Emergency Medicine Division

Research Committee

2016 Research Report

A joint committee of the University of Cape Town,
Stellenbosch University and the Western Cape Government

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Contents

1 Summary of EMDRC Research Activities

In 2016 the Emergency Medicine Divisional Research Committee (EMDRC) received 56 submissions with 16 research proposals approved for further submission to the relevant university structures and research ethics committees (Table 1).

Table 1: EMDRC Review activities 2011-2016

	Ave	2011	2012	2013	2014	2015	2016
All submissions	**64**	58	53	43	54	114	**56**
Summaries	*29*	*28*	*34*	*6*	*20*	*58*	*28*
Proposals	*35*	*30*	*19*	*37*	*34*	*56*	*28*
Reviews performed	**129**	116	106	86	108	228	**112**
Submissions approved	**44**	38	38	29	33	82	**35**
Proposals approved	***23***	*21*	*17*	*25*	*18*	*35*	***16***
All revision	**18**	11	15	14	20	30	**16**
All rejected	**2**	9	0	0	1	2	**0**

Together with their students and colleagues, members of the EMDRC authored or co-authored 33 research publications including four editorials and 29 original research and review articles (Figure 1).

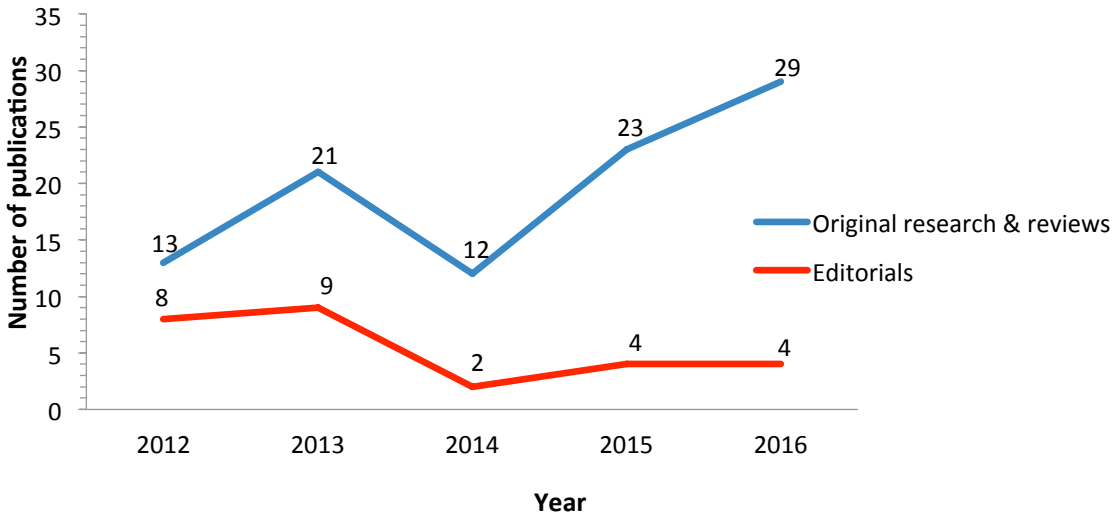

Figure 1: EMDRC Publication outputs 2012-2016

A total of 18 students successfully completed their dissertations through the Division of Emergency Medicine in 2016, either in full (PhD, MSc) or partial fulfilment (MMed, MPhil) of their degree requirements (Figure 2).

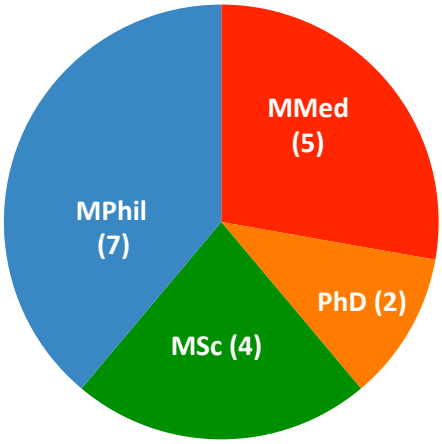

Figure 2: Breakdown of student dissertations completed in 2016

Full-text copies of all research outputs are available on request from Dr Colleen Saunders, Research Manager, Division of Emergency Medicine, University of Cape Town (T: +27 21 650 4842; E: c.saunders@uct.ac.za).

