

Centre for Clinical Research in Emergency Medicine

The Centre for Clinical Research in Emergency Medicine (CCREM) is a Centre within the Harry Perkins Institute of Medical Research, established in 2008 with start up and ongoing funding from Royal Perth Hospital and the Royal Perth Hospital Medical Research Foundation.

Our research involves collaboration between academic emergency physicians working in the Emergency Department (ED), a team of research nurses recruiting patients presenting to the ED with acute illnesses, and scientists analysing samples in the laboratory using immunological and molecular biological techniques. We are unique in having a wet lab within the ED, which allows for timely specimen preparation.

CCREM research approaches include observational studies and laboratory work designed to uncover the mechanisms of disease, and randomised controlled trials designed to improve clinical care. We also endeavour to integrate laboratory and clinical research, using laboratory studies to help us understand the results of clinical trials.

CCREM provides opportunities for both laboratory and clinical post-graduate honours and PhD students, and research terms for Emergency Medicine Advanced Trainees at Royal Perth Hospital.

CCREM staff and associates, 2013

Royal Perth Hospital

Clinical Academics

Professor Simon Brown MBBS PhD FACEM, Program Director

Professor Daniel Fatovich MBBS PhD FACEM

Associate Professor Glenn Arendts MBBS MMed FACEM

Research Registrars

Dr Christopher Armstrong MBChB

Dr David McCutcheon MBBS FACEM

Research management and administration

Ellen MacDonald RN, Clinical Nurse Manager

Cathy Read RN, National Coordinator PSP Study

Sophie Damianopoulos, Administrative Officer

Sarah Fitzhardinge BSc MBA, Research Assistant

Laboratory

Assistant Professor Shelley Stone BSc PhD, Research Fellow

Dr Pauline van Eeden BSc PhD, Research Associate

Ms Claire Cotterell BSc, Research Assistant

Ms Leah Stone BSc, Research Assistant

Ms Helen O'Donoghue BSc, Research Assistant

Research Nurses

Helen Hamersley RN, Jen Wurmel RN, Clare Nash RN, Naomi Sweeting RN, Dianne Catapang RN, Diana Khoo RN, Jessica Peel RN

PhD Students

Dr Craig Ellis MBChB FACEM, Associate Professor Stephen Macdonald BSc MBChB DCH MRCP FACEM, Ms Abbie Creamer BSc

Fremantle Hospital

Clinical Academic

Professor Yusuf Nagree MBBS FACEM MBA

Research management and administration

Karen Shakespeare RN, Research Coordinator
Vanessa Camarda, Administrative Officer

Research Registrar

Dr Bahati Mosetti, MBBS

Research Nurses

Sarah Gow RN, Maree Masters RN, Sue Burns RN, Madeline Barker RN

Armadale Kelmscott Memorial Hospital

Clinical Academic

Associate Professor Stephen Macdonald BSc MBChB DCH MRCP FACEM

Research Nurses

Alysee Pownall RN, Shiree Walker RN

South West Area Health Service

Clinical Academic

Dr Hugh Mitenko FACEM

Research Nurse

Marie Draper RN

Notable New Funding For 2013

A multi-centre RCT to prevent secondary falls in older people presenting to the emergency department with a fall. NHMRC (Partnership project). Barker A, Cameron P, Hill K, Flicker L, Haines T, Lowthian J, Waldron N, Arendts G, Redfern J, Forbes A. 2013-14 \$148,315

Assessment and Management of the Cognitively Impaired Older Person Presenting to Emergency Departments with Musculoskeletal Conditions or Injuries. Emergency Care Institute NSW. Fry M, Arendts G, Chenoweth L. 2013-14 \$158,890

Reducing demand on emergency departments in the last year of life. NHMRC Project Grant. Rosenwax LK, McNamara B, Semmens J et al (Arendts G AI). 2014-16 \$358 835

Emergency Department Delirium Initiative (EDDI): A study targeting the early identification of patients at risk of delirium. WA Health Targeted Research Fund. Dey I, Love J, Arendts G, Hare M. 2013-16 \$260,000

Ongoing Funding For 2013

Modelling community preferences for health policy: how choice experiments can inform the organisation of acute health services for older Australians. Australian Research Council Discovery Project. Howard K, Arendts G, Jan S, Quine S. 2012-2014 \$172,197

