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CONFERENCE VENUE

Adelaide Hilton Hotel
233 Victoria Square
Adelaide, South Australia
CONFERENCE LOGO
The Conference Logo, “The Spark of Life”, symbolises the vital essence of energy which keeps the human heart beating and the drive to breathe. It is the energy spark which is still present when the heart stops because of accident or illness; and which can be fanned to the flame or full life again, by timely cardiopulmonary resuscitation.

The conference logo was the concept of Professor John Pearn and was designed by John Pearn and Mr Paul Ramsden, Artist of Brisbane, as a voluntary service.
THE COUNCIL

The Australian Resuscitation Council is a national voluntary coordinating body which represents all major groups involved in the teaching and practice of resuscitation as follows:

- Australasian College for Emergency Medicine
- Australian College of Critical Care Nurses Ltd
- Australian College of Nursing
- Australian Defence Force
- Australian and New Zealand College of Anaesthetists
- Australian and New Zealand College of Paramedicine
- Australian New Zealand Intensive Care Society
- Australian Red Cross
- Cardiac Society of Australia and New Zealand
- College of Emergency Nursing Australasia Ltd
- Council of Ambulance Authorities
- National Heart Foundation of Australia
- Paramedics Australasia
- Perinatal Society of Australia & New Zealand
- Royal Australasian College of Surgeons
- Royal Australian College of General Practitioners
- Royal Life Saving Society - Australia
- St John Ambulance Australia
- Surf Life Saving Australia Limited
- State Branches of the Council

CONFERENCE COMMITTEE

Mrs Carol Carey (Conference Convenor)

Executive Committee
- Dr Richard Aickin
- Dr Jason Bendall
- Professor Julie Considine
- Professor Judith Finn
- Professor Hugh Grantham
- Dr Natalie Hood
- Dr Peter Leman

- Dr Helen Liley
- A/Professor Peter Morley (National Chairman)
- Mr Kevin Nation
- Ms Margaret Nicholson
- Professor Michael Parr (Deputy Chairman)
- Dr Dion Stub
VENUE
The Eleventh Spark of Life International Conference is being held at Hilton Adelaide on 4-6 May 2017.

REGISTRATION CENTRE
Registration opening times as follows:
• Thursday 4 May 2017 - Neonatal Satellite meeting 7.00am
• Thursday 4 May 2017 - Cocktail reception 6-8pm
• Friday 5 May and Saturday 6 May 2017 – 7.30am – 5.30pm

NAME BADGES
Please wear your name badge at all times during your attendance at the Conference.

LUNCH, MORNING AND AFTERNOON TEA (Neonatal Satellite Meeting 4 May 2017)
Lunch, morning and afternoon tea will be available.

LUNCH, MORNING AND AFTERNOON TEA (SOL Conference 5-6 May 2017)
Arrival tea & coffee, morning tea, lunch and afternoon tea will be served in the Trade Exhibition Area on both days.

WELCOMING COCKTAIL PARTY
The Welcoming Cocktail Party for Conference delegates and registered paying accompanying persons will be held on Thursday 4 May from 6pm to 8pm on the Mezzanine floor.

CONFERENCE DINNER
The Conference Dinner will be held in the Ballroom at Hilton Adelaide, 7.30pm for 8pm. Dress will be lounge suit. If you have registered and paid for the dinner there will be a ticket/s in your registration envelope.

TRADE EXHIBITION
The Trade Exhibition will be situated on the Mezzanine floor. The Trade Exhibition is an integral part of the Conference and all companies have made a significant contribution to the management of the meeting.

POSTER PRESENTATION
The poster presentations will be incorporated into the Trade Exhibition Area on the Mezzanine floor. Posters will be displayed throughout the conference.

SLIDE PREVIEW ROOM
A slide preview room will be open during the scientific sessions; presenters are requested to preview their presentations prior to the commencement of the session in which they are participating.
KEYNOTE SPEAKERS

Dr Clifton CALLAWAY, Pittsburgh (USA)
Dr Callaway earned his MD in 1993, and his PhD in Neurosciences in 1992, both from the University of California in San Diego. He completed a residency in Emergency Medicine at the University of Pittsburgh in 1996. Dr Callaway’s academic career has been at the University of Pittsburgh. He is Professor and the Ronald D. Stewart Endowed Chair of Emergency Medicine Research. In 2009, he was appointed Vice-Chair of Emergency Medicine. Dr Callaway has focused his academic career on being an investigator and a teacher of paramedics, medical students and physicians in the field of resuscitation medicine.

A/Professor Peter MORLEY (Australia)
A/Prof Morley is Chairman of the Australian Resuscitation Council and represents ANZICS on the ARC.

He has been an Editorial Board member and Evidence Evaluation Expert for the ILCOR international consensus process for resuscitation science in 2005, 2010, and 2015. He is the Director of Medical Education and Senior Specialist in the Intensive Care Unit of the Royal Melbourne Hospital. He is Clinical Dean at the Royal Melbourne Hospital Clinical School, The University of Melbourne.

A/Prof Morley has been a board member of the Joint Faculty of Intensive Care Medicine since 2002 (and now College of Intensive Care Medicine since 2010). He is Chair of the Assessment Committee, and previous Chair of the Education Committee and Chair of Examinations.
Professor Susan NIERMEYER (USA)

Susan Niermeyer, MD, MPH is Professor of Pediatrics in the Section of Neonatology at the University of Colorado School of Medicine at the Anschutz Medical Center. She practices and teaches at Children’s Hospital Colorado, University of Colorado Hospital, and community hospital nurseries in the Denver area. She also serves as faculty in epidemiology and the Center for Global Health at the Colorado School of Public Health.

Susan’s clinical and educational areas of emphasis include neonatal resuscitation, cardiopulmonary physiology in infancy, and global neonatal survival. She has served as co-chair of the American Academy of Pediatrics Neonatal Resuscitation Program Steering Committee and editor of the ILCOR (International Liaison Committee on Resuscitation) neonatal resuscitation guidelines in 2000.

She currently serves as editor-in-chief for Helping Babies Breathe, the AAP educational program for neonatal resuscitation in resource-limited settings, and continuity editor for the suite of Helping Babies Survive programs, including also Essential Care for Every Baby and Essential Care for Small Babies.

Susan’s research interests center on adaptation in the neonatal period, with a focus on cardiopulmonary adaptation and low birth weight at high altitude. Her high-altitude research has included study of infant oxygenation in Lhasa, Tibet, studies of infant birth weight and cardiopulmonary adaptation in La Paz, Bolivia, studies of pulmonary hypertension and cardiopathies in Peruvian children, and pulse oximetry screening for critical congenital heart disease at moderate to high altitude in Colorado.

Underlying her interest in neonatal resuscitation and high-altitude physiology is a strong commitment to the health of children around the world, especially those in isolated and resource-constrained regions. This is reflected in her continuing role with the American Academy of Pediatrics (AAP) in development and implementation of the Helping Babies Survive suite of educational materials, aimed at reducing the major causes of newborn deaths and improving global neonatal survival. She is also a technical advisor for the AAP on the Helping 100,000 Babies Survive and Thrive initiative, funded by the Bill and Melinda Gates Foundation and Laerdal Foundation, to accelerate newborn survival in India, Ethiopia, and Nigeria.
Jerry Nolan is a consultant in anaesthesia and intensive care medicine at the Royal United Hospital, Bath, UK and Honorary Professor of Resuscitation Medicine at the University of Bristol, UK.

He trained at Bristol Medical School and undertook anaesthesia and critical care training in the UK in Plymouth, Bristol, Bath and Southampton, and at the Shock Trauma Center, Baltimore in the United States.

Jerry is Editor-in-Chief of the journal Resuscitation and Chairman of the UK National Cardiac Arrest Audit Steering Group. In September 2016, Jerry will take on the role of Chairman of the European Resuscitation Council (ERC), the immediate past Co-chairman of the International Liaison Committee on Resuscitation (ILCOR) and co-editor for the 2015 International Consensus on CPR Science with Treatment Recommendations.

Jerry is an elected member of Council of the Royal College of Anaesthetists and his research interests are in cardiopulmonary resuscitation, airway management, and post-cardiac arrest treatment.
A/Professor Marcus Ong (Singapore)

A/Prof Marcus Ong is a Senior Consultant, Director of Research, and Clinician Scientist, at the Department of Emergency Medicine in Singapore General Hospital. He is also Associate Professor at Duke-NUS Medical School, Singapore and Consultant for the Hospital Services Division at Singapore’s Ministry of Health. A/Prof Ong’s research studies focus predominantly on pre-hospital emergency care, medical devices, and health services research.

His research has addressed issues such as out-of-hospital cardiac arrest (OHCA), improving ambulance deployment, acute myocardial infarction, etc.

A/Prof Ong has obtained more than S$5million in research grants for his studies, which include geospatial diseases mapping, clinical drug trials, resuscitation and cardiovascular sciences, pre-hospital emergency care, and biomedical engineering. He was awarded $1.35million research grants for an international, multi-centre cohort study of out-of-hospital cardiac arrest across the Asia-Pacific. This clinical research network has published more than 10 articles in peer-reviewed journals since 2009. In total, A/Prof Ong has published more than 120 articles in international and local journals, such as Journal of the American Medical Association, American Journal of Medicine, Critical Care Medicine, Resuscitation, Annals of Emergency Medicine, etc.

A/Prof Ong has also patented an invention using Heart Rate Variability for risk prediction of acutely ill patients. The technology is currently being developed into bedside triage devices that can help in risk stratification of critically ill patients.
Professor Gavin PERKINS (UK)

Gavin Perkins is Professor of Critical Care Medicine at the University of Warwick and National Institute for Health Research Senior Investigator. He leads the emergency and critical care group within Warwick Clinical Trials Unit. The group have active research programmes in resuscitation science with work streams including regionalised cardiac arrest care, the national out of hospital cardiac arrest registry, CPR quality improvement, PARAMEDIC-1 (LUCAS mechanical CPR) and PARAMEDIC-2 (Adrenaline) Trials.

Prof Perkins directs the Masters level Post Graduate Certificate in Advanced Critical Care Practice which supports the training of Critical Care Paramedics for regional air ambulance and other partners.

Clinically he holds appointments as a Consultant Physician in Critical Care Medicine at Heart of England NHS Foundation Trust and MERIT Team Consultant with West Midlands Ambulance Service.

He is the regional Clinical Research Speciality Lead for Critical Care for the Comprehensive Research Network. His national roles include being Chair of the Resuscitation Council (UK) Advanced Life Support Committee and a Director of Research for the Intensive Care Foundation. He is a member of the National Institute for Health Research (NIHR) Health Service Delivery and Research Panel, NIHR Fellowships panel and NHS England Community Resuscitation Group. Internationally he is Chair of the European Resuscitation Council Scientific Committee and BLS/AED Working Group and Co-Chair for the International Liaison Committee for Resuscitation.
INVITED SPEAKERS

NEONATAL SATELLITE MEETING AND SOL CONFERENCE

Dr Richard AICKIN

Richard is Chairman of both the New Zealand Resuscitation Council (NZRC) and the Australian and New Zealand Committee on Resuscitation (ANZCOR) as well as Vice Chair of the ILCOR Paediatric task force. He is a Paediatric Emergency Physician at the Starship Hospital, Auckland, New Zealand.

Dr Chad ANDERSEN

Chad Andersen is currently Medical Head of Neonatal Medicine at the Women’s and Children’s Hospital in Adelaide, South Australia. Following completion of specialty training in Australia, he spent 2 years as a Clinical and Research Fellow at McMaster University Medical Centre, Ontario, Canada. He received a Resident Medical Association Scholarship for research into the linkage between antenatal inflammation and bronchopulmonary dysplasia in premature newborns. During this time he co–designed the premature infants in need of transfusion (PINT), randomised trial and subsequently coordinated recruitment in Australia. He was later appointed Consultant Neonatologist at the Mercy Hospital for Women, Melbourne, Australia. He facilitated the geographical move of the hospital from East Melbourne to Heidelberg and was instrumental in developing a series of initiatives to reduce the impact of nosocomial infection in very preterm newborns in addition to establishing a model of 24 hour in–house consultant led care. He moved back to Adelaide as a consultant and later as Medical Head. He has participated in a number of large NHMRC funded trials though is principally interested in transfusion medicine and oxygen handling particularly as they relate to outcome in preterm newborns.
A/Prof Jason BENDALL
A/Prof Jason Bendall is the Deputy Director of Training & Deputy Chair of the Medical Advisory Panel for St John Ambulance Australia. Jason is a Fellow in Anaesthesia and Prehospital & Retrieval Medicine at John Hunter Hospital Newcastle. Jason is the Deputy Convener of ANZCOR First Aid sub-committee and is a member of the ILCOR First Aid Task Force.

Prof Stephen BERNARD
Stephen is Director of Intensive Care at Knox Private Hospital and an Intensive Care Physician at The Alfred Hospital in Victoria, Australia. He is also Medical Director of Ambulance Victoria. His research interests include the treatment of neurological injury after resuscitation from cardiac arrest and severe trauma. He is also co-investigator in a number of other NHMRC funded clinical trials including therapeutic hypothermia after severe traumatic brain injury (POLAR), paramedic administration of tranexamic acid in severe trauma (PATCH), therapeutic hypothermia and early decompression in spinal cord injury (ICED), reduction of oxygen after cardiac arrest (EXACT) and targeted hypercapnia after cardiac arrest (TAME).

Prof George BRAITBERG
Professor George Braitberg has been a practicing emergency physician and toxicologist for 28 years. He currently holds the position of Professor of Emergency Medicine, Department of Medicine Royal Melbourne Hospital and University of Melbourne and Director of Emergency Medicine, Royal Melbourne Hospital. George is a Fellow of the American College of Medical Toxicology and the Australasian College for Emergency Medicine. He is a Board member of St Johns Ambulance Victoria and Barwon Health and is a part time Medical Advisor to Ambulance Victoria. He holds a Master of Bioethics and is completing a Masters of Health Services Management. His research interests include toxicology, pre-hospital care and health system redesign.
Prof Derek CHEW

Derek Chew is a clinical and interventional cardiologist, clinical trialist and outcomes researcher in cardiovascular medicine. His training in Interventional Cardiology was at the Cleveland Clinic Foundation, and he has completed a Masters of Public Health at the Harvard School of Public Health. He is currently Professor of Cardiology Flinders University, and is the Network Director of Cardiology for the Southern Adelaide Local Health Network. He has led the Heart Foundation/CSANZ 2016ACS Guidelines writing group and served on the European Society of Cardiology Guidelines for the management of ACS Writing committee.

Prof Judith FINN

Judith is Director of the Prehospital, Resuscitation and Emergency Care Research Unit (PRECRU) in the School of Nursing, Midwifery and Paramedicine at Curtin University (Perth, Western Australia). She is also Director of the Australian Resuscitation Outcomes Consortium (Aus-ROC) – a NHMRC Centre of Research Excellence administratively based at Monash University (Melbourne, Victoria). Judith is the immediate past Co-Chair of the ILCOR “EIT - Education, Implementation and Teams” Task-force.

Mr Michael GALE

Mike is the National Course Coordinator for the Australian Resuscitation Council and an active Instructor and Director in all ARC Courses. He has been involved in ARC Courses since their commencement in 2005 and is one of three Educators on the ARC Instructor Courses. He has been involved in inter-professional education for over 25 years in resuscitation, basic life support, acute and critical care. He continues to practice clinically as a Registered Nurse in an Angiography and Cardiac Intervention suite for an acute 24 hour emergency service at the Fiona Stanley Hospital in Western Australia.

Mike is part of the editorial team for the ARC Adult Advanced Life Support Manuals and development of the Neonatal Emergency Response Manuals. He leads the development of the supporting educational material, including the governance and framework for course facilitation for ARC provider and instructor courses. Mike provides support and guidance for over a thousand instructors in delivery of courses to thousands of candidates each year. He continues to remain actively involved in the delivery of basic life support education to many individuals and groups each year from diverse backgrounds and is currently investigating cultural aspects of resuscitation delivery in Australia.
Dr Bevan HEADLEY

Bevan Headley is a Staff Neonatologist at the Women’s & Children’s Hospital, Adelaide. He trained in England and Australia and moved to Adelaide in 2003. He has a particular interest in bioethical matters relevant to Neonatology. At present he is researching a thesis, through Monash University, on probability, risk and decision-making in critical care situations.

Dr Natalie HOOD

Natalie is a paediatric emergency physician who has been the medical advisor to SLSA for ten years and their representative on the Australian Resuscitation Council. She is a member of the ILCOR First Aid Task Force. In the role as an evidence reviewer and question owner for a number of the first aid topics Natalie has been actively involved in the formulation of the ILCOR CoSTR first aid treatment recommendations. As an active, patrolling lifesaver, she can focus on applicability of these recommendations to the frontline aquatic environment.

