emergency department with chest pain worthwhile? *Emerg Med J* 2006; 23:23-6.
13. Kelly AM, Kerr D. Clinical features in the emergency department can identify patients with suspected acute coronary syndromes who are safe for care in unmonitored hospital beds. *Intern Med J* 2004; 34:594-7.
14. Goodacre S, Kelly AM, Kerr D. The potential impact of interventions to reduce time to thrombolysis. *EMJ* 2004; 21: 625-9.
15. Kelly AM, Kerr D, Patrick I, Walker T. Call-to-needle times for thrombolysis in acute myocardial infarction in Victoria. *Med J Aust* 2003; 178:381-5.

Acute Cardiology and Resuscitation (cont)

16. Sultana RV, Kerr D, Kelly AM, Cameron P. Validation of a tool to safely triage selected patients with chest pain to unmonitored beds. *Emergency Medicine (Fremantle)* 2002; 14:393-9.
17. Kelly AM, Kerr D, Patrick I, Walker T. Benchmarking ambulance call to needle times for thrombolysis after myocardial infarction in Australia: a pilot study. *Intern Med J* 2002; 32:138-42.
18. Bryant MG, Kelly AM. "Point of entry" treatment gives best time to thrombolysis for acute myocardial infarction. *Australian Health Review*. 2001; 24:157-160.
19. Rosengarten P, Kelly AM. Does routine use of the 15 lead ECG improve the diagnosis of acute myocardial infarction in patients with chest pain? *Emergency Medicine* 2001; 13:190-3.
20. Kelly AM, Kerr D. It is safe to manage selected patients with acute coronary syndromes in unmonitored beds. *Journal of Emergency Medicine* 2001; 21: 227-233.

Asthma

1. Kelly AM, Clooney M. Improving Asthma Discharge Management In Relation to Emergency Departments: The ADMIRE Project *Emerg Med Austral* 2007;19:59-62.
2. Cunnington D, Smith N, Steed K, Rosengarten P, Kelly AM, Teichtahl H. Oral versus intravenous corticosteroids in adults hospitalised with asthma. *Pulm Pharmacol Therapeutics* 2005; 18:207-212.
3. Erbas B, Kelly AM, Physick W, Code C, Edwards M. Air pollution and childhood asthma emergency hospital admissions: estimating intra-city regional variations. *Int J Envir Health Res* 2005; 15:11-20.
4. Powell CVE, Raftos J, Kerr D, Rosengarten P, Kelly AM. Asthma in emergency departments: Adult/paediatric versus paediatric only centres. *J Paediatr Child Health* 2004; 40:433.
5. Kelly AM, Kerr D, Powell CVE, Kerr D. Is severity assessment after one hour of treatment better for predicting the need for admission in acute asthma? *Respir Med* 2004; 98:777-81.
6. Eddy E, Kelly AM. Acute asthma presentations: Is there a relationship between severity and abnormalities on chest xray? *Hong Kong J Emerg Med* 2004; 11:147-51.
7. Kelly AM, Powell C, Kerr D. A snapshot of asthma in Australia. *Intern Med J* 2003; 33: 406-13.
8. Powell CVE, Kelly AM, Kerr D. Lack of agreement in classification of the severity of acute asthma between emergency physician assessment and classification using the National Asthma Council Australia guidelines. *Emergency Medicine [Fremantle]* 2003; 15: 49-53.
9. Kelly AM, Powell CVE, Kerr D. Patients With A Longer Duration Of Asthma Symptoms Are More Likely To Require Admission To Hospital. *Emergency Medicine (Fremantle)* 2002; 14:142-5.

Blood Gas Analysis

1. Kelly AM, Klim S. Agreement between arterial and transcutaneous pCO₂ in patients undergoing non-invasive ventilation *Resp Med Epub* 2010, Dec 4.
2. Lim BL, Kelly AM. How useful is transcutaneous carbon dioxide monitoring in the adult emergency department? *Hong Kong J Emerg Med* 2010; 17:82-4
3. Lim BL, Kelly AM. A meta-analysis on the utility of peripheral venous blood gas analyses in exacerbations of chronic obstructive pulmonary disease in the emergency department. *Eur J Emerg Med* 2010; 17:246-8.
4. Middleton P, Kelly AM, Brown J, Robertson M. Agreement Between Arterial And Venous Values For pH, Bicarbonate, Base Excess and Lactate *Emerg Med J* 2006; 23:622-4.
5. Kelly AM, Kerr D, Middleton P. Validation of venous pCO₂ to screen for arterial hypercarbia in patients with chronic obstructive airways disease. *J Emerg Med* 2005; 28:4:377-9.
6. Kelly AM, McAlpine R, Kyle E. Agreement between bicarbonate measured on arterial and venous blood gases. *Emerg Med Australas* 2004; 16:407-9.
7. Fu P, Douros G, Kelly AM. Does potassium concentration measured on blood gas analysis agree with serum potassium in patients with diabetic ketoacidosis? *Emerg Med Austral* 2004; 16:280-3.
8. Kelly AM, Kyle E, McAlpine R. Venous pH and pCO₂ can be used to screen for significant hypercarbia in emergency patients with acute respiratory disease. *J Emerg Med* 2002; 15-19.
9. Kelly AM, McAlpine R, Kyle E. Venous pH can safely replace arterial pH in the initial evaluation of patients in the emergency department. *Emerg Med J* 2001; 18:340-2.
10. Kelly AM, McAlpine R, Kyle E. How accurate are pulse oximeters in patients with acute exacerbations of chronic obstructive airways disease? *Respiratory Medicine* 2001; 95:336-40.