Evidence-based paramedic models of care to reduce unnecessary emergency department attendance. WA Health Targeted Research Fund. Jacobs I, Finn J, Fatovich D, Arendts G, Mountain D, Williams T, Gibson N, Spirvulis P and Celenza A. 2012-2013 \$370,000

Continuous Positive Airway Pressure (CPAP) trial for treatment of Acute Pulmonary Oedema by Ambulance Paramedics in the Pre-Hospital Setting. University of WA Research Development Awards. Williams T, Jacobs I, Finn J, Summers Q and Arendts G. \$29,619

Differential gene regulation during elderly sepsis: correlation with poor clinical outcomes. University of WA Research Development Award. van Eeden P, Brown S, Stone S and Arendts G. \$30,000

A randomized controlled trial of invasive versus conservative treatment of primary spontaneous pneumothorax. Department of Health, Western Australian State Health Research Advisory Council Research Translation Grant 2012-2013. Brown S. \$190,000

A randomised trial of patient centred intervention to reduce re-presentations of older people at risk after discharge from the emergency department. WA State Health Research Advisory Council 2012-14 Arendts G. \$200,000

Granzyme B in acute ischaemic stroke. Royal Perth Hospital Medical Research Foundation Grant. Van Eeden P, Armstrong C, Stone S, Brown S, Fatovich D and Hankey G. \$17,500 + 0.5FTE for a Research Assistant.

Leukocyte cell signalling after traumatic brain injury: correlation with clinical outcomes. Neurotrauma Research Program. Brown S, Stone S, Webb S, Henry N, Rao S, Fatovich D and Arendts G. \$160,000

Establishing an Emergency Medicine Research Collaborative. University of Western Australia, University of Queensland Bilateral Research Collaboration Award. Macdonald S, Brown S, Fatovich D, Stone S, Chu K and Brown A. \$15,498

The Crystalloid versus Albumin in the Resuscitation of Emergency Department Patients with Septic Shock (CARESS) trial inflammatory marker pilot study. Williams J, Greenslade J, Brown S, Stone S, Lukin B. Queensland Emergency Medicine Research Foundation. \$41,270

Bacterial load and survival in septic shock (BLISS). Iredell J, Webb S, Stanley K, Brown S, Nichol A, Bailey M. (Stone S, AI) (NHMRC Project Grant 632622) \$165,263.

Immunological mechanisms and management of critical illness and injury. Brown S. NHMRC Career Development Fellowship. 2012-2015 \$76,000 per annum.

New Investigations

(1) Coordinated by CCREM

Assessing Risk in Sepsis using Tissue Oxygen Saturations (ARISTOS)

A clinical observational study examining the use of near infrared spectroscopy derived tissue oxygen saturation at the bedside in Emergency Department patients with sepsis to determine the utility of this measure to predict organ dysfunction.

Inflammation and acute stroke study

A study of patients presenting to the ED with acute stroke, investigating early immunological markers.

Microcirculation in Acute Atrial Fibrillation

An observational study of the effects of atrial fibrillation on the microcirculation using dynamic near infrared spectroscopy.

(2) Collaborations - patient recruitment at CCREM sites, but coordinated by other centres or units

Preferences for the organisation of acute health services for older people (PROSpER)

Preferences for providing acute medical care for people living in residential aged care facilities (University of Sydney).

Target Pain Study

A multi-Emergency Department study testing if the adoption of a pain score target will increase patient satisfaction with their pain management in the ED. (Prof D Taylor, Austin Health)

Ongoing Investigations

(1) Coordinated by CCREM

Critical illness and shock study (CISS)

A prospective study of patients presenting to the Emergency Department with critical illness or injury that compromise the cardiovascular and/or respiratory systems. Currently focussing on the acute immune response to anaphylaxis, septic shock, traumatic brain injury and post-cardiac arrest.

Clinical Associations with Acute Decompensated Diastolic Heart Failure in the Elderly (DHF Study)

A multicentre, prospective observational study following elderly patients with established DHF over a period of time by comparing their baseline characteristics when they are well to when they present unwell to the Emergency Department.