Prof Stuart HOOPER

Professor Stuart Hooper is an NHMRC Principal Research Fellow and Director of the Ritchie Centre at the Hudson Institute of Medical Research and Monash University. He is a fetal and neonatal physiologist whose research focuses on fetal and neonatal lung development and its transformation into a functional gas-exchange organ at birth. Specifically, his research focuses on:

• factors regulating normal and abnormal growth of the lung,
• the cardiovascular and respiratory transition at birth and
• how assisted ventilation of very preterm infants can be improved to avoid injury to the lungs and brain.

Stuart also leads a multi-disciplinary research team that has pioneered the use of phase-contrast X-ray imaging to image the entry of air into the lungs at birth.
Dr Amy KEIR

Amy is a Neonatologist at Women's and Children's Hospital in Adelaide and a Retrieval Consultant at the South Australian Ambulance Service (SAAS) MedSTAR kids.

Dr Karl KERN

Dr Kern is a Professor of Medicine at the University of Arizona, where he is the Gordon A. Ewy, MD Distinguished Endowed Chair of Cardiovascular Medicine. Dr Kern is also a Co-Director of the Sarver Heart Center at the University of Arizona. Dr Kern’s research interests have centered on cardiopulmonary resuscitation and he has been an active investigator of CPR since 1983. He is the Coordinator of the University of Arizona /Sarver Heart Center Resuscitation Research Group, which developed both “Chest Compression-Only Basic Life Support CPR” and “Cardiocerebral Resuscitation”. Dr Kern has over 250 publications, including 180 original research reports, most in the field of resuscitation science. During 2014, he was awarded honorary membership in the European Resuscitation Council in recognition of life-long commitment and leadership in Resuscitation, and the Drexel University College of Medicine’s Lifetime Achievement Award. In 2015, he was honoured as an International Liaison Committee on Resuscitation (ILCOR) and American Heart Association (AHA) “CPR Giant”. In 2016, Dr Kern received the Lifetime Achievement in Health Care Award from the local Media group in Tucson, Arizona and in 2017 he was honoured for his achievements in improving survival for cardiac arrest victims at the Tucson Heart and Stroke Ball of the AHA.
Ms Tracy KIDD
Tracy Kidd is a registered nurse with a background in emergency and critical care nursing across metropolitan, regional and rural Victoria. She has completed a Masters in nursing science: clinical education and currently provides continuing nursing education with a clinical risk focus and Advanced Life Support education across the Loddon Mallee Region in Victoria. She has been the Australian College of Nursing representative on the Australian Resuscitation Council since 2013.

A/Prof Helen LILEY
A/Prof Helen Liley is a neonatologist at Mater Mothers’ Hospital in Brisbane. She is the Perinatal Society of Australia and NZ representative on the Australian Resuscitation Council and a member (since 2009) of the Neonatal Task Force of the International Liaison Committee on Resuscitation.

Dr Swee Han LIM
A/Professor Swee Han Lim is the Senior Consultant in the Department of Emergency Medicine at Singapore General Hospital, former Head of Emergency Department. He is currently the President of the Society for Emergency Medicine in Singapore, Secretary for the Asia Society of Emergency Medicine, Immediate Past Chairman of Resuscitation Council of Asia and Treasurer / BLS taskforce member ILCOR. He has many publications in peer-reviewed journals related to acute cardiac diseases, resuscitation and cardiac biomarkers.

Ms Gill MIBUS
Gill has been a Neonatal Nurse for 28 years, and an endorsed Neonatal Nurse Practitioner for 12 Years. She obtained her Masters in Nursing (Nurse Practitioner) in 2006 from Flinders University. Gill works in Adelaide as part of the multi-disciplinary Neonatal team at the Women’s and Children’s Hospital. Her interests include neonatal resuscitation and nursing education. She has visited Papua New Guinea several times, with the Australian College of Neonatal Nurses Special Interest Group, helping to teach the Help Babies Breathe Programme.
Ms Mia MCLANDERS

Mia McLanders graduated with a BA and later with a BPsyscSci(Hons) with first class honours at The University of Queensland in 2013. Mia is currently in the final stages of completing her PhD in human factors psychology at The University of Queensland with support from an Australian Postgraduate Award and a scholarship from the Mater Research Institute. In her PhD research Mia is seeking ways to improve teamwork during neonatal resuscitation through the use of cognitive aids. Her research is based at the Mater Hospital, Brisbane, Queensland. In 2014 she won the Human Factors and Ergonomics Society's Alphonse Chapanis Student Paper Award for outstanding human factors research presented at the annual meeting.

Dr Marta THIO

Dr Marta Thio is a Spanish-trained Neonatologist who has worked at the Women’s Hospital, Melbourne and PIPER-Neonatal retrieval since 2010. She has an interest in training, education and research related to Neonatal Resuscitation. She has been involved in Neonatal Resuscitation training since 2000, first in Spain (National Resuscitation Guidelines and Training Program developer, and currently scientific assessor) and since 2010 also in Victoria. She reviewed the neoResus website before it went live and she contributes to its updates and delivery of the training program. She joined the ILCOR committee in 2015. Her PhD investigated neonatal resuscitation equipment for low-resource settings. She holds an NHMRC Early Career Fellowship grant for her current research projects.

Dr Lindsay MILDENHALL

Lindsay Mildenhall is a Consultant Neonatologist at Counties Manukau District Health Board, Auckland NZ. He has research interests in neonatal Echocardiography, resuscitation and deferred cord clamping. He was an ILCOR Neonatal worksheet author for the 2010 and 2015 reviews and will continue to be for the 2020 round. Lindsay has represented the NZ Paediatric Society on the NZRC since 1999.
Dr Cathrin PARSCH
Dr. Cathrin Parsch is the Chief Medical Officer (CMO) of the South Australian Ambulance Service (SAAS) and an Emergency Medicine Consultant at the Lyell McEwin Hospital and as a Retrieval Consultant for the state-wide retrieval service SAAS-MedSTAR. Originally from Germany, where she trained as a Neurosurgeon, she has called Adelaide home for 20 years. Dr Parsch is particularly passionate about improving mental health care as well as neonatal and paediatric care in both the pre-hospital and hospital environments.

Prof Michael PARR
Michael Parr is Deputy Chair / Secretary-Treasurer and Chair of the ALS Sub-Committee of the ARC (representing the Australian & New Zealand College of Anaesthetists). Michael trained in the UK, New Zealand, USA and Australia. He is Director of Intensive Care at Liverpool Hospital, and at Macquarie University Hospital. He is an editor of ‘Resuscitation’, ANZCA representative to the Australian Resuscitation Council and a member of ILCOR ALS subcommittee.

Prof Michael READE
Colonel Reade trained in anaesthetics and intensive care at Royal North Shore, the Austin, the John Radcliffe in Oxford and the University of Pittsburgh. He has a doctorate in applied molecular biology from Oxford and a masters in clinical trials. In November 2011 he was appointed the inaugural Defence Professor of Military Medicine and Surgery at the University of Queensland, where his research focusses on the management of traumatic coagulopathy and critical illness cognitive dysfunction. He is the Clinical Director of the Regular Army’s only field hospital, and has deployed eight times including twice to Afghanistan and twice to Iraq.
Dr Tony SMITH

Tony Smith is the Medical Director for St John in New Zealand and is an Intensive Care Medicine Specialist at Auckland City Hospital. He chairs the clinical working group that develops the clinical procedures and guidelines for all ambulance personnel in New Zealand, is a member of both the Australian and New Zealand Resuscitation Councils and a member of the Auckland HEMS team. He has an active role in out-of-hospital care.

Dr Dion STUB

Dr Dion Stub is an Interventional Cardiologist specialising in coronary and structural heart intervention. Dion graduated from Monash University in 2003 and undertook cardiology training at The Alfred Hospital whilst also completing a certificate in research methodology. Dion has particular interest in treating the cardiac emergencies of myocardial infarction and cardiac arrest, and was awarded his PhD in 2013 developing Australia’s first treatment pathway for patients with refractory cardiac arrest, through combined research at the Baker IDI Heart and Diabetes Institute and The Alfred Hospital. Dion has published over 50 peer reviewed manuscripts and delivered multiple presentations in both cardiac emergencies and structural heart intervention, and has been internationally recognized for his research. He currently holds the prestigious combined National Health and Medical Research Council and National Heart Foundation Early Career Fellowship to support his clinical research in improving outcomes in cardiac arrest. He is a staff specialist at Alfred Hospital and Western Health, cardiology medical, senior research fellow with Monash University and Baker IDI Heart and Diabetes institute, medical advisor to Ambulance Victoria and representative on Australia Resuscitation Council.
A/Prof Tony WALKER

Tony Walker ASM is Chief Executive Officer of Ambulance Victoria adjunct Associate Professor in the College of Health and Biomedicine at Victoria University. He has is qualified Intensive Care Paramedic with over three decades experience working in a range of senior clinical governance, education and operational roles. Tony is a Fellow of Paramedics Australasia, a Fellow of the Australian Institute of Management and Board member of the Emergency Services Foundation and the Council of Ambulance Authorities. He is past Chair of the Australian Resuscitation Council (Victorian branch) and past Deputy Convenor of the Australian Resuscitation Council ALS sub-committee, an Associate Investigator with the Australian Resuscitation Outcomes Consortium (Aus-ROC) and an executive member of the Global Resuscitation Alliance, an international network collaborating to implement best practices to increase survival from sudden cardiac arrest.

A/Prof Myra WYCKOFF

Myra Wyckoff is a neonatologist at the Children’s Medical Center and the Parkland Health and Hospital System in Dallas, Texas and a Professor of Pediatrics at the University of Texas. She has been involved in the International Liaison Committee on Resuscitation Neonatal Task Force as a representative of the American Academy of Pediatrics and the American Heart Association since 2003. Since 2016, she has co-chaired the Neonatal Task Force. In addition to the 2006, 2010 and 2015 ILCOR Consensus Statements in the Science of Resuscitation with Treatment recommendations, her publications have included influential clinical practice guidelines and research into many aspects of neonatal care and resuscitation, particularly cardiovascular support with chest compressions and adrenaline.
## NEONATAL SATELLITE MEETING

**THURSDAY 4 MAY 2017**

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<td>09:00 - 09:10</td>
<td><strong>Welcome</strong></td>
<td>ARC Chairman A/Prof Peter Morley</td>
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<tr>
<td>09:10 - 09:40</td>
<td><strong>What’s new in neonatal resuscitation – Chair – Dr Helen Liley</strong></td>
<td>A/Prof Helen Liley/Dr Lindsay Mildenhall</td>
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<td>09:40 - 10:00</td>
<td><strong>ILCOR Consensus on the science of resuscitation with treatment recommendations – what are we looking at next?</strong></td>
<td>Prof Myra Wyckoff</td>
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<td>10:00 - 10:30</td>
<td><strong>The people, the environment and the cues – how do we improve teamwork and cognitive aids to improve resuscitation</strong></td>
<td>Ms Mia McLanders</td>
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<td>10:30 - 11:00</td>
<td><strong>Morning Tea</strong></td>
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<td>11:00 - 11:40</td>
<td><strong>Timing of cord clamping – effect on normal physiology and role in resuscitation: physiology and evidence – Chair – Dr Lindsay Mildenhall</strong></td>
<td>Prof Stuart Hooper</td>
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<td>11:40 - 12:00</td>
<td><strong>What’s the evidence?</strong></td>
<td>Prof Susan Niermeyer</td>
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<td>12:00 - 12:30</td>
<td><strong>Haemoglobin, oxygen handling and postnatal transition</strong></td>
<td>Dr Chad Andersen</td>
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<td>12:30 - 13:30</td>
<td><strong>Lunch</strong></td>
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<td>13:30 - 14:00</td>
<td><strong>Resuscitation quandaries – Chair – Dr Lindsay Mildenhall</strong></td>
<td>Dr Bevan Headley</td>
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<td>14:00 - 14:40</td>
<td><strong>Resuscitation in the retrieval and low resource setting – Chair – Dr Helen Liley</strong></td>
<td>Dr Amy Keir/Dr Cathrin Parsch</td>
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<tr>
<td>14:40 - 15:20</td>
<td><strong>Integrating neonatal care - tertiary centre, local hospital and retrieval service</strong></td>
<td>Prof Susan Niermeyer</td>
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<td>15:20 - 15:50</td>
<td><strong>Helping Babies Breathe</strong></td>
<td>NNP Gill Mibus</td>
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<td>15:50 - 16:45</td>
<td><strong>New devices and strategies for lower resource settings</strong></td>
<td>Dr Marta Thio</td>
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<tr>
<td>16:45 - 17:00</td>
<td><strong>Wrap up</strong></td>
<td>A/Prof Helen Liley</td>
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ABSTRACTS
NEONATAL SATELLITE MEETING
ANZCOR 2016 Neonatal Resuscitation Guidelines

A/Prof Helen Liley¹ and Dr Lindsay Mildenhall²

¹ Australian Resuscitation Council and ² New Zealand Resuscitation Council

City/State/Country ¹ Australia and ² New Zealand

New Australian and New Zealand Neonatal Resuscitation Guidelines reflect recent advances in neonatal resuscitation science, as critically appraised by the International Liaison Committee on Resuscitation. Substantial changes since the 2010 Guidelines include:

- updates to the Newborn Resuscitation Flowchart to include a greater emphasis on maintaining normal body temperature, and to emphasise the importance of beginning assisted ventilation by one minute in infants who have absent or ineffective spontaneous breathing;
- updates to the physiology of the normal perinatal transition that resuscitation is trying to restore;
- recommendations for more frequent reinforcement of training, and for structured feedback for resuscitation training instructors;
- new guidance in relation to the timing of cord clamping for preterm newborn infants;
- recommendation to monitor body temperature on admission to newborn units as a resuscitation quality indicator;
- suggestion to consider ECG monitoring (as an adjunct to oximetry) to obtain more rapid and accurate estimation of heart rate during resuscitation;
- removal of previous suggestions to intubate meconium-exposed, non-vigorous term infants to suction the trachea; and
- suggestion to establish vascular access (to enable administration of intravenous adrenaline (epinephrine) as soon as chest compressions are deemed to be needed.

Among these changes the higher emphasis on maintaining normal temperature during resuscitation of infants of all gestations, and to undertake more frequent reinforcement of training have the potential to have the greatest clinical impact.

ILCOR Consensus on the Science of Resuscitation With Treatment Recommendations – what are we looking at next?

Prof Myra Wyckoff

Co-chair - International Liaison Committee on Resuscitation Neonatal Task Force, United States of America

The ILCOR Task Forces have reviewed the scientific evidence for resuscitation practice approximately every 5 years and have developed evidence-based treatment recommendations. There have been progressive improvements in the methodology of systematic review, and in the measures to minimise risk of bias from reviewer conflict of interest. ILCOR now uses the GRADE process to facilitate rigorous assessment of bias in research papers, to ensure standardised terminology for consensus statements and recommendations and to allow clear acknowledgement of the values and preferences that have influenced the recommendations. From 2016, ILCOR is using new methods for consensus-based prioritisation of questions for systematic review, and for continuous evidence appraisal, that should ensure that guidelines can be updated when critical new evidence is available rather than in 5 year cycles.
There are increased opportunities for comment from professionals and the public. For the Neonatal Task Force, the prioritisation of specific questions is still underway, but the topic areas that will be considered are: Anticipation of resuscitation need; Umbilical cord management; Initial steps of stabilization; Assessment of heart rate; Positive pressure ventilation; Assessment of oxygen need and administration of oxygen; Chest compressions; Medications; Volume Resuscitation; Post resuscitation care; Guidelines for withholding and discontinuing; Human and system performance during neonatal resuscitation.

The people, the environment and the cues – how do we improve teamwork and cognitive aids to improve resuscitation

Ms Mia McLanders

Background
Investigators increasingly recognise that effective teamwork is necessary for successful resuscitation. Research in other areas of healthcare shows that team performance can be improved with cognitive aids. Cognitive aids can reduce cognitive load and support team cohesion. Cognitive aids can provide support for teams during training, and the cognitive aids transfer to clinical practice. Our aim was to create a cognitive aid (or aids) that would help neonatal resuscitation teams handle the specific challenges they encounter.

Method
One-on-one semi-structured interviews were conducted with highly experienced neonatologists and code nurses (N=7) at the Mater Mothers’ Hospital in Brisbane, Australia. Using the Critical Incident Technique, we asked participants to recount a memorable resuscitation event, focusing on the team dynamics. After each interview, cognitive aid(s) were designed and/or modified in response to (1) solvable team challenges, and (2) feedback about the cognitive aid designs as they evolved.