2 Editorials, Opinion pieces and Brief Communications

2.1 Triage is easy, said no triage nurse ever.

E. Dippenaar, S.R. Bruijns. International Emergency Nursing. 2016. 29; 1-2.

This editorial describes the development of triage systems within the emergency centre and describes issues affecting the reliability and validity of those systems, particularly within the low- to middle-income country setting. The role of emergency nurse training, experience and critical-thinking in the triage system is discussed.

2.2 The Sendai framework and emergency care.

P.Y. Kim, H.R. Sawe, L.A. Wallis. AFJEM. 2016. 6(1).

During the Third United Nations World Conference on Disaster Risk Reduction, the Sendai Framework for Disaster Risk Reduction 2015–2030 was adopted. This framework outlines four priorities for action in order to (i) enhance the understanding of disaster risk in all its dimensions, (ii) strengthen disaster risk governance, (iii) invest in disaster risk reduction and (iv) enhance disaster preparedness. This editorial describes the AFEM position on the role of emergency and acute care in this Sendai Framework.

2.3 Pre-hospital clinical practice guidelines – Where are we now?

M. McCaul, K. Grimmer. AFJEM. 2016. 6(2).

This editorial introduces the African Federation for Emergency Medicine pre-hospital clinical practice guideline project initiated in 2015 on behalf of the Health Professions Council of South Africa Professional Board of Emergency Care (HPCSA PBEC).

2.4 South African pre-hospital guidelines: Report on progress and way forward.

M. McCaul, B. de Waal, P. Hodkinson, K. Grimmer. AFJEM. 2016. 6(3).

This editorial describes progress in the development of the pre-hospital clinical practice guidelines (CPG) on behalf of the HPCSA PBEC, and discusses the foreseeable challenges in implementing these CPGs.

3 Original Research and Reviews

3.1 Defining and improving the role of emergency medical services in Cape Town, South Africa.

T. Anest, S. Stewart de Ramirez, K.S. Balhara, P. Hodkinson, L. Wallis, B. Hansoti. EMJ. 2016; 33:557-561.

This qualitative study aimed to identify barriers to paediatric care within the prehospital care system in Cape Town, South Africa. Healthcare personnel that span the prehospital pathway to care included EMS ground crew; EMS dispatchers; and nurses and doctors from clinics, community health centres, and hospitals. Eight broad themes were identified, including: access, communication, community education, equipment, infrastructure, staffing, training, and triage. Subcategories identified areas for targeted intervention, included increasing the number of healthcare personnel in clinics, broadening the advanced life support provider base, and introducing basic medical language in dispatch staff training.

3.2 Professional needs of young Emergency Medicine specialists in Africa: Results of a South Africa, Ethiopia, Tanzania, and Ghana survey.

C. Bae, H. Geduld, L.A. Wallis, DV. Smit, T. Reynolds. AfJEM. 2016; 6(2).

Emergency Medicine specialist programs are relatively new in Sub-Saharan Africa. At present, four of the seven Universities offering these programs are in South Africa. As these programs expand, the African Federation for Emergency Medicine (AFEM) aims to support recent graduates and their respective national societies. This study explored the needs of EM graduates from 2012-2014. Of the forty-seven (66%) survey respondents, most felt confident in their competency and skills as clinicians and least confident in research skills. Respondents felt the best way for AFEM to help new EM graduates was to continue advocacy programmes and to develop leadership and mentorship programmes.

3.3 Gender differences in burns: A study from emergency centres in the Western Cape, South Africa.

L. Blom, A. Klingberg, L. Laflamme, L. Wallis, M. Hasselberg. 2016. Burns. 42(7).

This cross-sectional study made use of burn case reports (n=1915) from eight emergency centres in the Western Cape, South Africa (June 2012-May 2013). Children <4 years in urban areas had the highest burn incidence. Only among adult males were gender differences apparent, with fire burns being more common among men aged 20-39 years and hot liquid burns among men 55+ years. Despite similar abbreviated injury scale (AIS) scores, men were transferred to higher levels of care more often while women were treated and discharged more often.