Emergency Department Complex Needs Coordination Team (ED CoNeCT)

A randomised trial of patient centred intervention to reduce re-presentations of older people at risk after discharge from the emergency department.

Jack Jumper Ant Venom Immunotherapy (JJA VIT) Trials

A study of immunotherapy dosing and immune response (IgE, IgG4). First phase published in the Journal of Allergy and Clinical Immunology (2012). Completed in 2013.

Primary Spontaneous Pneumothorax Study

An Australasian randomised controlled trial of conservative management with observation only versus interventional (aspiration and/or insertion of chest drain) treatment of primary spontaneous pneumothorax.

Residential Aged Care Facility Study

A randomised controlled trial to reduce emergency department transfers and improve quality of life in residential aged care facilities.

Sepsis/Saline Trial

A pilot randomised trial of hypertonic saline versus normal saline as the initial bolus fluid in patients with infectious systemic inflammatory response syndrome.

Emergency Department Anaphylaxis Studies (EDA II and III)

(i) A randomised controlled trial of intramuscular versus intravenous adrenaline during anaphylaxis (ii) A study of gene activation and biochemical mediators of anaphylaxis.

Chest Pain Registry

The chest pain registry is a longitudinal study of patients presenting to the Emergency Department with chest pain and is looking at medium term outcomes of these patients. Co-ordinated by CCREM partner, Fremantle Hospital Emergency Medicine Research

Use of BNP in Syncope

This study is examining whether the use of a simple blood test (BNP) can improve diagnostic accuracy of patients presenting to the Emergency Department with syncope. Co-ordinated by CCREM partner, Fremantle Hospital Emergency Medicine Research

(2) Collaborations - patient recruitment at CCREM sites, but coordinated by other centres or units

Australasian Resuscitation in Sepsis Evaluation (ARISE Study).

A multi-centre, randomised controlled trial of early goal-directed therapy in patients presenting to the emergency department with severe sepsis in Australasia (ANZICS Clinical Trials Group)

The prophylactic hypothermia trial to lessen traumatic brain injury (POLAR).

This trial will investigate whether early and sustained cooling of patients with severe traumatic brain injury is associated with better survival and less disability compared to standard care in which patients are maintained at normal temperature (ANZICS Clinical Trials Group).

Australian Snakebite Project and Fresh Frozen Plasma Study (ASP-FFP)

A national multicentre prospective cohort study of snake envenoming in Australia (Dr G Isbister, University of Newcastle, Calvary Mater Hospital).

Redback Antivenom Evaluation (RAVE) II Study

Randomised controlled trial of intravenous antivenom versus placebo in the treatment of redback spider bite. Completed April 2013 (Dr G Isbister, University of Newcastle, Calvary Mater Hospital).

Evidence-based paramedic models of care to reduce unnecessary emergency department attendance: feasibility and safety.

Development and validation of clinical protocols for extended care paramedics (Prof I Jacobs, Curtin University).

Functional status of survivors of out-of-hospital cardiac arrest (OCHA) in Perth

A retrospective observational study to determine the functional/neurological outcome of OHCA survivors discharged from hospital and to estimate the uptake of post-resuscitation practices such as therapeutic hypothermia and coronary reperfusion (Prof I Jacobs, Curtin University).

The FluCAN Surveillance System

FluCAN is the first system in Australia to collect high quality and reliable data on hospitalised acute respiratory disease and other influenza related admissions in real time. Royal Perth Hospital participates as the sentinel site for WA. (Dr A Cheng, Infectious Diseases Unit, Alfred Hospital).

Emergency Department Pulmonary Embolism Diagnosis (EDPED)

Early discharge of patients diagnosed with low risk pulmonary embolism from the emergency department (Dr T Ercleve, Sir Charles Gairdner Hospital)

Quantifying alcohol-related harm presenting to Emergency Departments in Australasia

To determine the proportion of alcohol-related presentations to emergency departments in Australia and New Zealand, at a single time point on a weekend night shift (Dr Diana Egerton-Warburton, ACEM)

Publications 2013

Arendts G. Response to outcomes in older patients requiring comprehensive allied health care prior to discharge from the emergency department: Reply. *Emerg Med Australas.* 2013; 25(3):285.