Results
The interviews revealed challenges associated with ambiguous role allocation, especially surrounding leadership. They also revealed factors leading to communication breakdown, such as uncertainty about others’ experience level, and an emotionally charged environment (especially influenced by the leader). Several nurses expressed the need for a more systematic approach to equipment layout, and noted the limitations of ad-hoc solutions such as using the bed for equipment layout. Further, lack of bench space was cited as an issue, particularly for sterile UVC (umbilical venous catheter) set-up. During each interview, the team provided feedback to the cognitive aids as they evolved. The first version of the cognitive aid was a slightly modified version of the existing 2-page recording form. The final cognitive aid solution that evolved included (1) a 4-page recording form that included role allocation, (2) a pictorial equipment organisation system for the top of the code cart that corresponds with the ABCD steps of a resuscitation, (3) a swing-out shelf attachment for the code cart that provides extra bench space and a dedicated area for UVC set-up.

Discussion:
Our iterative and team-centred design approach allowed us to draw from the experience of neonatal resuscitation teams to understand the challenges that exist in their environment that may hinder team coordination. Next steps are to formally evaluate the cognitive aids in step-through simulations and ultimately in the clinical context. The design of future team training programs should reflect a bottom-up approach to developing interventions that draw from the experience of individuals and teams at every stage.
The Physiology of Delayed cord clamping

Stuart Hooper

The Ritchie Centre, Hudson Institute for Medical Research, Department of Obstetrics and Gynecology, Monash University, Melbourne, Victoria, Australia

In recent years the debate about the timing of umbilical cord clamping after birth has almost entirely focused on placental transfusion and the notion that, after birth, blood moves from the placenta into the infant in a time dependent manner. Unfortunately, few have questioned the mechanisms underpinning net blood transfer from the placenta into the infant after birth and considered whether some infants may be at risk of losing blood during delayed cord clamping. Furthermore, the focus on placental transfusion overlooks the very important role of delayed cord clamping in sustaining and stabilising cardiac output during the fetal to neonatal transition. Before birth, cardiac output is dependent on umbilical venous return, but after birth it is dependent on pulmonary venous return. As such, clamping the umbilical cord before the lungs have aerated and pulmonary blood flow has increased causes an immediate loss in cardiac output, which remains low until the lungs aerate. On the other hand, aerating the lungs before cord clamping allows the supply of blood needed to sustain cardiac output to immediately switch from umbilical to pulmonary venous return with no reduction in supply. As such, there is very good scientific evidence demonstrating that the timing of umbilical cord clamping after birth should be based on whether the infant is breathing, not on elapsed time, as the latter has no reference to the infants changing physiology.

Very few investigations have focussed on the mechanisms leading to net placental to infant blood transfusion during delayed cord clamping, but more are urgently required. Indeed, the assumption that blood will transfer from the placenta into the infant after birth in a time dependent manner is overly simplistic and completely ignores the possibility that some infants could lose blood back into the placenta. As such, if delayed cord clamping is to be implemented as a standard of care, we need to be careful to avoid any circumstances whereby the infant is at risk of losing blood into the placenta. Furthermore, the evidence for placental transfusion per se, is entirely based on the findings of an increase in haematocrit and a gradual body weight increase after birth in infants following delayed cord clamping. However, these measurements were all made after birth and overlook the possibility that infants may lose blood into the placenta during labour and that “placental transfusion” is actually the process of blood volume restoration after delivery. This would explain why placental transfusion is considerably less in infants delivered by caesarean section. While fetal compression during labour may be one mechanism for the infant loosing blood loss into the placenta, birth asphyxia is another potential mechanism. Thus it is possible that blood volume restoration will not occur until the infant becomes oxygenated, which further underpins the need to base the timing of cord clamping on the infants physiology.

In summary, there is good evidence to indicate that delayed cord clamping should be based on the infant’s physiology and not on time after birth. Whether or not placental transfusion is actually the process of blood volume restoration following delivery, it is critical to understand the mechanisms involved to avoid any infants loosing blood. Nevertheless, it is well established that delaying cord clamping until after ventilation onset stabilises cardiac output during the fetal to neonatal transition.
Timing of umbilical cord clamping - What's the evidence

Susan Niermeyer, MD, MPH
Department/Organisation: University of Colorado School of Medicine and Colorado School of Public Health, Aurora, Colorado USA

Recent experimental physiology data and a large, population-based observational study have changed umbilical cord clamping from a strictly time-based construct to a more complex equilibrium involving circulatory changes and the onset of respirations in the newly born infant. However, available evidence is not yet sufficient to optimize the management of umbilical cord clamping. Although current guidelines support delayed cord clamping for both term and preterm infants, they vary in their recommendations and lack advice for clinicians who face practical dilemmas in the delivery room. This review examines the evidence around physiological outcomes of delayed cord clamping and cord milking vs. immediate cord clamping. Gaps in the existing evidence are highlighted, including the optimal time to clamp the cord and the interventions that should be performed before clamping in infants who fail to establish spontaneous respirations or are severely asphyxiated, as well as those who breathe spontaneously. The behavioral and technological changes needed to promote adoption and safe practice of physiologic cord clamping will be illustrated with experience from the VentFirst trial and linked to directions for further research.

Haemoglobin, Oxygen handling and postnatal transition

Dr Chad Andersen, A/Prof Michael Stark and Dr Nicolette Hodyl
Department of Neonatal Medicine, Women’s and Children’s Hospital and Robinson Research Institute, University of Adelaide, Adelaide, SA.

Acquired brain injury is a key determinant of long term neurosensory outcome in very preterm babies. Typically this pattern of injury occurs in the setting of maladaptive transition. For this reason, understanding the physiology of cardiopulmonary transition, and oxygen handling in particular, is critically important in this population. Most clinicians focus management on the constituent parts of oxygen physiology (including haemoglobin concentration, oxygen saturation and cardiac output) treating these as independent variables, though in reality they are managed collectively with both oxygen consumption and delivery in constant flux. This raises some key questions regarding oxygen handling and postnatal adaptation in the preterm baby. Specifically, how should oxygenation be determined so as to incorporate both oxygen consumption and delivery? And further, how can this balance be altered in the at risk preterm baby to avoid early, acquired brain injury?
You’ve had the what, now for the why: resuscitation of stillborn and pre-viable infants

Dr Bevan Headley
Women’s & Children’s Hospital, Adelaide, South Australia

Dr Headley will discuss resuscitation of newborns at 22-23 weeks’ gestation and babies born with no signs of life, at any gestation. We have a pretty good idea of the physiology and we are quite good at the practical tasks. This knowledge and skill is the answer to practical questions of what to do and how to do it. However, less well answered are questions such as when to start and when to stop resuscitation, when we believe the intervention is probably not in the patient’s interests. I aim to outline the principal arguments in this debate, which concern definitions, technical limitations and value judgements about predicted outcomes. I will also consider selected empirical literature and clinical guidelines. I will argue that certain assumptions about when we are viable and when we are dead are questionable, and that we are right not to act on them.

Integrating neonatal care - tertiary centre, local hospital and retrieval service

Dr. Amy Keir - Neonatologist and Retrieval Consultant with the South Australian Ambulance Service (SAAS) and Dr. Cathrin Parsch - the Chief Medical Officer of SAAS, will discuss the benefits and challenges of integrating neonatal retrieval medicine across the ambulance service, tertiary and referring centres within South Australia.

Helping Babies Breathe, second edition

Susan Niermeyer, MD, MPH
Department of Pediatrics, University of Colorado School of Medicine; Center for Global Health, Colorado School of Public Health, Aurora, Colorado USA

Helping Babies Breathe (HBB) is a skills-based curriculum in neonatal resuscitation shown to improve early neonatal mortality and stillbirth rates in low-resource settings. Since its launch in 2010, HBB has been implemented in 80+ countries with translation of materials into 26 languages. Together with Essential Care for Every Baby, HBB forms the foundation of essential newborn care for national newborn programs across Latin America, Africa, and South Asia. In order to build on this success, the 2nd edition now provides not only updated science (based on 2015 ILCOR neonatal guidelines), but also strengthened educational advice, and new guidance on program implementation and quality improvement based on feedback and lessons learned from the global community of HBB users.
PNG experience

Gill Mibus
Neonatal Nurse, Women’s and Children’s Hospital, Adelaide, South Australia

Gill has travelled with the Australian College of Neonatal Nurses to Goroka, Papua New Guinea on five occasions teaching the Help Babies Breathe programme to Health Care workers and Nursing students at the Goroka Hospital in the Eastern Highland Province. The group has also been involved with teaching Village Birth Attendants who work in primitive and remote areas of the Eastern Highlands. She will share with you her experiences and challenges in teaching in a Low Resource Country.

New devices and strategies for lower resource settings

Dr Marta Thio

The major causes of neonatal mortality worldwide are peripartum asphyxia and preterm birth. Babies needing resuscitation at birth are critically dependent on equipment that ensures airway patency, the delivery of effective basic assisted ventilation and reliable monitoring. Furthermore, in low resourced settings not only the simplicity of cost/effective equipment but also the logistics, supply factors and training are the main challenges. The design of respiratory resuscitation devices has evolved over time to better meet the anatomical and physiological characteristics of the baby, to make them easier to use correctly and where feasible, to ensure affordability. This talk will explain recent research to evaluate devices and equipment designed for lower resource settings, in the context of a simple neonatal flowchart.
FRIDAY 5 May 2017

0830–0835 Welcome
(5min)
Chair: National Chairman
A/Prof Peter Morley

0835-1030 Plenary I
Chair: Michael Parr
0835-0905 “Don Harrison Perpetual Lecture”
Peter Morley 30 min
0905-0930 Helping babies survive—the big picture
Susan Niermeyer 25 min
0930-0955 We are improving outcomes.
Tony Walker 25 min
0955-1020 NHFA and CSANZ ACS guidelines
Derek Chew 25 min
1020-1030 Questions
10 min

1100-1300 Plenary II
International updates
Chair: Julie Considine
1100-1120 Community Innovations for Cardiac Arrest
Marcus Ong 20 min
1120-1140 Mechanical CPR: Where, when, which?
Gavin Perkins 20 min
1140-1200 Airway management...not again!
Jerry Nolan 20 min
1200-1220 Defibrillation—what’s new?
Karl Kern 20 min
1220-1240 Challenges – broad complex tachycardia
Swee Han Lim 20 min
1240-1300 Withdraw or continue in the ICU?
Clif Callaway 20 min
1300-1315 Questions

1315-1400 Lunch

1400-1530 Four concurrent Sessions
Chair: Jason Bendall

Session 1: Free Papers
1400-1415 Epidemiology of out-of-hospital cardiac arrest (OHCA) in Australia and New Zealand: results from the Aus-ROC OHCA Epistry
Authors: B Beck, JE Bray, K Smith, T Walker, H Grantham, C Hein, M Thorrowgood, A Smith, M Inoue, T Smith, B Dicker, A Swain E Bosley, K Pemberton, M McKay, M Johnston-Leek, P Cameron, G Perkins, G Nichol, J Finn, on behalf of the Aus-ROC Steering Committee

1415-1430 Education Experiences of Cardiac Patients and Spouses - can we add cardiopulmonary resuscitation training? A qualitative study.
Authors: S Cartledge, S Feldman, J Bray, D Stub, J Finn
<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
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<tr>
<td>1430-1445</td>
<td>Regions with low rates of bystander CPR also have lower rates of residents with CPR training in Victoria, Australia.</td>
<td>Bray JE, Straney L, Smith K, Cartledge S, Case R, Bernard S and Finn J</td>
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<td>1445-1500</td>
<td>Incorporating Cardiopulmonary Resuscitation Training Into A Cardiac Rehabilitation Program: A Feasibility Study.</td>
<td>S Cartledge, J Finn, J Bray, R Case, L Barker, D Missen, J Shaw, D Stub</td>
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<td>1500-1515</td>
<td>Long-term outcomes following traumatic Out-of-Hospital Cardiac Arrest.</td>
<td>B Beck, JE Bray, P Cameron, E Andrew, S Bernard, K Smith</td>
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<td>1515-1530</td>
<td>Long-Term Functional Outcome and Health-Related Quality of Life of Elderly Out-Of-Hospital Cardiac Arrest Survivors.</td>
<td>E Mercier, E Andrew, Z Nehme, M Lijovic, S Bernard, K Smith</td>
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<td>1400-1415</td>
<td>Associations Between Attendance By A Single Crewed Ambulance And Cardiac Arrest Outcomes In New Zealand.</td>
<td>B Dicker, P Davey, T Smith</td>
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<td>1415-1430</td>
<td>Early Arterial Blood Gas In Patients With Out-Of-Hospital Cardiac Arrest.</td>
<td>M Wittwer, C Zeitz, M Arstall</td>
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<td>1430-1445</td>
<td>Recurrent Out-Of-Hospital Cardiac Arrest: Time-To-Event and Predictors of Occurrence.</td>
<td>Z Nehme, E Andrew, R Nair, S Bernard, K Smith</td>
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<tr>
<td>1445-1500</td>
<td>Transporting Non-Survivors of Out Of Hospital Cardiac Arrest in South Australia: A Comparison of Local And Universal Termination of Resuscitation Guidelines.</td>
<td>C Hein, M Thorrowgood, P Hakendorf, H Grantham, K Driscoll</td>
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<tr>
<td>1515-1530</td>
<td>Paramedic Exposure to Endotracheal Intubation is associated with Successful Tube Placement but not Cardiac Arrest Survival.</td>
<td>K Dyson, J Bray, K Smith, S Bernard, L Straney, R Nair, J Finn</td>
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### Session 3: Free Papers  
**Chair:** Fin Macneil

**1400-1415** Cardiopulmonary Resuscitation (CPR) in a Quaternary teaching Hospital: Performance Component Quality and impact on Patient Outcomes. An observational study.  
Authors: RMY Cheong, J Burke, **PT Morley**

**1415-1430** Can they save a life? Measuring the CPR performance of new medical students.  
Authors: M. Heily; L. Ng; R. Cheong, S.Craig; **PT Morley**

**1430-1445** Depression, Anxiety and Stress Following Traumatic Physical Injury: A Mixed Methods Study.  
Authors: **T Wiseman**, K Curtis, K Foster

**1445-1500** Evidence-Based Practice Differs for Patients with Acute Coronary Syndrome According To Gender: A Retrospective Multi-Site Study.  
Authors: **L Kuhn**, K Page, M Street, J Rolley, J Considine

**1500-1515** Identifying barriers to the provision of bystander CPR during emergency calls.  
Authors: **Rosalind Case**, Susie Cartledge, Josine Siedenburg, Lahn Straney, Karen Smith, Judith Finn, Bill Barger, Janet Bray

**1515-1530** Medical Emergency Team (MET) Calls in a Metropolitan Private Hospital: A Cross Sectional Study.  
Authors: J.A. Kant, **PT Morley**, S. Murphy, R. English, L. Umstad

### Session 4: The future of BLS training  
**Chair:** Hugh Grantham

David Halliwell, an international speaker, will be asked to set the background for an interactive session on BLS and the issues of BLS in the future. A panel will be leading an interactive session on issues such as mouth to mouth; role of oxygen; will the ratio stay at 30:2?; what to do with the bariatric resuscitation; what to do with the obstetric resuscitation; how should it be taught?; how should it be assessed?; how does BLS relate to respecting patient's wishes?; is there new ground breaking technology on the horizon?; how and what do we teach the reluctant candidate?  
**Presenters:** David Halliwell, Hugh Grantham, Darryl Clare, Toni Dunbabin, Tracy Kidd, Peter Mckie

**1530-1600** Afternoon tea
1600-1730  Plenary III  Chair: Kevin Nation
First Aid: What's in and what's out  Natalie Hood  20 min
In hospital cardiac arrest  Michael Parr  20 min
Questions:  5 min
3 way debate (10 min and 5 min rebuttal)
What did the Americans ever do for resuscitation? Clif Callaway  15 min
What did the British ever do for resuscitation? Jerry Nolan  15 min
What did the Aussies ever do for resuscitation? Peter Morley  15 min
The vote “who did the most for resuscitation” (using the standard UN Security Council protocol)

1730  Close
1930  Conference Dinner
SATURDAY 6 May 2017

0830-1030  **Plenary IV**  *The next big thing!*  
Chair: Peter Morley

(8 x 15 mins)
- For little things-Neonatal
- Paediatric
- Ambulance
- First Aid
- Emergency Department
- Advanced Life Support
- Cardiology
- Pounds and Pressure:
- CPR of the bariatric patient

1030-1100  **Morning tea**

1100-1300  **Plenary V**  
Chair: Tracy Kidd

(6x20mins)
- Adrenaline for OHCA
- Public access defibrillation- where are we now?
- Traumatic Cardiac Arrest

Debates
- Seattle: Too good to be true vs No it’s not
- ECMO: Too good to be true vs No it’s not
- Drugs are a waste of time vs No they’re not

1300–1400  **Lunch**

1400-1530  **Plenary VI**  *How I Manage*  
Chair: Richard Aickin

(4 x 20 mins)
- Community involvement in guidelines and research
- The dangerous candidate on a course
- Cognitive aids

1530-1600  **Afternoon tea**

1600-1650  **Plenary VII**  *The wrap up!*  
Chair: Peter Morley

(3x15mins)
- Resuscitation Research why bother?
- The real cost of resuscitation
- Where to from here?