3.4 Image-based teleconsultation using smartphones or tablets. Qualitative assessment of medical experts.

C. Boissin, L. Blom, L. Wallis, L. Laflamme. 2016. Emerg Med J. dx.doi.org/10.1136/ emermed-2015-205258.

This study aimed to assess whether images viewed by medical specialists on handheld devices such as smartphones and tablets were perceived to be of comparable quality as when viewed on a computer screen. Burn surgeons and emergency medicine specialists practicing in Sub-Saharan Africa or the USA participated in a survey. The study found that images of ECGs, X-rays, and clinical photographs of dermatological conditions and burn wounds were of better quality on handheld devices than on computer screens. Handheld devices may be a teleconsultation substitute for physicians working in emergency settings.

3.5 Community-based perceptions of emergency care in Zambian communities lacking formalised emergency medicine systems.

M.C. Broccoli, C. Cunningham, M. Twomey, L.A. Wallis. 2016. Ann Emerg Med. 64(4).

The objective of this study was to identify critical interventions necessary to improve the Zambian emergency care system. A qualitative study with focus groups consisting of community members and additional focus groups of healthcare providers was conducted. Barriers to emergency care included transportation, healthcare provider deficiencies, lack of community knowledge, the national referral system, and police protocols. Interventions identified as high-impact included: creating community education initiatives, strengthening the formal prehospital emergency care system, implementing triage in healthcare facilities, and training healthcare providers in emergency care.

3.6 Improving publication quality and quantity for acute care authors from low- and middle-income settings.

S.R. Bruijns, M. Banner, G.A. Jacquet. 2016. Ann Emerg Med. doi: 10.1016/j.annemergmed.2016.09.011.

This study describes a quality improvement project of referrals to the African Journal of Emergency Medicine's (AfJEM's) Author Assist programme between January 2011 and December 2015. After either pre- or post-peer review rejection, authors are matched to an experienced volunteer assistant to revise and resubmit their article. Of the 47 articles referred for Author Assist, 28 (60%) made use of the programme. Of the 14 resubmissions during the study, 12 (86%) were accepted for publication. Author Assist reversed one in four rejection decisions through a process that unavoidably, yet minimally biases peer-review. This is the only free, journal-led publication improvement service available in low- and middle-income countries, and the only one specific to emergency medicine.

3.7 Utilisations and perceptions of emergency medical services by patients with ST-segments elevation acute myocardial infarction in Abu Dhabi: A multicenter study.

E.L. Callachan, A.A. Alsheikh-Ali, S. Bruijns, L.A. Wallis. 2016. Heart Views. 17(2).

This study aimed to describe the perceptions towards EMS among physicians caring for patients with ST-Elevation Myocardial Infarction (STEMI) in Abu Dhabi. A convenience sample of physicians involved with STEMI patients from four government facilities with primary PCI were surveyed. Most respondents were “very likely” (67%) to advise a patient with a cardiac emergency to use EMS, but only 39% felt the same for themselves or their family. Most respondents “strongly agree” to the following steps to improve EMS care: 12-lead ECG and telemetry to EC by EMS (69%), EMS triage of STEMI to PCI facilities (65%), and activation of PCI teams by EMS (58%). Only 19% were supportive of pre-hospital fibrinolytics by EMS.

3.8 Operationalising emergency care delivery in sub-Saharan Africa: consensus-based recommendations for healthcare facilities.

E.J.B. Calvello, A.G. Tenner, M.C. Broccoli, A.P. Skog, A.E. Muck, J.P. Tupesis, P. Brysiewicz, S. Teklu, L.A. Wallis, T. Reynolds. Emerg Med J. 2016. 33(8).