Arendts G, Fitzhardinge S, Pronk K, Hutton M. Outcomes in older patients requiring comprehensive allied health care prior to discharge from the emergency department. *Emerg Med Australas.* 2013; 25(2):127-131.

Arendts G, Fitzhardinge S, Pronk K, Hutton M, Nagree Y, Donaldson M. Derivation of a nomogram to estimate probability of revisit in at-risk older adults discharged from the emergency department. *Intern Emerg Med.* 2013; 8(3):249-254.

Arendts G, Lowthian J. Demography is destiny: an agenda for geriatric emergency medicine in Australasia. *Emerg Med Australas.* 2013; 25(3):271-278.

Arendts G, Quine S, Howard K. Decision to transfer to an emergency department from residential aged care: A systematic review of qualitative research. *Geriatrics & gerontology international*. 2013; 13(4):825-33.

Arendts G, Fitzhardinge S, Pronk K, Hutton M. Front-loading allied health intervention in the emergency department does not reduce length of stay for admitted older patients. *International journal of clinical practice*. 2013 67(8):807-810.

Brown S. Pleurodesis for primary spontaneous pneumothorax. *Lancet*. 2013 382(9888):203.

Brown S, Macdonald S, Hankey G. Do risks outweigh benefits in thrombolysis for stroke? 2013. *BMJ* 347:f5215.

Brown S, Stone S, Fatovich D, Burrows S, Holdgate A, Celenza A, Coulson A, Hartnett L, Nagree Y, Cotterell C, Isbister G. Anaphylaxis: clinical patterns, mediator release, and severity. *J Allergy Clin Immunol*. 2013 132(5):1141-1149 e1145.

Brown S, Stone S, Fatovich D, Isbister G. Reply: To PMID 23915715. *J Allergy Clin Immunol*. 2013 132(6):1457.

Cheng A, Holmes M, Irving L, Brown S, et al. Influenza vaccine effectiveness against hospitalisation with confirmed influenza in the 2010-11 seasons: a test-negative observational study. *PloS one*. 2013 8(7):e68760.

Cheng A, Brown S, Waterer G, Holmes M, et al. Influenza epidemiology, vaccine coverage and vaccine effectiveness in sentinel Australian hospitals in 2012: the influenza complications alert network (FluCAN). *CDI*. 2013 37(3):E246.

Ellis B, Brown S. Parenteral antihistamines cause hypotension in anaphylaxis. *Emerg Med Australas*. 2013; 25(1):92-93.

Fatovich D. Response from Prof. Fatovich to Stroke thrombolysis: Leaving the past, understanding the present and moving forward. *Emerg Med Australas*. 2013; 25(2):196-197.

Fatovich D. Medical reversal: What are you doing wrong for your patient today? *Emerg Med Australas*. 2013; 25(1):1-3.

Fatovich D, Jacobs I, Langford S, Phillips M. The effect of age, severity, and mechanism of injury on risk of death from major trauma in Western Australia. *The journal of trauma and acute care surgery*. 2013; 74(2):647-651.

Fatovich D, Phillips M, Hubble K, Vasikaran S. High-sensitivity troponin in marathon runners. *Med J Aust*. 2013 199(3):169-170.

Fatovich DM. Deeper understanding of the evidence on stroke thrombolysis. *Emerg Med Australas* 2013; 25(4): 375-6.

Finn JC, Fatovich DM, Arendts G, Mountain D, et al. (2013) Evidence-based paramedic models of care to reduce unnecessary emergency department attendance--feasibility and safety. *BMC emergency medicine* 13:13.

Gillman L, Fatovich D, Jacobs I. Mortality of interhospital transfers originating from an Emergency Department in Perth, Western Australia. *Aust Emerg Nurs J.* 2013 16:144-151

Hare M, Arendts G, Wynaden D, Leslie G. Nurse Screening for Delirium in Older Patients Attending the Emergency Department. *Psychosomatics.* 2013.

Huddle N, Arendts G, Macdonald S, Fatovich D, Brown S. Is comorbid status the best predictor of one-year mortality in patients with severe sepsis and sepsis with shock? *Anaesthesia and intensive care.* 2013 41(4):482-489.