Clinical Decisions Rules and Risk Scores

1. Nguyen H, Kerr D, Kelly AM. Comparison of prognostic performance of scores to predict risk of stroke in emergency department patients with transient ischaemic attack. *Eur J Emerg Med* 2010 Feb 15. [Epub ahead of print]
2. Brehaut J, Graham I, Wood T, Taljaard M, Eagles D, Lott A, Clement C, Kelly AM, Mason S, Kellermann A, Stiell I. Measuring Acceptability of Clinical Decision Rules: Validation of the Ottawa Acceptability of Decision Rules Scale (OADRS) in Four Countries. *Med Decis Making*. 2010;30(3):398-408. Epub 2009 Dec 30.
3. Perry J, Eagles D, Clement CM, Brehaut J, Kelly AM, Mason S, Kellermann A, Stiell IG. International Survey of Emergency Physicians' Current Practice for Acute Headache and the Need for a Clinical Decision Rule. *CJEM*. 2009;11:516-522.
4. Eagles D, Stiell I, Clement C, Brehaut JC, Taljaard M, Kelly AM et al. International Survey of Emergency Physicians' Awareness and Use of the Canadian C-Spine Rule and the Canadian CT Head Rule *Acad Emerg Med* 2008; 15:1256-61.

Clinical Decisions Rules and Risk Scores (cont)

5. Eagles D, Stiell I, Clement C, Brehaut JC, Kelly AM, Mason S et al. International Survey of Emergency Physicians' Priorities for Clinical Decision Rules. *Acad Emerg Med* 2008; 15:177-82.
6. Cosgriff T, Kelly AM, Kerr D. External Validation of the San Francisco Syncope Rule in the Australian context. *CJEM* 2007;9:157-61.
7. Kerr D, Bradshaw L, Kelly AM. Implementation of the Canadian C-Spine rule reduces cervical spine x-ray rate for alert patients with potential neck injury. *J Emerg Med* 2005; 28:127-31.
8. Kelly AM, Bradshaw L, Kerr D. Can nurses apply the Canadian c-spine rule? *Can J Emerg Med* 2004;6:161-4.

Education

1. Kelly AM, Hunyadi-Anticevic S, Hew R. Emergency Medicine Training for Croatia: A Croatia-Australia partnership. *Resuscitation* 2007; 72:252-6.
2. Kelly AM. Getting more out of clinical experience in the emergency department. *Emergency Medicine (Fremantle)* 2002; 14:127-130.
3. Kelly AM, Richardson D. Training for the role of triage in Australasia. *Emergency Medicine* 2001; 13:230-2.

Estimating Children's Weight in Emergencies

1. Kelly AM, Nguyen K, Krieser D. Validation of the Luscombe Weight Formula for Estimating Children's Weight. *Emerg Med Australas Epub* 2010, Dec 6.
2. Krieser D, Nguyen K, Kerr D, Jolley D, Clooney M, Kelly AM. Parental weight estimation of their child's weight is more accurate than other weight estimation methods for determining children's weight in an emergency department? *Emerg Med J* 2007; 24:756-9.
3. Kelly AM, Kerr D, Clooney M, Krieser D, Nguyen K. External validation of the 'Best Guess' formulae for paediatric weight estimation. *Emerg Med Australas* 2007; 19:543-6.
4. Nguyen K, Krieser D, Kerr D, Jolley D, Clooney M, Kelly AM. Failed validation of the Argall weight formula for estimating children's weight *Acad Emerg Med* 2007;14:486-8.

Headache and Migraine

1. Kelly AM, Walczynski T, Gunn B. The Relative Efficacy Of Phenothiazines For The Treatment Of Acute Migraine: A Meta-analysis. *Headache* 2009;49:1324-32.
2. Kelly AM, Kerr D, Clooney M. Impact of Oral Dexamethasone Versus Placebo After ED Treatment Of Migraine With Phenothiazines On The Rate Of Recurrent Headache: A Randomised Controlled Trial. *Emerg Med J* 2008; 25:26-9.

Intranasal Naloxone for Heroin Overdose

1. Kerr D, Kelly AM, Dietze P, Jolley D, Barger B. Randomised controlled trial comparing the effectiveness And safety Of intranasal naloxone for treatment of heroin overdose by Ambulance Officers. *Addiction*. 2009;104:2067-2074.
2. Kerr D, Dietze P, Kelly AM, Jolley D. Improved response by peers after witnessed overdose in Melbourne. *Drug Alcohol Rev* 2009; 28:327-30.
3. Kerr D, Dietze P, Kelly AM, Jolley D. Attitudes of Australian heroin users to peer distribution of naloxone for heroin overdose: Perspectives on intranasal administration. *J Urban Health* 2008;85:352-60.
4. Kelly AM, Kerr D, Dietze P, Patrick I, Walker T, Koutsogiannis Z. A randomised trial of intranasal versus intramuscular naloxone in prehospital treatment for suspected opioid overdose. *MJA* 2005; 182:24-7

Pain Management

1. Mitchell R, Kelly AM, Kerr D. Does emergency department workload adversely influence timely analgesia? *Emerg Med Australas* 2009; 21:52-8.
2. Lord B, Cui J, Kelly AM. The impact of patient gender on paramedic pain management in the prehospital setting. *Am J Emerg Med* 2009; 27:525-9.
3. Kelly AM, Brumby C, Barnes C. Nurse-initiated, titrated intravenous opioid analgesia reduces time to analgesia for selected painful conditions. *Can J Emerg Med* 2005;7:149-54.
4. Kelly AM, Powell CV, Williams A. Lack of correlation between patient and child visual analogue scale pain scores: A challenge for paediatric pain and analgesia research *Pediatr Emerg Care* 2002; 18:159-162.
5. Kelly AM. The minimum clinically significant difference in VAS score does not differ with severity of pain. *Emerg Med J* 2001; 18:205-7.
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Pneumothorax

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