1650 -1700  **Closing remarks**

Peter Morley
Plenary I – Friday 5 May 2017

“Don Harrison Perpetual Lecture” - 0835 - 0905

A/Prof Peter Morley

Helping Babies Survive – the big picture

Susan Niermeyer, MD, MPH
Department of Pediatrics, University of Colorado School of Medicine; Center for Global Health, Colorado School of Public Health; Senior Medical Advisor for Newborn Health, United States Agency for International Development, Aurora, Colorado USA

Newborn deaths in the first 28 days of life now account for nearly half of all deaths globally among children under 5 years of age. More than 98% of those deaths occur in low- and middle-income countries. The day of birth is also the time of greatest risk for death – whether maternal death, stillbirth, or neonatal death. The Every Newborn Action Plan focuses on the triple target of reducing neonatal death, fresh stillbirth, and maternal death to achieve the UN Sustainable Development Goals.

Helping Babies Survive is a suite of educational programs developed by the American Academy of Pediatrics to help health workers in resource-limited settings reduce the three major causes of global neonatal death: asphyxia, prematurity/small size at birth, and infection. Helping Babies Breathe (HBB), the first in the series, equips birth attendants with the skills to support all babies in a smooth transition and provide appropriate intervention (clearing the airway as needed, stimulation, bag and mask ventilation) for babies who do not breathe at birth. Essential Care for Every Baby begins where HBB leaves off and focuses on the life-saving steps of thermal protection, early and exclusive breastfeeding, prevention of infection, and recognition of Danger Signs in the first day and month of life. Essential Care for Small Babies emphasizes the special needs of the small, well baby, including thermal support with continuous skin-to-skin care and alternative methods of feeding breast milk. All three programs utilize simple, pictorial materials anchored by an Action Plan and purpose-designed low-cost, high-fidelity simulators for active practice of skills. The programs result in demonstrated improvement in knowledge and skill performance; however, to achieve improved neonatal survival, ongoing practice and facility-based quality improvement activities need to become part of the commitment to improve care.

We are Improving Outcomes

Tony Walker ASM
Ambulance Victoria, Melbourne, Victoria, Australia

Background

Out-of-hospital cardiac arrest (OHCA) is a significant cause of disability and death in Australia with as many as 30,000 OHCAs occurring across the nation every year. Typically, less than 10% of arrest patients survive. However, when cardiopulmonary resuscitation (CPR) and defibrillation are provided quickly, alongside an effective system of care, the chances of an arrest patient being resuscitated and having a good neurological recovery greatly increases.
Ambulance Victoria has had strategic focus on improving survival from cardiac arrest for the past two decades, with a strong emphasis on ensuring a strong and effective cardiac arrest system of care, also known as the Chain of Survival. This involves increasing community CPR and AED use, dispatcher assisted CPR, firefighter co-responder and community first responder programs, highly trained ALS and Intensive Care Paramedics operating under evidence based Clinical Practice Guidelines, transport to appropriate health services and a cardiac arrest registry with more than 80,000 records underpinning research and continuous improvement activities.

Results

In 2015-2016 96% of bystanders called 000 as their first call for help, with more than half (61%) of patients who were witnessed to collapse by a bystander receiving bystander CPR, compared to 36% of patients 10 years ago. Patients who received bystander CPR were approximately 11 times more likely to be found in a shockable rhythm with patients who received bystander CPR were twice as likely to be discharged alive from hospital as those who did not receive bystander CPR (12% vs 6%). Patients who received their first shock by a bystander were more likely to be discharged alive from hospital (55%) compared to those who had to wait for first shock by ambulance paramedics (28%). More than one-third (35%) of Victorian patients who were seen to collapse, had a shockable heart rhythm on arrival of help and subsequently received resuscitation by emergency medical services survived. This increases to 38% for patients in metropolitan Melbourne. More patients in Victoria are surviving cardiac arrest than in London (31%). Most Victorian survivors were discharged home (83%). Of patients arresting in 2014-2015 who were followed up 12 months after their arrest, 74 per cent of those working prior to their arrest had returned to work 12 months after their arrest.

Conclusion

A strategic, systems based focus on improving cardiac arrest survival can result in improved cardiac arrest survival outcomes.

NHFA/CSANZ Australian Clinical Guidelines for the Management of Acute Coronary Syndromes (ACS) 2016

Chew DP, Scott IA, Cullen L, French JK, Briffa TG, Tideman PA, Woodruffe S, Kerr A, Branagan M, Aylward PE

Heart Foundation and Cardiac Society of Australia and New Zealand

Based on consultation with stakeholders and a rigorous literature search, key recommendations were developed by the working group and graded to provide guidance to health professionals. A 30 day period of public consultation was provided.

Recommendations and practice advice regarding care of patients with chest pain, STEMI, NSTEACS and secondary prevention (including attendance at cardiac rehabilitation and secondary prevention services) were updated and refined. The updated guideline provides practice advice and recommendations to guide health professionals caring for patients with ACS in Australia, based on current evidence.

Key recommendations will be presented, covering chest pain, STEMI, NSTEACS and Secondary Prevention. This guideline provides practice advice and recommendations to guide clinicians caring for ACS patients from first medical contact through to discharge, including attendance at cardiac rehabilitation or secondary prevention service.
Community Interventions For Cardiac Arrest

Associate Professor Marcus Ong
Department of Emergency Medicine, Singapore General Hospital, Duke-NUS Medical School, Ministry of Health, Singapore

Considerable research in resuscitation science shows that early high quality cardio-pulmonary resuscitation (CPR) and rapid time to defibrillation increases a patient’s chance of survival during out-of-hospital cardiac arrest (OHCA). Since time is of the essence, community witnesses to the OHCA are often best positioned to administer life-saving treatment. Over 70% of Singapore’s OHCA’s occur in private residential areas. Outcomes for OHCA in residential areas are poorer than in non-residential areas. Most OHCA events are witnessed by lay bystanders, usually a family member or someone known to the victim. A trained lay bystander can commence CPR immediately and apply an on-site AED in 2-4 minutes. In 2013, medical dispatchers began providing instructions to 995 callers who reported that the victim had collapsed and was not breathing. With this coaching over the phone, we have seen an increase in bystander CPR from 20% historically to over 40% currently. In 2014, the Dispatcher Assisted first Responder (DARE) programme was launched to prepare school children to deliver CPR and to accelerate the public adoption of CPR awareness and skills to perform in case of an emergency. Other initiatives include an innovative phone app called myResponder allows SCDF to put out an alert of a nearby OHCA to the phone user’s location. The User will have the option of accepting the opportunity to go to the victim’s side to help with CPR, or to retrieve the nearest AED, the location of which will be displayed in the app. In order for this to work, two registries have been created. One is an AED registry where all publicly available AEDs will be included; the other is a national registry of first responders. This will consist of the names and contact information of trained (DARE, BCLS, ACLS, etc.) first responders.

We are embarking on a nationwide effort to install Automated External Defibrillators (AEDs) in public housing apartments across the country, tied with DARE training of residents. We are also piloting the use of an innovative, credit-card sized, real-time feedback device for laypersons called the CPRcard. Use of the card will help researchers address an evidence-gap in Singapore regarding the quality of CPR performed by lay bystanders who are provided real-time feedback. We aim to demonstrate improvements in bystander CPR rates, layperson defibrillation and OHCA survival outcomes in an implementation science type study which is ongoing, in partnership with the Pan Asian Resuscitation Outcomes Study (PAROS).
Mechanical chest compression: Where, when and which?

Gavin Perkins

University of Warwick and Heart of England NHS Foundation Trust, Warwick, West Midlands, UK

High quality, un-interrupted chest compressions are critical for improving outcomes from cardiac arrest yet it can be difficult to sustain performance with manual chest compressions. Mechanical chest compression devices deliver consistent quality chest compressions, yet meta-analyses of randomised controlled trials showed no overall effect on return of spontaneous circulation, survival or favourable neurological outcome. The ILCOR Consensus on Science and Treatment Recommendations advise against the routine use of mechanical chest compression devices. The recommendations highlight that there may be specific situations where manual CPR is impractical and mechanical CPR can be considered.

This talk will review the latest literature relating to mechanical CPR and when to consider their use. Practical guidance on the optimal approach for device deployment will be provided emphasising the importance minimising interruptions in chest compressions. Key information from the major devices that have been evaluated in large clinical effectiveness trials will be reviewed to allow informed choices about devices.

Airway management…not again!

Jerry Nolan

Department of Anaesthesia and Intensive Care Medicine, Royal United Hospital, Bath, United Kingdom

The ideal airway management strategy during CPR remains unclear. In practice, there is often a progression in complexity of airway management, from no intervention (compression only CPR), mouth-to-mouth, and bag-mask ventilation, through to supraglottic airway (SGA) devices and tracheal intubation. The best airway is likely to vary depending on the time-point in the resuscitation process, and the skill set of the attending rescuer. A key message is to ensure high quality chest compressions and minimise any interruptions for airway intervention.

Several observational studies have documented an association between use of bag-mask ventilation and better outcome in comparison with use of either an SGA or tracheal tube but, despite attempts to control for confounders (e.g. by using propensity analysis) such studies have a high risk of selection bias. Observational studies comparing SGAs with tracheal intubation have reached conflicting conclusions.

Three ongoing prospective OHCA studies, one randomised clinical trial of tracheal intubation versus bag-mask ventilation (CAAM Study NCT02327026) and two cluster randomised trials of an SGA versus tracheal intubation (AIRWAYS-2 ISRCTN: 08256118 and PART – NCT02419573) should provide useful data on the optimal airway management strategy in OHCA.
“Defibrillation-what’s new?”

Karl B. Kern, MD

University of Arizona Sarver Heart Center, Tucson, Arizona USA

Exciting new developments and concepts in defibrillation include a recent successful targeted AED program in one of the largest cities in the world, where time to defibrillation by EMS is often delayed due traffic congestion. Targeting the Sao Paulo subway system for AED placement and training of on-duty security personnel in AED usage resulted in the first documented cardiac arrest saves ever on this widely used inter-city metro system. Survival after cardiac arrest in the subway improved from 0% to 43% with this new program. The success of this program serves as a model of overcoming significant barriers to improve outcomes from out-of-hospital cardiac arrest in large, crowded, inner-city environments throughout Latin America.

Defibrillation on commercial airplanes was first reported by Quantas Airlines in Australia, and soon spread to all major international commercial carriers. Early results showed successful defibrillation was possible with on-board AEDs, but the experience was limited to small case series of this rare but deadly in-flight emergency. A recent report outlined a 10 year experience of in-flight cardiac arrest on commercial carriers. Shockable rhythms were found in 25% of cases. The survival rate for passengers with a shockable rhythm was 23% versus only 2% for those with a non-shockable rhythm per the AED record. Flight diversions did not significantly affect resuscitation outcomes.

A controversy has arisen how to best treat patients with refractory ventricular fibrillation, those not responding to defibrillation attempts. Some confusion exists as to what “refractory VF” really means, but two distinctly different approaches have emerged.

One, additional defibrillation attempts, including the use of “double sequential defibrillation”, using two separate AEDs. The other is temporary cessation of further defibrillation attempts while continuing CPR, using typically a mechanical CPR device during transport to the hospital, for initiation of ECMO (extracorporeal membrane oxygenation) and coronary angiography ± PCI to correct the cause of refractory ventricular fibrillation. Once accomplished defibrillation is typically readily achieved and occasionally even spontaneous! The data regarding both approaches, though limited, will be reviewed.

Challenges – broad complex tachycardia

Swee Han Lim

Emergency Medicine / Singapore General Hospital, Singapore

Immediate diagnosis and management of broad complex Tachycardia is a challenge in the Emergency department. The management prescribed by the current ACLS guideline may be oversimplified. The proper identification of a broad complex Tachycardia is of paramount importance. The initial diagnosis to a broad complex Tachycardia can be approached on the basis of the regularity of the rhythm (see attached chart).
The clinical and ECG features of the various broad complex tachycardia and their specific management will be dealt with in the lecture.

**Withdraw or Continue in the ICU**

**Dr Clifton W Callaway, MD, PhD**  
*University of Pittsburgh, USA*

More than half of patients who have return of pulses after CPR will not have good recovery despite support in the intensive care unit. In some settings, families may choose to withdraw artificial life support when recovery appears impossible. That is an ethically and emotionally charged decision, and it is the duty of the clinical team to provide as accurate a prognosis as possible for that family. In over 70% of cases who do not survive intensive care, brain injury is the primary reason. Many tests and signs have been studied to estimate the probability of brain recovery: clinical exam, electroencephalography, evoked potentials, blood markers, CT scans and magnetic resonance imaging. None of these signs and tests provide perfect prediction, and a combination of tests may provide the best information. These tests suggest that it is primarily injury to the cortex of the brain that determines whether patients can benefit from continued intensive care. Current research focuses on how to protect the brain as well as on how best to assess its potential for recovery.
First Aid What’s in and What’s Out

Natalie Hood
ANZCOR First Aid Task Force Convenor, Melbourne, Australia

As First Aid moves towards evidence based best practice, ANZCOR is again involved both locally and internationally to ensure that our guidelines are practical, user friendly, in line with peak body organisations and reflecting the best available subject evidence.

Topical subjects include first aid management of haemorrhage, in particular severe, life-threatening haemorrhage, management of diabetic emergencies and spinal motion restriction.

Looking ahead, internationally, the first aid community has prioritised the topics most in need of review in the near future. These include management of jellyfish stings, snake bite, amputated parts, fainting and hyperventilation.

Tourniquets are in….Cervical collars are out….and much more.
Adrenaline for OHCA

Gavin Perkins
University of Warwick and Heart of England NHS Foundation Trust, Warwick, West Midlands, UK

The drug adrenaline has been an integral component of advanced life support from the birth of modern cardiopulmonary resuscitation in the early 1960s. In guidelines written originally in 1961, Peter Safar recommended the use of very large doses of adrenaline: 10 mg intravenously or 0.5 mg intra-cardiac and adrenaline has continued to be recommended ever since.

The potentially beneficial effects of adrenaline are attributed to stimulation of α receptors in vascular smooth muscle, causing vasoconstriction. This increases aortic diastolic pressure, which in turn leads to increased coronary perfusion pressures, which is associated with an increased chance of ROSC. Potentially harmful effects are α and β receptor mediated and include reduced cerebral micro-vascular blood flow and exacerbation of cerebral injury, cardiovascular instability after ROSC and adverse immunomodulatory and metabolic effects.

Meta-analyses of observational and randomised controlled trials suggests that adrenaline improves the return of spontaneous circulation (ROSC) and admission to hospital. However there is no consistent evidence that adrenaline improves survival to hospital discharge or neurological outcomes. Indeed, many observational studies have suggested adrenaline may actually lead to worse outcomes. However such studies are susceptible to bias and highlight the need for randomised controlled trials.

This talk will review the latest evidence relating to adrenaline for cardiac arrest and discuss the design and implementation of the PARAMEDIC-2 trial, a pragmatic, individually randomised, double blind, controlled trial comparing adrenaline to placebo in out of hospital cardiac arrest.

Public Access Defibrillation – Where are we now?

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Background

Out-of-hospital cardiac arrest (OHCA) is a significant cause of disability and death in Australia with as many as 30,000 OHCAs occurring across the nation every year. Typically, less than 10% of arrest patients survive. However, when cardiopulmonary resuscitation (CPR) and defibrillation are provided quickly, alongside an effective system of care, the chances of an arrest patient being resuscitated and having a good neurological recovery greatly increases. Timely response by first responder teams and early intervention by bystanders remains a key factor driving favourable outcomes for patients with a shockable rhythm. The advent of Automated External Defibrillators (AEDs) and their widespread availability in the community has provided the opportunity for members of the community to early provide defibrillation in cardiac arrest prior to the arrival of Emergency Medical Services (EMS).
Results

In Victoria, Australia there has been an almost four-fold increase in the use of public automated external defibrillators (AED) by bystanders between 2006-2007 and 2015-16 (2.8% to 11.0%, p<0.001). The proportion of OHCA patients surviving a cardiac arrest when first defibrillated with a public AED was 76%, compared with 50% of patients first shocked by paramedics and 56% of patients first shocked by first responders. The 2015-2016 event survival rates according to who provided the first shock were significantly different (p<0.001). Similar to event survival, survival to hospital discharge in 2015-2016 was significantly different according to who provided the first defibrillation.