Isbister G, Buckley N, Brown S. Tiger snake (*Notechis* spp) envenoming: Australian Snakebite Project (ASP-13). *Med J Aust.* 2013; 198(4):194-195.

Isbister G, Brown S, Page C, McCoubrie D, et al. Snakebite in Australia: a practical approach to diagnosis and treatment. *Med J Aust.* 2013 199(11):763-768.

Isbister G, Buckley N, Page C, Scorgie F, Lincz L, Seldon M, Brown S, ASP Investigators. A randomized controlled trial of fresh frozen plasma for treating venom-induced consumption coagulopathy in cases of Australian snakebite (ASP-18). *Journal of thrombosis and haemostasis.* 2013 JTH 11(7):1310-1318.

Johnston C, Brown S, O'Leary M, Currie B, Greenberg R, Taylor M, et al. Mulga snake (*Pseudechis australis*) envenoming: a spectrum of myotoxicity, anticoagulant coagulopathy, haemolysis and the role of early antivenom therapy - Australian Snakebite Project (ASP-19). *Clin Toxicol (Phila).* 2013; 51(5):417-424.

Lenzer J, Hoffman J, Furberg C, Ioannidis J. Ensuring the integrity of clinical practice guidelines: a tool for protecting patients. 2013 *BMJ* 347:f5535. (D Fatovich was a member of the Working Group).

Macdonald SP, Nagree Y, Fatovich DM, Phillips M, Brown SG. Serial multiple biomarkers in the assessment of suspected acute coronary syndrome: multiple infarct markers in chest pain (MIMIC) study. *Emerg Med J* 2013; 30(2): 149-54.

Macdonald S. Stroke care in Australia: why is it still the poor cousin of health care? *Med J Aust.* 2013 199(3):166.

Nagree Y, Camarda V, Fatovich D, Cameron P, Dey I, Gosbell A, et al. Quantifying the proportion of general practice and low-acuity patients in the emergency department. *Med J Aust.* 2013; 198(11):612-5.

Nagree Y, Gosbell A, McCarthy S, Moore K, Mountain D. Determining the true burden of general practice patients in the emergency department: getting closer. *Emerg Med Australas.* 2013 25(6):487-490.

Stone S, Isbister G, Shahmy S, Mohamed F, Abeyasinghe C, Karunathilake H, Ariaratnam A, Jacoby-Alner T, Cotterell C, Brown S. Immune response to snake envenoming and treatment with antivenom; complement activation, cytokine production and mast cell degranulation. *PLoS neglected tropical diseases*. 2013 7(7):e2326.

Stone S, Phillips E, Wiese M, Heddle R, Brown S. Immediate-type hypersensitivity drug reactions. *British journal of clinical pharmacology*. 2013

Tohira H, Finn J, Williams T, Fatovich D, Jacobs I. Accuracy of the 'mode of transportation' variable in the Emergency Department Information System data. *Emerg Med Australas*. 2013 25(4):382-383.

Williams T, Finn J, Fatovich D, Jacobs I. Outcomes of different healthcare contexts for direct transport to a trauma center versus initial secondary center care: a systematic review and meta-analysis. *Prehosp Emerg Care*. 2013 17:442-457.

Conferences including Proceedings, Papers, Posters

International

Brown S. Anaphylaxis: clinical features and evidence for a mast cell-leukocyte cytokine cascade in humans. Annual Society for Academic Emergency Medicine (SAEM) Scientific Meeting, Atlanta, Georgia, USA, May 2013

Brown S. Management of ant venom allergy. EAACI-WAO World Allergy and Asthma Congress, Milan, Italy, June 2013

National

Arendts G. Do we need geriatric emergency physicians? Emergency Care and Population Ageing Summit, Melbourne, March 2013

Arendts G. Care Coordination Teams. Emergency Care and Population Ageing Summit, Melbourne, March 2013

Arendts G. What makes people from nursing homes come to hospital, and what makes them not: The evidence. 3rd Annual RBWH Aged Care Conference, Brisbane, May 2013

Arendts G. Transitional Care for the Older Person Discharged from ED. 30th Australasian College for Emergency Medicine Annual Scientific Meeting. Adelaide, November 2013