A major barrier to successful integration of acute care into health systems is the lack of consensus on the essential components of emergency care within resource limited environments. The 2013 African Federation for Emergency Medicine Consensus Conference identified the essential services provision associated with 6 emergency sentinel conditions. Levels of emergency care were assigned based on the expected capacity of the facility to perform signal functions, and the necessary human, equipment and infrastructure resources identified. These consensus-based recommendations provide the foundation for objective facility capacity assessment in developing emergency health systems that can bolster strategic planning as well as facilitate monitoring and evaluation of service delivery.

3.9 Paediatric emergency and acute care in resource poor settings.

T. Duke, B. Cheema. 2016. J Paed Child Health. 52.

The quality of emergency and acute care for children in health facilities in developing countries is a global and local public health issue. The obstacles are many, but improvement in service and outcomes for seriously ill children can occur with systematic quality approaches that include training in acute holistic clinical care, use of treatment guidelines, appropriate technology, essential medicines, and audit and reporting. This review article describes paediatric emergency and acute care in the least developed regions of low- and middle-income countries and identifies gaps and requirements for improving quality.

3.10 Comparison of two training programmes on paramedic-delivered CPR performance.

K. Govender, K. Sliwa, L.A. Wallis, Y. Pillay. Emerg Med J. 2016. 33(5)

This study aimed to compare CPR performance in two groups of paramedics who received CPR training from different CPR training programmes. Paramedics who received CPR training with a tailored programme were rated competent 70.9% of the time, compared with paramedics who attended the traditional programme and who achieved this rating 7.9% of the time. Specific improvements were seen in the time required to detect cardiac arrest, chest compression quality, and time to first monitored rhythm and delivered shock. In this out-of-hospital cardiac arrest scenario, competent CPR performance was significantly higher when training was received using a tailored programme.

3.11 Prioritising the care of critically ill children: a pilot study using SCREEN reduces clinic waiting times.

B. Hansoti, M. Dalwai, J. Katz, M. Kidd, I. Moconochie, A. Labrique, L. Wallis. 2016. BMJ Glob Health. doi:10.1136/ bmjgh-2016-000036

This study aimed to evaluate the impact of the novel Sick Children Require Emergency Evaluation Now (SCREEN) tool on the waiting times of critically ill children who present for care to primary healthcare clinics in Cape Town, South Africa. A pre/post-evaluation study design was used. The SCREEN programme resulted in statistical and clinically significant reductions in waiting times for children with critical illness to see a professional nurse (2h 45m to 1h 12m; $p<0.001$). The reduction in proportion of children who left without being seen by a professional nurse was also significantly reduced (25.8% to 18.48%; $p<0.001$). SCREEN is a novel programme that uses readily available laypersons trained to make a subjective assessment of children arriving at primary healthcare centres, and provides a low cost, simple methodology to prioritise children and reduce waiting times in low-resource healthcare settings.

3.12 Pathways to care for critically ill or injured children: A cohort study from first presentation to healthcare services through to admission to intensive care or death.

P. Hodkinson, A. Argent, L. Wallis, S. Reid, R. Perera, S. Harrison, M. Thompson, M. English, I. Maconochie, A. Ward. 2016. PLoS One. 11(1).

This year-long cohort study in Cape Town, South Africa aimed to evaluate the care pathway of critically ill and injured children in order to identify preventable failures in the care provided. The methodology was novel in that the pathway included first presentation to healthcare services up until paediatric intensive care unit (PICU) admissions or emergency centre death, using expert panel review of medical records as well as caregiver interviews. A total of 282 children, 252 emergency PICU admissions, and 30 deaths were enrolled. Key modifiable factors were related to access to care and identification of the critically ill, assessment of severity, inadequate resuscitation, and delays in decision making and referral. There was potentially avoidable severity of illness in 185 (74%) of children, and death prior to PICU admission was avoidable in 17/30 (56.7%) of children. Major improvements could

be achieved through simultaneous interventions enacted throughout the healthcare system; the aim ought to be an improvement in the entire system rather than in isolated steps within that system.