The proportion of patients surviving to hospital discharge when first defibrillated with a public AED was 55%, compared with 28% of patients first shocked by paramedics and 38% of patients first shocked by first responders (p<0.001).

Ambulance services are recognising the critical role that Public Access Defibrillation plays in improving survival from OHCA and are developing a range of innovative strategies, including the use of smartphone apps, to increase visibility of location of AEDs to members of the public and to connect members of the public to patients in suspected cardiac arrest. These strategies have been shown to be successful in increasing the use of CPR and AEDs in cardiac arrest.

Conclusion

Public Access Defibrillation significantly improves survival to hospital discharge from OHCA. The availability of technology to improve bystander visibility of publically available AEDs and nearby OHCAAs, as part of an effective OHCA system of care can further improve AED use and cardiac arrest survival.

Traumatic cardiac arrest: what’s different?

Colonel Michael C. Reade

Joint Health Command, Australian Defence Force, Brisbane, Australia

ANZCOR published its first guideline on the management of traumatic cardiac arrest in 2016. Building on 15 years’ military trauma experience, several priorities differ from conventional resuscitation. Neurologically-intact survival after traumatic arrest in a military context was 21%, and in civilians 5.1-7.5%, highlighting that in appropriate circumstances attempted resuscitation is not futile.

In cardiac arrest due to trauma, addressing underlying causes takes priority over chest compressions, defibrillation and adrenaline. The first peri-arrest priority is to stop the bleeding with a tourniquet or direct pressure +/- a haemostatic dressing. Peripheral IV cannulation may be impossible, necessitating intraosseous or central venous access. 20ml/kg warmed fluid should be given rapidly, ideally a 1:1 - 1:2 plasma:red blood cells. If blood is unavailable, crystalloid (precipitating coagulopathy) is better than nothing (precipitating death). The target systolic blood pressure should be 90mmHg (110mmHg in head injury) for the first hour, then as required to ensure the lactate falls. Patients with chest trauma not responding should have their chest decompressed. Finger (not needle) thoracostomy is preferred. Pericardial tamponade due to trauma is usually due to a penetrating myocardial wound, requiring surgical thoracotomy. Needle pericardiocentesis is seldom appropriate. If all else fails, resuscitative thoracotomy may be appropriate; penetrating trauma is more likely than blunt trauma to respond.
A favourable outcome is rarely possible if resuscitative thoracotomy is initiated more than 10 minutes after the onset of cardiac arrest. Resuscitation (including external cardiac compressions) should continue for up to 10 minutes after potentially reversible causes have been addressed.

DEBATES- Seattle: Too good to be true vs No it’s not

Karl B. Kern, MD  
University of Arizona Sarver Heart Center, Tucson, Arizona USA

Seattle/King County in Washington State, USA has reported the highest community survival rates for nearly 3 decades, including a 62% survival rate for out-of-hospital VF cardiac arrest of 62% in 2013!

What is it they do that in the Pacific Northwest that is so effective and saving lives from cardiac arrest. Can you and I learn important lessons that we can apply to our own communities to improve outcomes from this continued public health problem.
Community involvement in guidelines and research

Gavin Perkins
University of Warwick and Heart of England NHS Foundation Trust, Warwick, West Midlands, UK

Researchers and clinicians often do not first-hand experience of the illness, disease or health condition that they wish to research. Involving patients and the public as partners in research and guidelines can therefore provide clinicians / researchers with insights into what it is like to live with a particular disease, illness or health condition. These insights can help to make health research more relevant to the needs of patients, carers and service users.

Patient and public involvement (PPI) in research (also known as service user/lay involvement) refers to an active partnership between patients and/or members of the public and researchers. Involvement is distinct from awareness and participation. Awareness refers to PPI being informed about a study or guidelines. Participation refers to taking part as a subject of the research. Involvement described where PPI contribute to the research process as advisers and possibly also as co-researchers.

This talk will outline how to involve patients and the public in research. It will provide practical examples of how, in the context of cardiac arrest research, patient and public involvement has helped shame, inform and improve research and guidelines.

Further information:
http://www.invo.org.uk
https://www2.warwick.ac.uk/fac/med/about/centres/clahrc/ppi/

The dangerous candidate on the Course

Mike Gale
Australian Resuscitation Council, Melbourne, Australia

This session considers when a candidate or student may be identified as ‘dangerous’ and reviews examples of some of the issues arising. Principles for management of those ‘dangerous candidates’ are discussed with a key element of transparent communication. During teaching on any course many candidates with a variety of personalities and skills will present challenges to the educator. Perhaps one of the most challenging situations is what happens when a ‘dangerous candidate’ has emerged. What to do during the course and what to do afterwards are those frequent questions considered. It is a rare event when someone who is considered ‘dangerous’ or ‘unsafe’ on a course. However those rare events will require strategies to manage them when they do arise.
Cognitive aids

Ms Mia McLanders
The University of Queensland, Queensland, Australia

Background
Investigators increasingly recognise that effective teamwork is necessary for successful resuscitation. Research in other areas of healthcare shows that team performance can be improved with cognitive aids. Cognitive aids can reduce cognitive load and support team cohesion. Cognitive aids can provide support for teams during training, and the cognitive aids transfer to clinical practice. Our aim was to create a cognitive aid (or aids) that would help neonatal resuscitation teams handle the specific challenges they encounter.

Method
One-on-one semi-structured interviews were conducted with highly experienced neonatologists and code nurses (N=7) at the Mater Mothers’ Hospital in Brisbane, Australia. Using the Critical Incident Technique, we asked participants to recount a memorable resuscitation event, focusing on the team dynamics. After each interview, cognitive aid(s) were designed and/or modified in response to (1) solvable team challenges, and (2) feedback about the cognitive aid designs as they evolved.

Results
The interviews revealed challenges associated with ambiguous role allocation, especially surrounding leadership. They also revealed factors leading to communication breakdown, such as uncertainty about others’ experience level, and an emotionally charged environment (especially influenced by the leader). Several nurses expressed the need for a more systematic approach to equipment layout, and noted the limitations of ad-hoc solutions such as using the bed for equipment layout. Further, lack of bench space was cited as an issue, particularly for sterile UVC (umbilical venous catheter) set-up. During each interview, the team provided feedback to the cognitive aids as they evolved. The first version of the cognitive aid was a slightly modified version of the existing 2-page recording form. The final cognitive aid solution that evolved included (1) a 4-page recording form that included role allocation, (2) a pictorial equipment organisation system for the top of the code cart that corresponds with the ABCD steps of a resuscitation, (3) a swing-out shelf attachment for the code cart that provides extra bench space and a dedicated area for UVC set-up.

Discussion
Our iterative and team-centred design approach allowed us to draw from the experience of neonatal resuscitation teams to understand the challenges that exist in their environment that may hinder team co-ordination. Next steps are to formally evaluate the cognitive aids in step-through simulations and ultimately in the clinical context. The design of future team training programs should reflect a bottom-up approach to developing interventions that draw from the experience of individuals and teams at every stage.
Epidemiology of out-of-hospital cardiac arrest (OHCA) in Australia and New Zealand: results from the Aus-ROC OHCA Epistry

**B Beck,**1 JE Bray,1,2 K Smith,1,3,4 T Walker,3 H Grantham5, C Hein,5,6 M Thorrowgood,6 A Smith,7 M Inoue,2 T Smith,8 B Dicker,8,9 A Swain,9,10,11 E Bosley,12,13 K Pemberton,12 M McKay,14 M Johnston-Leek,14 P Cameron,1,15 G Perkins,16 G Nichol,17 J Finn,1,2,4,7 on behalf of the Aus-ROC Steering Committee.

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**Objective**

The purpose of this study was to describe and compare the epidemiology of out-of-hospital cardiac arrest (OHCA) in Australia and New Zealand (NZ).

**Methods**

Data were extracted from the Aus-ROC OHCA Epistry for 2015. The Aus-ROC OHCA Epistry captures data from five ambulance services in Australia and two ambulance services in NZ, with a total capture population of 19.5 million people.

**Results**

In 2015, there were 19,761 OHCA cases submitted to the Epistry (15,158 in Australia and 4,603 in NZ) with an overall crude incidence of 99.8/100,000 population (Australia: 99.7/100,000 population, NZ: 100.2/100,000 population). Demographics, most arrest characteristics and outcomes between the two countries were similar. Overall, the median age was 66 years (interquartile range: 50-80 years), 98% were adults, 67% were male, 75% occurred in the home, 36% were bystander or EMS witnessed, 35% received bystander CPR, 72% were of presumed medical aetiology, and 15% of the non EMS-witnessed cases were in a shockable rhythm (VF/VT) on EMS arrival. For bystander-witnessed cases, bystander CPR rates were higher in NZ than Australia (71% vs 60%, p<0.001). Of the 9,451 cases (48%) that received attempted resuscitation, 34% had a return of spontaneous circulation (ROSC) in the prehospital setting (Australia 33% vs NZ 35%, p=0.112) and 28% had ROSC on arrival at hospital (Australia 28% vs NZ 29%, p=0.286).

**Conclusion**

OHCA characteristics and outcomes were similar between Australia and NZ. This data provides important baseline data to monitor temporal trends and the next phase will explore regional variation between ambulance services.
Education experiences of cardiac patients and spouses - can we add cardiopulmonary resuscitation training?  
A qualitative study

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Background
Targeting cardiopulmonary resuscitation (CPR) training for high-risk cardiac patients has long been advocated. However, there is a paucity of qualitative data on the attitudes and preferences of this group. We sought to understand the education experiences of patients and spouses following an acute cardiac event; and explore attitudes, beliefs and intent towards CPR training.

Methods
We conducted a qualitative study underpinned by phenomenology and the Theory of Planned Behaviour (TPB), to explore attitudes and intent towards CPR training. Semi-structured interviews were conducted with cardiac patients and spouses purposively sampled from a cardiology ward of a public tertiary hospital. Interviews were transcribed verbatim and thematic analysis undertaken.

Results
Data saturation was achieved within 12 interviews (9 male patients, 3 female patients, mean age=62 years, range=47 years-75 years). Emotional themes related to diagnosis of denial, shock and fear featured for all participants. Three strongly interrelated themes emerged: information (perceived lack of information for the majority), feeling in and out of control, and the caring responsibility of spouses. There was evidence of all three TPB intentions, including recognition of the: great worth placed in receiving CPR training, the social pressure of knowing CPR and facilitators to obtaining training (e.g. integrating training into cardiac rehabilitation). Only the eldest patient spouse pair (75 years) were not interested in CPR training.

Conclusion
There are unmet education needs for cardiac patients and spouses. Information increased control and decreased negative emotions associated with diagnosis. Participants had positive attitudes and intent towards learning CPR if integrated within a cardiac rehabilitation program.
Regions with low rates of bystander CPR also have lower rates of residents with CPR training in Victoria, Australia

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Introduction

Bystander cardiopulmonary resuscitation (CPR) more than doubles the chances of surviving an out-of-hospital cardiac arrest (OHCA). However, despite the availability of dispatcher CPR instructions, recent data has shown considerable regional variation in bystander CPR rates across the Australian state of Victoria. This study aims to determine if there is an associated regional variation in rates of CPR training and in willingness to perform CPR in these communities.

Methods

We first allocated each Victorian postcode as either a low or high bystander CPR region using data on adult, bystander witnessed OHCA (n=7,175) from the Victorian Ambulance Cardiac Arrest Registry. We then surveyed adult Victorians (n=404) and compared CPR training data of the respondents from regions with low and high bystander CPR.

Results

Of the 404 adults surveyed, 223 (55%) resided in regions with low bystander CPR. Compared with respondents from high CPR regions, respondents residing in regions with low bystander CPR had lower rates of CPR training (62% vs. 75%, p=0.009) and lower self-ratings for their overall knowledge of CPR (76% vs. 84%, p=0.04). There were no differences between the regions in their reasons for not having undergone CPR training, or in their willingness to perform either standard (including mouth-to-mouth ventilations) or hands-only CPR in varying hypotheticals.

Conclusion

This study found lower rates of CPR training in regions with lower rates of bystander CPR. Targeting these regions with CPR training programs may have potential to improve bystander CPR rates and OHCA outcomes.

Incorporating Cardiopulmonary Resuscitation Training Into A Cardiac Rehabilitation Program: A Feasibility Study

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Aim

Targeting cardiopulmonary resuscitation (CPR) training to high-risk cardiac populations has long been advocated, but is an area in need of research evidence. We investigated the feasibility of providing CPR training in a cardiac rehabilitation program to cardiac patients and their family members.

Methods

A prospective before and after study design was used. CPR training was delivered using video self-instruction (VSI) CPR training kits, facilitated by a cardiac nurse. Data was collected pre-training, post-training and at one month.
Results

Cardiac patient participation rates in CPR classes were high (n = 56, 72.7% of eligible patients) with a further 27 family members attending training. Patients were predominantly male (60.2%), family members were predominantly female (81.5%), both with a mean age of 65 years. Confidence to perform CPR and willingness to use CPR skills significantly increased post-training (both p<0.001). Skills assessed post-training demonstrated a mean compression rate of 112 beats per minute and a mean depth of 48 millimetres. Training reach was doubled as participants shared the VSI kit with a further 87 people. Training received positive feedback from participants and cardiac rehabilitation staff strongly agreed or agreed that CPR training was an appropriate addition to their program.

Conclusion

We demonstrated that cardiac rehabilitation is an effective and feasible environment to provide CPR training. Using VSI CPR training kits enabled further training reach to the target population. Future large scale studies are now needed to assess whether this training is suitable in different types of cardiac rehabilitation programs.

Long-term outcomes following traumatic out-of-hospital cardiac arrest

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Background

There is an emerging interest in traumatic out-of-hospital cardiac arrest (OHCA). However, little is known about the long-term outcomes of these patients. This study aimed to describe the in-hospital and long-term outcomes of patients with traumatic OHCA.

Methods

The Victorian Ambulance Cardiac Arrest Registry (VACAR) was used to identify cases of traumatic OHCA that occurred between July 2008 and June 2014. We excluded cases <16 years of age or with a mechanism of hanging or drowning. For patients transported to hospital, data was linked with the Victorian State Trauma Registry (VSTR) to capture detailed injury information and functional outcomes at 12 months post-injury (Glasgow Outcome Scale–Extended (GOS-E)). Of the 168 traumatic OHCA patients that were transported to hospital, 151 were classified as major trauma. Of these, 124 were linked to the VSTR, 25 could not be linked and 2 opted-off the registry.

Results

The 124 cases of traumatic OHCA predominately resulted from blunt trauma (80%). Eighteen patients survived to hospital discharge (15%), of which 10 were discharged home. The median (interquartile range (IQR)) injury severity score (ISS) was non-significantly lower in survivors (ISS=17, IQR:14-29) than non-survivors (ISS=25.5, IQR:16.5-40.5, p=0.186). At 12 months post-injury (data available for n=15), 2 patients had died, while 10 patients (66%) reported moderate or good functional outcomes (GOS-E≥5) and 8 patients (53%) were living at home without additional care.
Conclusions

While survival rates in traumatic OHCA are low, patients can have good functional outcomes, demonstrating that the resuscitation of these patients is not futile.

Long-Term Functional Outcome and Health-Related Quality of Life of Elderly Out-Of-Hospital Cardiac Arrest Survivors

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Objectives

To describe the long-term functional outcome and health-related quality of life of elderly (≥65 years) out-of-hospital cardiac arrest (OHCA) survivors in Victoria, Australia.

Methods

Elderly OHCA patients who arrested between January 1st, 2010 and December 31st, 2014 were identified from the Victorian Ambulance Cardiac Arrest Registry (VACAR). Living status, Glasgow Outcome Scale-Extended (GOSE), Euro-Qol-5D (EQ-5D) and the Twelve-item Short Form (SF-12) were collected by telephone 12 months after OHCA.

Results

Emergency medical services attended 14,678 elderly OHCA patients during the study period, 6,851 (46.7%) of which received a resuscitation attempt. Of these, 668 patients (9.8%) survived to hospital discharge. The mean age was 75 (standard deviation [SD] 7.4) years and 75.4% were male. Eight-five patients died within 12 months. A total of 483 patients were interviewed (response rate 82.9%). At 12 months, 313 responders (64.9%) were living at home without care. Most responders (67.2%) had a good long-term functional recovery (GOSE≥7). The proportion of patients with a GOSE≥7 progressively decreased with increasing age (65-74: 66.1%; 75-84: 53.0%; ≥85: 27.3%). On the EQ-5D, the majority of survivors reported no problem with self-care (83.4%), pain (69.3%) and anxiety (74.1%). Among the 1,951 patients who arrested in supported accommodation, 43.5% had a resuscitation attempt. Of these, 21 survived to hospital discharge (2.5%). Only eight (1.0%) were alive 12 months after arrest, and one (0.1%) had a good functional outcome.