Brown S. Immune mediator changes in snake envenoming and after antivenom. Toxicology and Poisons Network Australasia (TAPNA), Newcastle, April 2013

Brown S. Convene/run a 1.5 hour workshop on Sting and Drug Anaphylaxis. Toxicology and Poisons Network Australasia (TAPNA), Newcastle, April 2013

Brown S. Venom immunotherapy: established cure or work in progress? 24th Annual Scientific Meeting of the Australasian Society of Clinical Immunology and Allergy (ASCIA). Perth, September 2013

Fatovich D. Reversal of thinking. Winter Symposium, Australasian College for Emergency Medicine. Broome, June 2013

Fatovich D. Art and Emergency Medicine. Winter Symposium, Australasian College for Emergency Medicine. Broome June 2013

Nagree Y. High sensitivity troponins. Australasian College for Emergency Medicine Winter Symposium Broome, June 2013

Nagree Y. Ambulance ramping (delayed off-stretcher) is caused by admitted patients. Australasian College for Emergency Medicine Annual Scientific Meeting. Adelaide, November 2013

Nagree Y. Some patients can be safely discharged after a single troponin on arrival. Australasian College for Emergency Medicine Annual Scientific Meeting. Adelaide, November 2013

Stone S. New insights into pathogenesis of anaphylaxis. 24th Annual Scientific Meeting of the Australasian Society of Clinical Immunology and Allergy (ASCIA). Perth, September 2013

Local

Stone S. Anaphylaxis to snake antivenoms: How a bad day can get so much worse. School of Pathology and Laboratory Medicine, University of Western Australia, Perth, May 2013.

Stone S. Anaphylaxis to snake antivenoms: How a bad day can get so much worse. Western Australian Institute of Medical Research Seminar Series, Perth, June 2013

Stone S. Anaphylaxis: Clinical patterns, mediator release and severity. UWA School of Medicine and Pharmacology Seminar Series. Perth, September 2013

Annual Research Symposium

Sepsis and respiratory emergencies. Chair: Daniel Fatovich. 24 October 2013.

Why do sepsis research in the ED?

Arendts G, Associate Professor, Emergency Medicine, University of Western Australia and Emergency Physician, Royal Perth Hospital.

Early diagnosis of sepsis and bacterial resistance

Iredell J, Professor of Medicine and Microbiology at University of Sydney, Director – Centre for Research Excellence in Critical Infection and Director – Infectious Diseases at Westmead Hospital, Sydney.

Prognostic modelling in sepsis

Macdonald S, Associate Professor, Emergency Medicine, University of Western Australia and Emergency Physician, Armadale Health Service, Perth.

Acute inflammatory response in sepsis

Stone S, Research Assistant Professor, Emergency Medicine, University of Western Australia.

Tension pneumothorax – what is it and does it exist?

Simpson G, Thoracic and General Physician, Cairns Base Hospital, Queensland.

Primary spontaneous pneumothorax

Ball E, Respiratory Medicine Fellow, Sir Charles Gairdner Hospital, Perth.

Pulmonary embolism

Keijzers G, Emergency Physician, Gold Coast Hospital, Queensland.

High flow nasal cannula therapy in respiratory emergencies

Kinnear F, Emergency Physician and Research Co-ordinator, Emergency Medical and Children's Services, The Prince Charles Hospital, Queensland.

Acute asthma in the pre-hospital and emergency environment

Ellis C, Emergency Physician and Deputy Medical Director, St John Ambulance, New Zealand.

Awards for research excellence

2013 Best Paper Award (selected from abstract) at the Annual Society for Academic Emergency Medicine (SAEM) Scientific Meeting, Atlanta, Georgia, USA (out of 834 papers selected for presentation at the conference). (Brown SGA, Stone SF, Fatovich DM, Burrows SA, Holdgate A, Celenza A, Coulson A, Hartnett L, Nagree Y, Cotterell C, Isbister GK; Anaphylaxis: clinical features and mediator release patterns)

Outcomes of Patients with Cardiac Arrest as predicted by Clinical and Laboratory Markers collected within hours of ED admission. Robert Vandongen Vacation Scholarship for Medical Students 2013. Medical Research Foundation. Brookes D (supervisor D Fatovich).