3.13 Miliary tuberculosis: Sonographic pattern in chest ultrasound.

L. Hunter, S. Bélard, S. Janssen, D.J. van Hoving, T. Heller. Infection. 2016. 44(2).

Miliary tuberculosis is characterised by a multitude of small nodular opacities on chest radiography. Despite ultrasound of the chest gaining wider acceptance as a diagnostic tool of lung infections, sonographic changes of pulmonary miliary TB have not yet been reported. B-lines and comet-tail artefacts disseminated throughout multiple lung areas and a pattern of sub-pleural granularity as consistent changes seen in lung ultrasound of ten patients with pulmonary miliary TB diagnosed by chest radiography are described.

3.14 Caregivers' experiences of pathways to care for seriously ill children in Cape Town, South Africa: A qualitative investigation.

C.H.D. Jones, A. Ward, P.W. Hodkinson, S.J. Reid, L.A. Wallis, S. Harrison, A.C. Argent. 2016. PLoS One. 11(3).

This qualitative study used semi-structured interviews with primary caregivers of children who were admitted to the paediatric intensive care unit (PICU) or died in the health system prior to PICU admission. The study aimed to explore caregivers' experiences and perceptions of pathways to care, from first access through various levels of the health service, for seriously ill or injured children in Cape Town, South Africa, in order to identify areas for improvement. Forty-five interviews were conducted with caregivers. The caregivers relayed experiences such as delays within health facilities and in the referral process, early identification of critically ill children, and quality of care. These data provide insights into the difficulty and uncertainty facing caregivers about where and how to access emergency care for their sick children, the strategies they use to overcome these barriers, and the importance of good communication.

3.15 Emergency medicine educational resource use in Cape Town: modern or traditional?

A.C. Kleynhans, A.H. Oosthuizen, D.J. van Hoving. 2016. Postgrad Med J. doi:10.1136/postgradmedj-2016-134135

This study, conducted via online survey, describes the usage of various traditional and modern educational resources by members of the division of emergency medicine at Stellenbosch University and the University of Cape Town during 2014. With a response rate of 69.6% (n=87), the textbooks were most preferred (n=78, 89.7%), followed closely by open access educational resources (n=77, 88.5%) and journals (n=76, 87.4%). Other multimedia resources included emergency medicine and critical care blogs (71%), YouTube (35%) and podcasts (21%). Computers were most frequently used to access educational resources except for social media where smart phones were preferred. This study illustrates an opportunity for greater integration of online resources and social media in educational activities to enhance multimodal and self-directed learning.

3.16 A 3-year survey of acute poisoning exposures in infants reported in telephone calls made to the Tygerberg poison information centre, South Africa.

C.J. Marks, D.J. van Hoving. South African J Child Health 2016. 10(1).

This study analysed the toxic substances responsible for acute poisoning exposures in infants (<1 year of age) as well as the severity of the exposures through a retrospective analysis of the Tygerberg Poison Information Centre (TPIC) database over a 3-year period. The TPIC handled 17 434 consultations during the 3-year study period. Infants were involved in 1 101 cases (6.3%), of which 46 cases (4.2%) were neonates. Most poisoning exposures in infants are not serious and can be safely managed at home after contacting a poison centre.

3.17 A promising poison information centre model for Africa.

C.J. Marks, D.J. van Hoving, N. Edwards, C. Kanema, D. Kapindula, T. Menge, C. Nyadedzor, C. Roberts, D. Tagwireyi, J. Tempowski. AfJEM 2016. 6(2).

The burden of poisoning exposures in Africa is a significant public health concern, yet only ten African countries have poisons information centres. This project aimed to engage international multi-sector stakeholders in Eastern Africa with regard to establishing a sub-regional poisons centre serving multiple countries. Participants of the stakeholder meetings agreed that the establishment of such a centre was both necessary and feasible. The overall suggestion was for countries to establish their own poisons centres and to coordinate these centres through a network hub. Further investigation is needed to identify the most suitable location for the network hub, the activities it should fulfil, and the availability of specialists in poisons information who could become members of the hub.