Conclusion

Most elderly OHCA survivors have an adequate long-term functional status and health-related quality of life. However, the likelihood of having a good functional recovery decreases with increasing age, and is rare for patients arresting in supported accommodation.
Associations Between Attendance By A Single Crewed Ambulance And Cardiac Arrest Outcomes In New Zealand

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Aim
This study aimed to investigate the effect of the first locating emergency response ambulance being single crewed (SC) on out-of-hospital cardiac outcomes (OHCA) in New Zealand.

Method
A retrospective analysis of New Zealand OHCA registry data for the period of 1 October 2013 to 30 June 2015. Cases were included in the analysis if a resuscitation attempt was made, the patient’s age was greater than 15 years, Fire Service did not arrive on scene more than 1 min ahead of ambulance and the responding vehicle was a transporting emergency ambulance with 1 or 2 crew. Logistic regression modelling was used to account for confounding. The primary outcome was survival to hospital discharge.

Results
A total of 2,347 OHCA cases were included. Univariate analysis showed that there was no difference in the rates of return of spontaneous circulation sustained to hospital handover in patients attended by either SC ambulances or double crewed (DC) ambulances (OR 0.779, 95% CI 0.602-1.010, p=0.059). After adjustment for confounders patients were significantly less likely to survive to hospital discharge when attended by SC ambulances compared to those attended by DC ambulances (OR 0.548, 95% CI 0.333-0.903, p=0.018).

Conclusion
The study identified that patients attended by a SC ambulance had poorer survival to hospital discharge than those attended by DC ambulances. Although further investigation into relationships may be required, it is clear that that number of crew in the first arriving ambulance may radically impact OHCA survival rates in New Zealand.

Early Arterial Blood Gas in Patients with Out-Of-Hospital Cardiac Arrest

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Introduction
Arterial blood gas (ABG) measurements of oxygen (PaO2) and carbon dioxide (PaCO2) have been shown to predict survival in patients admitted with out-of-hospital cardiac arrest (OHCA). This study aimed to explore ABG measurements taken within the first few hours post-return of spontaneous circulation (ROSC).
Methods
The Lyell McEwin Hospital OHCA database was used to identify cases between 2011 – 2015, excluding syncopal episodes with <30sec CPR and missing ABG or ROSC times. The first ABG measurement in emergency and/or intensive care unit (ICU) was retrospectively collected and analysed.

Results
Overall, 168 cases were included in the study: 98 and 70 with first ABG recorded in emergency and ICU, respectively. Time from ROSC to first ABG was 116.5±80mins. In cases with ABG ≤1hr post-ROSC, those with shockable rhythm, any witnessed arrest, decreasing PaO2, decreasing PaCO2, increasing pH and cardiac cause were significantly associated with survival (p<0.05, n=48). In all cases with ABG ≤2hr post-ROSC, only PaO2 no longer predicted survival (n=91). Exploratory logistic regression analysis of cases with ABG ≤2hr post-ROSC revealed that only shockable rhythm and witnessed arrest predicted survival. There was no significant difference in PaO2 values from emergency to ICU.

Conclusion
Many important clinical decisions are made within the first few hours post-resuscitation from OHCA. Our data suggest that patients with hyperoxia (PaO2>300mmHg) in the first hour are less likely to survive, with the effect disappearing over time. There also appears to be little change in PaO2 between emergency and ICU in our cohort.

Recurrent Out-of-Hospital Cardiac Arrest: Time-To-Event and Predictors of Occurrence
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Objectives
The purpose of this study was to describe the frequency of, and determine predictors for, recurrent out-of-hospital cardiac arrest (OHCA) in survivors of the index event.

Methods
Between January 2000 and June 2015, we included consecutive OHCA survivors to hospital discharge from a state-wide OHCA registry in Victoria. Patient identifiers were used to match index and recurrent episodes of OHCA, and death records from a government database. Kaplan-Meier curves and a Cox proportional-hazards model were used to estimate the long-term risk of recurrent OHCA and identify predictors of occurrence.

Results
Among 3,533 survivors, 214 (6.0%) experienced a recurrent OHCA. Rates of recurrent OHCA at 1, 5, 10 and 15 years was 2.5% (95% CI: 2.0%, 3.1%), 6.0% (95% CI: 5.2%, 7.0%), 8.5% (95% CI: 7.3%, 9.8%), and 11.3% (95% CI: 9.1%, 13.8%), respectively. Kaplan-Meier estimates of recurrent OHCA were higher for patients aged ≥65 years, non-cardiac aetiologies and initial non-shockable rhythms. In the Cox model, index characteristics were significantly associated with recurrent OHCA: age in years (hazard ratio [HR] 1.02, 95% CI: 1.01, 1.03; p<0.001), respiratory (HR 2.00, 95% CI: 1.21, 3.30; p=0.007) or overdose/poisoning aetiology (HR 2.63, 95% CI: 1.21, 5.74; p=0.02), and; initial shockable rhythm (HR 0.66; 95% CI: 0.47, 0.93; p=0.02).
The temporal trend was also significant, indicating a 4% reduction in the hazard of recurrent OHCA every year from baseline (HR 0.96, 95% CI: 0.92, 0.99; p=0.03).

**Conclusion**

Although the risk of recurrent OHCA is reducing over time, survivors of non-cardiac and initial non-shockable arrests remain at higher risk.

**Transporting Non-Survivors of Out Of Hospital Cardiac Arrest in South Australia: A Comparison of Local and Universal Termination of Resuscitation Guidelines**

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**Background**

Despite the best intentions by emergency medical services (EMS), out of hospital cardiac arrest (OHCA) is not always reversible. In these cases, termination of resuscitation (TOR) may be necessary due to ethical considerations and futility. In South Australia, TOR follows a decision process based on the patient’s wishes, medical history, event details and a predetermined resuscitation time.

**Objective**

The authors wished to examine whether adult OHCA patients of presumed cardiac aetiology who are transported without return of spontaneous circulation (ROSC) in SA would have met an internationally validated universal TOR guideline.

**Methods**

Data were sourced from the SAAS Cardiac Arrest Registry (SAAS-CAR) (HREC:14/SAH/120) for a retrospective observational study. Main outcomes were survival to hospital discharge and whether the TOR guideline was met (non-EMS witnessed, non-shockable rhythm and no ROSC at any stage).

**Results**

From July 2009 to June 2016, resuscitation was attempted in 4,823 OHCA patients, 1243 (26%) were transported with ROSC, 3275 (68%) died on scene and 305 (6%) were transported under manual CPR. Excluded cases were paediatric (40), non-cardiac (45) and missing data (5). Of the 215 patients who were included, 42 (20%) met the TOR rule, none (0%) survived to hospital discharge, 36 (86%) died and 6 (14%) had no recorded outcome. 173 (80%) patients did not meet the TOR rule, 2 (1%) were discharged alive, 149 (86%) Died and 22 (13%) had no recorded outcome.

**Conclusion**

The universal TOR guideline identified all patients who did not survive and should be considered for inclusion in local guidelines.
MANUAL VERSUS SEMI-AUTOMATIC RHYTHM ANALYSIS AND DEFIBRILLATION FOR OUT-OF-HOSPITAL CARDIAC ARREST

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Objectives
Although manual and semi-automatic external defibrillation (SAED) are commonly used in the management of cardiac arrest, we sought to assess the optimal strategy for advanced life support providers.

Methods
Between July 2005 and June 2015, we included adult out-of-hospital cardiac arrests (OHCA) of presumed cardiac aetiology. On October 2012, a treatment protocol utilising SAED was introduced for advanced life support paramedics after years of manual defibrillation. The effect of the SAED protocol implementation on the time to first shock, successful cardioversion and patient outcomes was assessed using adjusted time series models.

Results
Of the 14,776 cases, 10,224 (69.2%) and 4,552 (30.8%) occurred during the manual and SAED protocols, respectively. After adjustment for temporal trends and arrest factors, the odds of delivering the first shock within 2 minutes of arrival increased under the SAED protocol (adjusted odds ratio [AOR] 1.72, 95% CI: 1.32, 2.26; p<0.001). Despite this, the SAED protocol was associated with a reduction in survival to hospital discharge (AOR 0.71, 95% CI: 0.55, 0.92; p=0.009), event survival (AOR 0.74, 95% CI: 0.62, 0.88; p=0.001) and prehospital return of spontaneous circulation (AOR 0.81, 95% CI: 0.68, 0.96; p=0.01) when compared with the manual protocol. Although SAED reduced the time to first shock, there was no improvement in the rate of successful cardioversion after first shock (AOR 0.73, 95% CI: 0.51, 1.06; p=0.10).

Conclusions
Although SAED improved the time to first shock, this did not translate into higher rates of successful cardioversion or survival for OHCA patients.
Paramedic Exposure to Endotracheal Intubation is associated with Successful Tube Placement but not Cardiac Arrest Survival

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Objective
Paramedic exposure to endotracheal intubation (ETI) may be an important factor in skill performance and patient outcomes. Our objective was to examine the association between prior ETI exposure and successful ETI. In a sub-cohort of out-of-hospital cardiac arrest (OHCA) cases, we also measured the association between patient survival and prior paramedic exposure to ETI.

Methods
We analysed data from Ambulance Victoria electronic patient care records and the Victorian Ambulance Cardiac Arrest Registry for 1-Jan-2008 to 26-Sep-2014. For each patient case, we defined ETI exposure as the number of ETIs attempted by each paramedic in the previous 3-years. Using logistic regression we estimated the association between ETI exposure and 1) successful ETI and 2) first-pass success. In the OHCA cohort we determined the association between prior ETI exposure and patient survival.

Results
During the 6.7-year study period, 769 paramedics attempted ETI in 14,857 patients. Most ETIs were performed on OHCAs (66%, n=9,751) and ETI was attempted before return of spontaneous circulation in the majority of these cases (79%). Paramedics typically performed 3 (IQR:1-6) ETIs/year. Most ETIs were successful (95%), including 80% on the first attempt. Prior ETI exposure was associated with ETI success (OR: 1.04, 95%CI:1.03-1.05) and ETI first-pass success (OR:1.02, 95%CI: 1.01-1.03). In the OHCA sub-cohort, paramedic ETI exposure was not associated with patient survival.

Conclusions
Paramedics performed few ETIs. Prior exposure was associated with successful ETI. Among OHCA patients where ETI was attempted, prior paramedic ETI exposure was not associated with patient survival.
Cardiopulmonary Resuscitation (CPR) in a Quaternary teaching Hospital: Performance Component Quality and Impact on Patient Outcomes. - An observational study

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Background
High-quality CPR had been shown to relate to successful cardiac arrest resuscitation. Advances in defibrillator technology had made objective measurements of CPR a possibility. At the Royal Melbourne Hospital (RMH), CPR quality had not been previously measured.

Objective
To determine the quality of multiple technical parameters of CPR, as practiced at the RMH, and to correlate CPR quality components and patient-related factors with in-hospital cardiac arrest (IHCA) patient outcomes.

Methods
Consecutive patients requiring CPR using a ZOLL defibrillator with novel real-time sensors attached from 1 July 2016 to 31 December 2017 are being recruited. Technical parameters of CPR including detailed components of chest compression, ventilation and pauses are statistically analysed. Patient demographics, arrest characteristics, and the key outcomes return of spontaneous circulation (ROSC), survival to hospital discharge and discharge destination are extracted from patient records.

Results
At this stage, eighteen (18) events have had a preliminary analysis. 4/18 (22.2%) had a shockable initial arrest rhythm. 5/18 (27.8%) had compressions within guideline-recommended targets for rate and depth. General trends for ventilation and pauses do not appear to reflect adherence to national guidelines. Association of CPR quality components with patient-related factors and patient outcomes is being evaluated.

Conclusion
Preliminary analysis suggests that the measured CPR parameters do not conform to guideline recommendations. A larger prospective trial with routine CPR measurement, monitoring and feedback during actual resuscitation episode is necessary to validate the effects of particular CPR quality components on overall patient outcomes.
Can they save a life? Measuring the CPR performance of new medical students

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*Intensive Care Unit, The Royal Melbourne Hospital, Melbourne, Victoria, Australia

Background

Medical students complete a first aid course prior to their first clinical year. Changes in medical curricula mean that students now start hospital attachments one year after commencement, instead of three and a half years in 2011. Do medical students in 2017 retain their CPR competency better than their 2011 counterparts?

Methods

On day one of their three-year hospital attachment, and after informed consent had been confirmed, students were directed to a manikin to perform two minutes of CPR. Assessors measured compression and ventilation rates, Compression:Ventilation ratios, and technique at 30 second intervals.

Results

Seventy (70) 2011 and fifty nine (59) 2017 students were tested. In 2011 during the first thirty (30) seconds, 15/70 (21%) had the correct rate, 34/70 (49%) had correct ratios, and 37/70 (51%) students had good technique. In 2017, 17/59 (29%) had correct rate, 14/59 (24%) had correct ratios, and 34/59 (58%) students had good technique. By two minutes, the 2011 students had 15/70 (21%) with correct rate, 36/70 (51%) with correct ratios, and 35/70 (50%) with good technique. The 2017 students had 19/59 (32%) with correct rate, 14/59 (24%) with correct ratios and 20/37 (54%) with good technique.

Conclusion

Overall, about half the students from each cohort were CPR competent over the two-minute test. The 2017 students were not significantly better, and appeared to have fewer with correct ratios (Relative Risk: 0.49; 95% CI: 0.29 to 0.82). The CPR competency of new medical students needs further investigation.

Depression, Anxiety And Stress Following Traumatic Physical Injury: A Mixed Methods Study

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Background

Traumatic injury and mental health disorders are co-associated. Early identification of depression, anxiety and stress (DAS), and associated preventive intervention, may reduce long-term negative impacts associated with injury.

Aim

Determine the incidence and severity of DAS in injured patients at 3 time intervals and to explore the experience of emotional well-being.
**Methods**

A mixed-methods explanatory sequential study was conducted between 2010 and 2014 at an Australian Level 1 trauma centre. In the first quantitative phase, participants hospitalised following injury were interviewed using the DASS-21 at three time points. Correlations and logistic regression investigated factors associated with DAS after injury.

In the qualitative phase, participants reporting high levels of DAS at three- and/or six-months participated in semi-structured interviews. Qualitative data were analysed using thematic analysis. Findings from both phases were integrated to determine recommendations.

**Results**

201 participants (18-94 years) ranging in injury severity participated. 54% reported high scores for depression, anxiety and/or stress in at least one of the 3 time points. ICU admission and high levels of DAS at 3-months post injury were predictors for ongoing high levels.

Qualitative interview data revealed: experiencing the impacts of injury; facing the emotional journey following injury; and being supported and managing the injury impacts.

Data integration determined: poor physical wellbeing is related to high incidence of in-hospital DAS; emotional support facilitates injury impacts management; male suicidality is linked with reluctance to seek emotional support.

**Conclusion**

The majority of injured patients experience DAS and prolonged elevated levels are associated with ICU admission and poor physical recovery. Since this study a routine screening and early intervention process for DAS has been developed at the study site.

**Evidence-Based Practice Differs For Patients with Acute Coronary Syndrome According To Gender: A Retrospective Multi-Site Study**

**L Kuhn**1,2,3, K Page2, M Street1,2,3, J Rolley1,4, J Considine1,2,3

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4. University of Canberra

City. 1. Geelong; 2. Geelong; 3. Box Hill, Melbourne; 4. Bruce, Canberra

**Background**

Evidence-based guidelines for acute coronary syndrome (ACS) reduce mortality. ACS guidelines are gender-neutral. Timely access to evidence-based hospital ACS care begins in the emergency department (ED) and is provided through to patient discharge.

**Aim**

We aimed to evaluate if application of the Australian ACS evidence-based guidelines differed between women and men admitted to hospital through the ED.
Methods
Retrospective analysis of patient level data was undertaken for adults with ACS from three Australian public hospitals with EDs from 1.1.2013 to 30.6.2015.

Results
The study included 288 patient presentations, stratified by gender. Women were older than men (79 vs 75.5 years; p=0.009). In the ED, women received less urgent triage scores (58.3 vs 71.5%; p=0.026) than men and waited longer for their electrocardiographs (18.5 vs 15 mins; p=0.001). Women were proportionately less likely to be admitted to coronary care units (52.4 vs 65.3%; p=0.023) than men, more often being admitted to general medicine units instead (39.6 versus 22.9%; p=0.003). Although there was no statistical difference in the proportion of in hospital deaths between genders (p=0.286), the percentage of women (10.4%) who died was observed to be higher than for men (6.3%).

Conclusions
Maximising treatment for patients with ACS saves lives. We found differences in ACS care by gender unsatisfactorily explained by patient level data. Further research needs to clarify reasons for these gender differences and whether they were appropriate or need to be minimised. Our findings are guiding subsequent research through which we aim to reduce ACS practice variation between genders.

Identifying barriers to the provision of bystander CPR during emergency calls

Rosalind Case1,2, Susie Cartledge1,2, Josine Siedenburg1, Lahn Straney1, Karen Smith1,4, Judith Finn1,3,5, Bill Barger4, Janet Bray1,2,3.

1Monash University (Melbourne), 2The Alfred Hospital (Melbourne), 3Curtin University (Perth), 4Ambulance Victoria (Melbourne), 5University of Western Australia (Perth), 6St John Ambulance Western Australia (Perth).

Introduction
The delivery of bystander cardiopulmonary resuscitation (CPR) is a crucial element in the chain of survival for out of hospital cardiac arrest (OHCA). However, a large proportion of bystanders do not perform CPR. We aimed to identify barriers to bystanders performing CPR when calling emergency services.

Methods
We retrospectively reviewed 139 emergency calls for adult Victorians where OHCA was identified during the call but no bystander CPR performed. Calls were in areas with previously identified low rates of bystander CPR. A thematic content analysis was independently conducted by two investigators.

Results
Calls progressed to DA-CPR instructions in only 26 (18.7%) of all cases. Of the 120 calls included in the thematic content analysis, three main barrier themes were identified: procedural barriers (46.7%), such as time lost due to language barriers, communication issues, or telephone problems; lack of CPR knowledge (81.2%); and personal factors (62.5%), such as physical frailty or disability, patient position, or emotional factors.
Conclusions

A range of factors are associated with barriers to delivering bystander CPR even in the presence of dispatcher instructions. Future research should focus on enhancing communication between dispatchers and bystanders and increasing CPR skills among non-English speaking communities. Targeted CPR training focusing on recognition of cardiac arrest and awareness of compression-only CPR should be delivered in areas with low bystander CPR rates.

Medical Emergency Team (MET) Calls in a Metropolitan Private Hospital: A Cross Sectional Study

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Introduction

Current literature on MET calls focuses on the public hospital system. Little is known about how MET call demographics, triggers, and outcomes differ in the private sector. Melbourne Private Hospital (MPH) has had a MET system since 2000.

Aim

To identify patient characteristics and outcomes of MET calls in a metropolitan private hospital (MPH) with a well-established MET system.

Methods

Retrospective cross-sectional data was collected from primary MET documentation, and hospital records for in-patients who received MET calls between 1st January 2015 and 31st December 2016.

Results

249 patients received at least one MET call, with 55% (95% CI 49-61%) occurring between 0700 and 2200 hours. Patients included 131 men and 118 women, with a mean age of 67 (65-69) years. Admissions were documented as medical in 49% and surgical in 48%. Staff concern was the most cited trigger (39%; 33-45%), 23 patients (9%; 6-13%) received subsequent MET calls during their admission, with most occurring over 24 hours after their first MET call. 235 (95%; 92-98%) patients survived to discharge, with an average length of stay following their first MET call of 6 days. Most surviving patients were discharged home (76%; 71-82%), with rehabilitation facilities being the next most common discharge destination.

Conclusion

There appear to be systematic differences in triggers and outcomes of MET calls between public and private institutions. Whether these differences are due to patient characteristics or cultural factors is yet to be determined.
SESSION 4: SUITE 3

THE FUTURE OF BLS TRAINING

David Haliwell, an international speaker, will be asked to set the background for an interactive session on BLS and the issues of BLS in the future. A panel will be leading an interactive session on issues such as mouth to mouth; role of oxygen; will the ratio stay at 30:2?; what to do with the bariatric resuscitation; what to do with the obstetric resuscitation; how should it be taught?; how should it be assessed?; how does BLS relate to respecting patient's wishes?; is there new ground breaking technology on the horizon?; how and what do we teach the reluctant candidate?

Presenters

David Haliwell, Hugh Grantham, Darryl Clare, Toni Dunbabin, Tracy Kidd, Peter Mckie
POSTER PRESENTATIONS
(IN ALPHABETICAL ORDER OF PRESENTER)
POSTERS WILL BE DISPLAYED THROUGHOUT THE ENTIRE CONFERENCE IN THE TRADE EXHIBITION AREA
Beyond Prognostication: An Exploratory Study Of Ambulance Officers’ Resuscitation Decision-Making

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Adult Emergency Department, Auckland DHB, Auckland, New Zealand

**Introduction**

When faced with a patient in cardiac arrest, New Zealand ambulance officers are authorised to commence, continue, withhold or terminate resuscitation efforts, in accordance with national clinical guidelines. Existing research into resuscitation decision-making utilises retrospective analysis of registry data or other clinical documentation. Such research may not capture all of the factors which are influencing decision-making or the potentially-complex and idiosyncratic cognitive process of information-gathering and sense-making.

**Method**

Semi-structured face-to-face interviews with a purposive sample of sixteen demographically-diverse ambulance officers, currently employed in a variety of emergency ambulance response roles, around New Zealand.

**Results**

Three main themes emerged: 1. Puzzle pieces; 2. Death on a spectrum or default and 3. Doing everything or transitioning. In order to make sense of complex and dynamic situations, participants appeared to be seeking-out and integrating factors to answer four main questions: How dead is this patient? Can we save this patient? Should we save this patient? and What if we can’t save this patient?

**Conclusion**

All participants described the importance of prognostic factors in decision-making, but confidence in a poor outcome for the patient was not always sufficient to withhold or terminate resuscitation. Withholding or terminating resuscitation required confidence, experience and a shift in focus, to manage the resulting scene of a death. Ambulance officers may benefit from mentoring and simulation training to develop confidence and skill in the assessment and management of their own, crew and bystander responses to withholding or terminating resuscitation.

Characteristics of Out-Of-Hospital Cardiac Arrest Patients Attended During a Thunderstorm Asthma Event

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**Objectives**

To describe the characteristics of out-of-hospital cardiac arrest (OHCA) patients attended during the largest known Thunderstorm Asthma (TA) event occurring in Victoria on November 21, 2016.
Methods

OHCA patients identified within the Victorian Ambulance Cardiac Arrest Registry (VACAR) during the TA event (6-11:59pm on 21/11/2016) were extracted for analysis. OHCAs occurring during the same hours on the three previous Mondays were extracted for comparison.

Results

A total of 17 OHCA patients were attended during the TA event, compared with 15 during the same hours on the three previous Mondays (Risk Ratio [RR] 2.1, p=0.03). Patients arresting during the TA event were younger than the comparator group (Mean: 48.2 (Standard Deviation [SD] 20.6) vs. 61.3 (SD 23.4) years), and were more likely to have a history of asthma (57.1 vs. 23.1%). Additionally, 6 patients during the TA event (54.6%) were recorded as taking a bronchodilator, compared with none during the comparator period. During the TA period, OHCAs were more often due to respiratory cause (52.9 vs. 0%), occurred in a public location (17.7 vs. 6.7%), were witnessed by a bystander (64.7 vs. 53.3%), and had an initial non-shockable rhythm (70.6 vs. 60.0%). In total, 58.8% of patients achieved prehospital return of spontaneous circulation during the TA event, compared with 40.0% during the comparator period. A total of 25.0% of patients arresting during the TA event were discharged from hospital alive, compared with 7.7% during the comparator period.

Conclusion

TA was associated with more OHCAs precipitated by a respiratory cause. Most patients had a history of asthma and were recorded as taking an asthma bronchodilator.

A systematic review of neurocognitive impairments in adult survivors of cardiac arrest

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1Monash University (Melbourne, Australia), 2The Alfred Hospital (Melbourne, Australia), 3Curtin University (Perth, Australia).

Introduction

Cardiac arrest may cause hypoxic brain injury in survivors, leading to neurocognitive impairments. However, the prevalence and types of neurocognitive impairments experienced by survivors is not well understood. The aim of this study was to perform an updated systematic review examining the evidence of specific neurocognitive impairments in adults who have experienced OHCA.

Methods

A search of Ovid MEDLINE, CINAHL, EMBASE, Informit, Cochrane Library, Web of Science, Scopus, ERIC and ProQuest Dissertations and Theses Global was conducted. We included all studies in which formal neuropsychological assessment was directly administered to participants >3 months after cardiac arrest. Two reviewers independently extracted data and evaluated the quality of evidence using the QUIPS (Quality in Prognostic Studies) tool.
Results
Of the 7132 studies identified, 24 were included. The majority of studies were prospective observational studies of poor quality (n = 14), with high heterogeneity between study designs, sample sizes, assessment time points and outcome measures. Neurocognitive impairments were common in OHCA survivors, with the most frequent type of impairments found in the memory domain, followed by executive function.

Conclusion
While there is a paucity of high-quality studies of neurocognitive impairments in OHCA survivors, the current evidence indicates that mild cognitive impairments are common in adult survivors of cardiac arrest.

Newborn Basic Life Support Training Program for NSW Health
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Health and Education Training Institute (HETI), NSW Health, New South Wales

Abstract:
Every year, approximately 10 000 newborns in NSW will need some degree of active resuscitation. The majority will only require simple interventions. Newborn Resuscitation (Basic Life Support) is mandatory for all clinical NSW Health staff who attend routine and emergency births. A standardised Newborn Basic Life Support (NBLS) training program was identified by four Local Health Districts (LHDs) as a priority in the District HETI nomination process.

Aim
to increase participant’s skill and confidence to initiate resuscitation measures for newborns. It is essential that the program content is consistent with the 2016 Australian and New Zealand Committee of Resuscitation (ANZCOR) newborn guidelines.

Method
HETI assembled a team to develop a strategy and a solution, utilising a consultative process with stakeholders from midwifery, medical and nursing experts from across NSW. A blended learning program was jointly considered the best approach to support local implementation and sustainability of the program.

Results
The NBLS program consists of an eLearning module and a face-to-face workshop. The 40 minute eLearning module provides theoretical content consistent with the 2016 ANZCOR guidelines and newborn life support flowchart. All NSW Health staff can access the module on the NSW Health eLearning platform (HETI online). The face-to-face workshop uses scenarios and low-level simulation based training to consolidate the participant’s knowledge and skills. NSW LHDs & Specialty Health Networks (SHN’s) deliver the workshops in their health care facilities utilising the HETI developed resources. Two pilot workshops conducted in regional and metropolitan areas as part of the evaluation process.
Retrospective Analysis of Patient Presentations at The Sydney Royal Easter Show From 2012 To 2014

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There is growing body of literature on mass gathering healthcare. However, little has been done to analyse relationships between patient demographics, treatment and disposition in detail for specific mass gathering events.

The purpose of this study was to conduct a retrospective analysis of all patients presenting to St John Ambulance NSW at the Sydney Royal Easter Show (SRES) between 2012 and 2014. Patient encounter data, demographics and environmental conditions over the three years were analysed and compared.

Over 2.5 million patrons attended the SRES from 2012-2014. St John Ambulance evaluated 4,141 patients over this period, with a presentation rate of 1.65 patients per 1000 patrons, and a transport to hospital rate of 0.055 per 1000 patrons. Of all presentations, 49% were injuries, 46% illnesses and 5% environmental. 12.4% of patients required treatment beyond the scope of first aid. Patients from rural/regional areas (15% of all patients) were more likely than those from the city to require advanced treatment, health professional review, and a discharge to hospital rather than returning to the event. Extremes of temperature were associated with a lower crowd size and higher patient presentation rates (PPRs), but had no impact on transfer or referral rates to hospital. Although PPRs decreased over the study period, a higher proportion of patients required longer treatment times and hospital referrals or transports.

This analysis may help prehospital care providers and organisers of mass-gathering events to improve resource management, training and staffing for similar events in the future.

The SA Ambulance Service Cardiac Arrest Registry (SAAS-CAR): A 7 Year Utstein Style Report Of Out-Of-Hospital-Cardiac- Arrests (OHCA) In South Australia.

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Background
SA Ambulance Service (SAAS) is the sole provider of emergency medical services (EMS) in South Australia (SA) and collects data on all OHCA as part of an ongoing key performance indicator and prospective observational study. The authors wished to examine this data under the 2014 updated Utstein-style guidelines for OHCA registries.

Methods
Data were sourced from the SAAS Cardiac Arrest Registry (SAAS-CAR) (HREC:14/SAH/120) utilising paper based patient care records linked to SAAS dispatch and SA Health electronic records. Patient and system elements were examined with main outcomes of “survived event” (return of spontaneous circulation (ROSC) at hospital handover) and “survival to hospital discharge” in two groups: all EMS treated OHCAs and the Utstein comparator group (bystander witnessed/ shockable rhythm).
Results SAAS attended 12,644 OHCA cases between July 2009 and June 2016 (crude incidence 108/100,000 population). Resuscitation was attempted in 38.1%, the mean age was 63 years, 68% were male, 59% bystander/EMS witnessed, 58% had bystander CPR, 81% were presumed cardiac and 28% were in a shockable rhythm. Pooled “survived event” and “survival to hospital discharge” for all EMS treated OHCAs was 26% and 10% respectively and 48% and 30% in the Utstein comparator group.

Conclusion This is the first report of OHCAs in SA according to the updated Utstein-style of reporting. This measure allows benchmarking against other EMS systems worldwide representing the EMS system’s effectiveness and efficacy, particularly from the Utstein comparator group. Further analysis is required of all data elements to identify potential improvements in both patient outcomes in SA and the data collection process.

Retrospective Advanced Life Support Level 1 course Evaluation

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The Australian Resuscitation Council (ARC) Advanced Life Support level 1 course (ALS1) was introduced across St George & Sutherland Hospitals to ensure a uniform and standardised approach to Advanced Life Support (ALS) training. This provided staff with a nationally and internationally accredited qualification.

The aim was to review the effectiveness of the course with regards to increase confidence and the use of skills leaned. 3-4 months after attending the course each candidate was sent an evaluation form (see Appendix 1)

From the information gathered we conclude that the ALS1 course ensures staff confidence to optimally care for patients in the immediate period of deterioration by recognising, assessing and treating the deteriorating patient and immediate management of cardiac arrest.

Appendix 1
Comparisons of Survival For Elderly Out-Of-Hospital Cardiac Arrest Patients By Residential Status In Perth Western Australia

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Background

Little is known about the survival outcomes of elderly out-of-hospital cardiac arrest (OHCA) patients who live in residential aged care facilities (RCFs).

Aim

To compare survival of elderly OHCA patients who live in RCFs with those who do not live in RCFs.

Methods

OHCA patients who were aged ≥65 years with resuscitation commenced by paramedics between 1996 and 2016 in Perth were extracted from the St John Ambulance Western Australia (SJA-WA) OHCA Database. The primary outcome was 30-day survival after OHCA. Multivariate logistic regression was performed to compare 30-day survival of RCF with non-RCF patients–adjusting for confounders. Subgroup analysis was conducted in those patients who were transported to hospital without achieving return of spontaneous circulation (ROSC) at emergency department (ED) arrival.

Results

During the study period, a total of 14,195 elderly OHCA patients were attended by SJA-WA and 5,648 (39.8%) had resuscitation attempted; of whom 9.7% (n=547/5648) lived in RCFs. Elderly OHCA patients who lived in RCFs were less likely to survive to 30 days than those who lived in non-RCFs (adjusted Odds Ratio: 0.24, 95% Confidence Interval 0.11-0.54). Among those who were transported to hospital without achieving ROSC at ED arrival (n=2795, 49.4%), there were no significant differences in 30-day survival between RCF and non-RCF patients (n=2/261, 0.8% vs n=26/2534, 1% respectively; p=0.6).

Conclusion

Elderly OHCA patients who lived in RCFs were less likely to survive to 30 days than those who lived in non-RCFs. Survival was not influenced by residential status if ROSC was not achieved before ED arrival.
Time of Administration Of Antiplatelet Agents In Patients Presenting With St Elevation Myocardial Infarction To The Catheter Laboratory

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Early administration of antiplatelet agents is recommended in patients with ST-segment elevation myocardial infarction (STEMI). The role of prehospital administration of antiplatelet agents and the choice of agent has been questioned. Accurate information about the time taken to administer antiplatelet agents after arrival at hospital is relevant to this debate. This study examined the time taken to administer antiplatelet drugs following patients’ arrival to hospital. A clinical audit was undertaken of patients presenting with STEMI to the Flinders Medical Centre emergency department who subsequently underwent urgent percutaneous coronary intervention (PCI). 134 patients presented with STEMI between 17th February 2015 and 22nd March 2016 of which 76 patients met the inclusion criteria. Data collected included patient demographics, usual medications, medications received in the acute phase of STEMI management and times of triage, antiplatelet and anticoagulant drug administration, and arrival at the catheter laboratory. Statistical analysis provided the means to interpret data with a particular focus on time difference from triage to drug administration and how this varies with the drug administered. Results from this clinical audit have potential in the debate about the role of prehospital antiplatelet agents, with particular relevance to the time of onset of drugs proposed for use in this space.

General ward Medical Emergency Team (MET) criteria in the Intensive Care Unit setting

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Objectives

MET criteria are widely used in the hospital setting to provide an early warning system to facilitate escalation of care. We aimed to determine the proportion of RMH Intensive Care Unit (ICU) patients who have met MET criteria within the previous 24-hour period.

Methods

Prospective study reviewing of all current RMH ICU inpatient observation charts, and examining observations from the prior 24 hour period. The primary endpoint was number of patients meeting general ward MET criteria within the previous 24 hours. Secondary endpoints included which MET criteria they had fulfilled, and whether adjusted daily physiological aims were recorded on their observation chart.

Results

Of 22 patients in the preliminary review, 21 observation charts were able to be reviewed. 18 met MET criteria in the previous 24-hour period (85.7%). The most common MET criterion was respiratory rate of <8 breaths/minute (9/18, 50%); all patients were mechanically ventilated. Other criteria were SBP <90 mmHg, respiratory rate of >30 breaths/minute, and pulse oximetry of <90%, each having four patients meeting these individual criteria (22.2% each). 20 patients had adjusted physiological aims recorded on their observation charts (95.2%).
Medical Emergency Calls in the Intensive Care Unit (ICU)
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Background/Objectives
Medical emergency calls within the intensive care unit (ICU), have experienced little scrutiny in the medical literature. We set out to determine the nature of these events at the RMH ICU, their outcomes, and their antecedents.

Methods
A prospective study with retrospectively gathered data. Medical emergency calls were identified from the Merlon Nurse Call system database, and matched to the patient using the inpatient management software, iPM. Patient progress notes, observation charts, and other documentation were then examined to gather relevant data. The primary endpoint was survival to discharge from the RMH ICU. Secondary endpoints included survival to hospital discharge, subsequent ICU emergency calls, and change of patient Goals of Care.

Results
Between 01/01/2017 and 16/03/2017, 34 individual calls were able to be followed up, 12 of these being false alarms or having no documentation (35.3%). There were 22 legitimate calls in 20 individual patients (15 male, 75%). Eight of these patients were admitted under the Trauma team (40%). 11 of the patients were 65 years or older (55%). 18/20 patients survived their calls (90%), and 15/20 survived to ICU discharge or are still inpatients of the ICU (75%). On a per call basis, there were two instances of CPR (2/22; 9.1%), three intubations (13.6%), and two electrical/chemical cardioversions (9.1%). The most common intervention was changes in vasoactive supports (inotrope or vasopressor infusions or boluses: 7/22; 31.8%).

Conclusion
Medical emergency calls in ICU need further study. Initial evaluation confirms patterns of deterioration, and a significant mortality.
Neurological Outcome In Adult Out-Of-Hospital Cardiac Arrest (OHCA) Patients – Not All Doom and Gloom!

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Aim
To describe neurological outcomes in OHCA patients who survive to hospital discharge (STHD).

Methods
The study cohort included adult OHCA patients (≥16 years) in Perth, Western Australia (WA) attended by St John Ambulance WA and admitted to hospital, between 1st January 2004 and 31st December 2015. Neurological status at hospital discharge (and prior to the arrest) was determined by medical record review using the five-point ‘Cerebral Performance Category (CPC)’ 1 and ‘Overall Performance Category (OPC)’ 1 scores. Adjusted multivariable logistic regression analysis was used to identify patient and/or prehospital factors associated with good neurological outcomes (CPC/OPC<3).

Results
Over the study period, SJA-WA attended 16,160 OHCAs. Resuscitation was attempted in 6,822/16,160 (42%) cases - with 1,341/6,822 (20%) admitted to hospital and 680/6,822 (10%) STHD. Of those STHD cases with CPC and covariate data available (n=649/680; 95%), the scores were: CPC1 n=469 (72%), CPC2 n=133 (21%); CPC3 n=40 (6%) and CPC4 n=7 (1%). OPC scores followed a similar distribution. Of those patients with poor neurological outcome (CPC>2); n=5/47 (11%) also had poor neurological status prior to the OHCA. Factors significantly associated with good neurological outcome included: public location of arrest and witnessed arrest.

Conclusion
It is important for clinicians to recognise that whilst overall survival is low, most survivors of OHCA have a good neurological outcome. Pessimism about prognosis in OHCA risks becoming a ‘self-fulfilling prophecy’.

Direct Transport to a Tertiary Hospital Improves Survival from Out-Of-Hospital Cardiac Arrest in Adults with Acute Coronary Syndrome

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Aim
To determine if adult out-of-hospital cardiac arrest (OHCA) survivors with acute coronary syndrome (ACS) benefit from direct transport to a tertiary hospital.

Methods
This retrospective cohort study used the St John Ambulance Western Australia OHCA Database and medical record review. We included adults (≥18 years) admitted to the intensive care units (ICU) of five tertiary hospitals in Perth, with mechanical ventilation and a hospital discharge diagnosis of ACS between January 2012 and December 2015. We compared survival to hospital discharge and 12-month survival between patients directly transported to a tertiary hospital and patients transferred to a tertiary hospital and its ICU from another hospital using multivariate logistic regression and Cox-proportional hazards regression models adjusted for Utstein variables and other known confounders.

Results
Of the 146 patients included in the analysis, 104 patients (71%) were directly transported to a tertiary hospital, and 42 (29%) were transferred from another hospital. A total of 76 patients (52%) survived to hospital discharge. Patients admitted directly were 3.3 times (odds ratio 3.3, 95% confidence interval [CI] 1.5, 7.3) more likely to survive to hospital discharge and 1.9 times (hazard ratio 1.9, 95% CI 1.2, 3.1) more likely to survive for 12 months than those transferred from another hospital despite adjustment for important confounders.

Conclusion
Direct transport to a tertiary hospital for intervention and intensive care may confer a significant survival advantage for adult OHCA patients with ACS. This has implications for the development of efficient and streamlined cardiac arrest care centres in Western Australia.
“The Long Dive”. Aquatic safety, voluntary endurance breath holding, aquatic activities and competition

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Hypoxic blackout, erroneously but commonly referred to as ‘shallow water blackout’, is a preventable cause of drowning. Preceded by hyperventilation, this cause of aquatic deaths occurs in both public and private swimming pools and in the sea. Case series include victims training for underwater hockey, synchronized swimming, free diving and voluntary submersion endurance challenges as competitive play. The history of endurance submersion dates from formal competition events called ‘the long dive’. The winners were those who achieved primacy in the maximum distance swum underwater, or timed maximum voluntary submersion. Although ‘The Long Dive’ is no longer part of formal aquatic competition the practice remains in a) informal ludic play particularly among younger males; b) as a perceived (but incorrect) belief that post-hyperventilation endurance submersion has training benefits for various aquatic sports. Voluntary endurance hypoxic submersion is disapproved by USA Swimming, Swimming Australia and Royal Life Saving; and has no place in the training for aquatic sport. Our experience suggests that the risk of hypoxic blackout is distinct from drowning deaths due to pre-existing cardiac disease including cardiac electrical abnormalities and epilepsy. This paper discusses: the history of ‘The Long Dive’; the associated pathophysiology; predisposing conditions; differential diagnosis of fatal and near fatal episodes; prevention stratagems which involve a) medical examination of those involved in sub-extreme underwater breath holding activities; b) advocacy, suitably targeted, for the awareness of risks; and c) education and training concerning the syndrome of hypoxic blackout for all involved in supervisory and training roles in aquatics.

Temporal Trends (2002-2014) Of Incidence And Shockable Status Of Adult Out-Of-Hospital Cardiac Arrest (OHCA) Of Presumed Cardiac Aetiology In Queensland

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Objective
To describe trends in incidence and shockable status of adult OHCA of presumed cardiac aetiology attended by Queensland Ambulance Service (QAS) paramedics between 2002 and 2014.

Methods
The QAS OHCA registry was used to collect data. Analyses included age-standardised rates by gender for all adults and older adults only (65 years+); age-specific incidence rates of young adults (18-49), middle age adults (50-64) and 5 groups of older adults (65-69, 70-74, 75-79, 80-84 and 85+); and proportions of shockable versus non-shockable initial rhythm together and by age group (young, middle age and older adults). Temporal trends were analysed.
Results

Over the thirteen years, 32,346 cases of adult OHCA of presumed cardiac aetiology were recorded on the QAS OHCA registry. Age-standardised incidence reduced significantly over time overall and in males only, in all adults and independently in older adults. A significant reduction independently in females was observed only in older adults. Age-specific rates reduced in the 18-49, 70-74, 75-79 and 80-84 year age groups, increased in the 50-64 age group (largely attributable to females) and no significant trends were found in the 65-69 and 85+ age groups. The proportion of cases with an initially shockable rhythm significantly decreased overall. This trend was observed independently in older adults, but not in young or middle age adults.

Conclusion

Age standardised incidence has reduced with a period of stagnation in the middle age and early older years. These factors require consideration in data interpretation and strategy planning.

Resuscitation Education For Prehospital Healthcare Professionals: You Can’t Always Get What You Want

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When an out-of-hospital cardiac arrest occurs, ambulance paramedics or prehospital healthcare professionals are often the first providers on scene with the skills and equipment to implement advanced life support (ALS).

The aim of this research was to review current practices in prehospital ALS education and identify areas for improvement.

A comprehensive literature review was carried out using Medline and CINAHL, followed by focus groups and in-depth interviews with prehospital practitioners. The focus of the review and interviews was on ALS education including environmental aspects, human factors and resuscitation scenarios. Results indicated that practitioners in the prehospital setting faced an uncontrolled and unpredictable environment, worked with various numbers of responders or differing experience, often had lay-person involved in the resuscitation, and dealt with the challenge of extricating and transporting patients to hospital in ambulances.

The elements required for effective prehospital resuscitation education were identified. Key improvement areas identified included realism and relevance, number of providers, simulation locations, roles and responsibilities, human factors and education being competency-based. However, evidence suggests these factors are not being consistently included in prehospital resuscitation education.
Chest Compression Fraction Inversely Associated With Return Of Spontaneous Circulation (ROSC) In Prolonged Out-Of-Hospital Cardiac Arrest (OHCA)


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Aim

To investigate whether the relationship between chest compression fraction (CCF) and survival outcomes varied depending on the downtime from onset of arrest to provision of cardiopulmonary resuscitation (CPR) by paramedics.

Methods

We included OHCA cases where CPR was administered by St. John Ambulance Western Australia (SJA-WA) paramedics in Perth between July 2014 and June 2016. CPR quality data were collected using the Q-CPR feedback device. We divided cases into three groups based upon downtime: ≤15 minutes, >15 minutes and unknown. The primary outcome was achievement of ROSC during resuscitation. Firstly, we compared CCF between those who did and did not achieve ROSC for each downtime group. Secondly, we derived a logistic regression model for each group that included ROSC as the dependent variable and CCF and other known confounders as independent variables.

Results

A total of 341 cases were included in the final analysis. CCF was significantly lower among those who achieved ROSC compared to those who did not in the group with downtime >15 minutes (mean [SD]: 73.01 [12.99]% vs. 83.05 [9.38]%, p=0.002); no significant relationship was observed in the other two groups. Similarly, patients with CCF>80% were 94% less likely to achieve ROSC than those with CCF≤80% in the group with downtime>15 minutes (aOR: 0.06, 95%CI: 0.01-0.38). This association was not observed in the other two groups.

Conclusion

The relationship between CCF and ROSC may vary depending upon the time from onset of arrest to provision of CPR by paramedics.
Nurses Recognition and Response to Clinical Deterioration in Cardiac Cath Lab

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Patients presenting to the cardiac catheter laboratory for treatment of acute coronary syndromes experience a mismatch in myocardial oxygen supply and demand, causing vital sign abnormalities prior to neurological, cardiac and respiratory deterioration. Delays in detecting clinical deterioration and escalating care increases risk of adverse events, unplanned ICU admission, cardiac arrest, and in-hospital mortality.

The aim of the study was to explore interventional cardiac nurses’ recognition and response to clinical deterioration in patients presenting to the cardiac catheter laboratory with an unstable acute coronary syndrome. A prospective exploratory descriptive design was used with 30 participants completing 10 written clinical scenarios. Participants scored their level of concern for each physiological cue and then ranked their preferred immediate response based on the deterioration identified. Hypotension and the presence of pain were the physiological cues of highest concern. The most common responses were to increase vital sign assessment to 5-minutely intervals, administer pain relief or provide reassurance. Despite the presence of clinical deterioration, calling cardiac arrest or medical emergency teams (MET) were not commonly selected.

In conclusion, interventional cardiac nurses most commonly use hypotension and the presence of pain to recognise clinical deterioration in interventional cardiac patients. Once clinical deterioration is identified, interventional cardiac nurses delay the escalation of care to the MET or cardiac arrest team, preferring to implement local nurse initiated interventions.
Surviving Out-Of-Hospital Cardiac Arrest in Northern Adelaide

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\(^1\)University of Adelaide and Lyell McEwin Hospital, \(^2\)SA Ambulance Service, \(^3\)Flinders University

Introduction
The Northern Adelaide Local Health Network (NALHN) services an area with the highest rates of hypertension, smoking, obesity, inactivity and socioeconomic disadvantage in South Australia. This study will investigate the incidence and survival of out-of-hospital cardiac arrest (OHCA) in this high-risk population.

Methods
The SA Ambulance Service Cardiac Arrest Registry (SAAS-CAR) in South Australia was searched for presumed cardiac cases of OHCA aged ≥18 years occurring within the NALHN postcode boundary between 2012 – 2015, excluding return of spontaneous circulation pre-SAAS arrival. Cases transported to a NALHN hospital were linked with the NALHN OHCA Database.

Results
During the study period, 6,980 OHCAs were recorded in SAAS-CAR. Of those, 1,683 (24%) were within the NALHN catchment area; postcode of arrest was missing in 179 cases. Resuscitation was attempted in 508 cases without obvious non-cardiac cause: average age 66, 54% male, 32% VF/VT, 11% EMS-witnessed, 45% bystander-witnessed, 25% transported to NALHN hospital, 7% to non-NALHN hospital. Linkage to the NALHN OHCA database was successful in 120/127 (94%) cases transported to a NALHN hospital. We found that 19 (16%) died in ED, and of those admitted 51/101 (50%) were discharged with favourable neurological recovery (CPC 1-2). Crude estimate of survival to discharge from a NALHN hospital in this population is 13.1%, and in those with witnessed (excluding EMS-witnessed) arrest and shockable rhythm is 44%.

Conclusion
In spite of the high burden of disease in NALHN, rates of transport to hospital and survival to hospital discharge are similar to reported Australian and international findings.
Kia ora tātou, haere mai ki Te Whanganui a Tara. Welcome all to Wellington.

It’s been ten years since our last conference in Wellington. During this time we’ve had two guideline reviews and done major work implementing the best available evidence into our training programmes. Our scientific meetings have grown over the past decade, and at NZ Resus 2018 – Coming of Age we look to further extend our appeal with content for carers both in pre-hospital and advanced settings.

NZ Resus 2018 – Coming of Age will also celebrate the first 21 years of the New Zealand Resuscitation Council. This is a really exciting time for us, and we’ll certainly make time to honour the huge contribution that so many have made to our successes and recognition as New Zealand’s authority in resuscitation and first aid.

Wellington, our destination, is an incredible small city, named by Lonely Planet as ‘the coolest little capital in the world’. Te Papa Tongarewa, the National Museum of New Zealand, is our conference venue – a New Zealand icon right on Wellington’s lively waterfront. We hope that you make the time to enjoy the national treasures within Te Papa’s collections, visit Wellington’s other world-class museums, explore the funky Cuba quarter, or sip the famous coffee and local brews during your Wellington experience.

Bookmark this website confer.co.nz/nzresus2018 and keep checking for programme updates, and please share this page with friends who might be interested.

You can also follow the conversation using the hashtag #NZResus2018.

Richard Aickin
CONFERENCE CONVENOR AND CHAIR
New Zealand Resuscitation Council
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Resuscitation Quality Improvement Program

Based on research evidence, the RQI Program provides a comprehensive learning system that addresses the problem of skills deterioration.

Measure to Improve - Analytics for RQI allows management to analyse and visualise departmental and personnel data with objective performance metrics. This allows competence to be tracked over time, to validate the effectiveness of the program, and to identify performance problem areas.

- COMPLIANCE
  RQI provides a systematic way to demonstrate compliance with hospital standards and facilitates accreditation and auditing.

- QUALITY
  Improves and maintains CPR quality.

RQI IN ACTION - Cabrini Health
In order to meet National Safety and Quality Health Service (NSQHS) Standards, Cabrini Health rolled out RQI across their entire healthcare provider workforce. As a result, they received a “Met with Merit” indication in their hospital accreditation.