3.18 Antifibrinolytic drugs for acute traumatic injury

M. McCaul, T. Kredo. SAMJ 2016. 106(8).

Antifibrinolytic agents have been used in trauma and major surgery to prevent fibrinolysis and reduce blood loss. This review discusses a Cochrane review investigating the effect of antifibrinolytic drugs in patients with acute traumatic injury. Three randomised controlled trials, of which two (n=20 451) assessed the effect of tranexamic acid (TXA), were included in the Cochrane review. The authors concluded that TXA safely reduces mortality in trauma with bleeding without increasing the risk of adverse events. TXA should be administered as early as possible, and within 3 hours of injury. There is still uncertainty with regard to the effect of TXA on patients with traumatic brain injury.

3.19 Hemaglobin glutamer-250 (bovine) in South Africa: consensus usage guidelines from clinician experts who have treated patients.

M. Mer, E. Hodgson, L.A. Wallis, B. Jacobson, L. Levien, J. Snyman, M.J. Sussman, M. James, A. van Gelder, R. Allgaier, J.S. Jahr. Transfusion 2016. 56(10).

Hemopure is a haemoglobin-based oxygen carrier registered with the Medicines Control Council of South Africa. It is indicated for the treatment of adult patients who are acutely anaemic, for the purpose of maintaining tissue oxygen delivery thus eliminating, delaying, or reducing the need for allogeneic red blood cells. This document provides clinical

recommendations on the safe and effective use of Hemopure based on the post marketing experience in South Africa as well as a better understanding of Hemopure properties reflected in recent publications.

3.20 Sonography in hypotension and cardiac arrest (SHoC): Rates of abnormal findings in undifferentiated hypotension and during cardiac arrest as a basis for consensus on a hierarchical point of care ultrasound protocol.

J. Milne, P. Atkinson, D. Lewis, J. Fraser, L. Diegelmann, P. Olszynski, M. Stander, H. Lamprecht. Cureus 2016. 8(4).

There is no agreed guideline on how to safely and effectively incorporate point of care ultrasound (PoCUS) into the advanced cardiac life support (ACLS) algorithm. This study aimed to report disease incidence as a basis to develop a hierarchical approach to PoCUS in hypotension and during cardiac arrest. Rates of abnormal PoCUS findings from 151 patients with undifferentiated hypotension included left ventricular dynamic changes (43%), IVC abnormalities (27%), pericardial effusion (16%), and pleural fluid (8%). Abdominal pathology was rare (fluid 5%, AAA 2%). During cardiac arrest there were no pericardial effusions, however abnormalities of ventricular contraction (45%) and valvular motion (39%) were common among the 43 patients included. A prospectively collected disease incidence-based hierarchy of scanning can be developed based on the reported findings. This will inform an international consensus process towards the development of proposed SHoC protocols for hypotension and cardiac arrest.

3.21 Time to standardise levels of care amongst Out-of-hospital emergency care providers in Africa.

NK Mould-Millman, C. Stein, L.A. Wallis. AfJEM 2016. 6(1).

The African Federation for Emergency Medicine's Out-of-Hospital Emergency Care (OHEC) Committee convened 15 experts from various OHEC systems in Africa. Together, a consensus process was used to define levels of care within which providers in African OHEC systems should safely and effectively function. The expert panel concluded that four provider levels were relevant for African OHEC systems: (i) first aid, (ii) basic life support, (iii) intermediate life support and (iv) advanced life support. Definitions for each provider level were also created to aid standardisation of providers across Africa and to help advance the practice of OHEC. In the second phase of this work, which commenced in mid-2015, the expert panel was tasked with delineating a clear scope of practice for each of the OHEC provider levels.

3.22 Electronic medical records in low to middle income countries: the case of Khayelitsha Hospital, South Africa.

E.C. Ohuabunwa, J. Sun, K.J. Jubanyik, L.A. Wallis. AFJEM. 2016. 6(1).

There is a growing need and tremendous push towards electronic medical records (EMRs), even in developing areas. This study sought to learn from the implementation process at one hospital in South Africa. In this hospital, EMRs were limited by paper charts needing to be scanned into a system, with limited record clerks and scanning equipment available. This

resulted in a backlog of missing records. Future implementations of EMRs should strive for a fully electronic EMR that does not depend on scanning of paper records, and the upfront costs are expected to save the hospitals tremendously in the future.

3.23 Access to out-of-hospital emergency care in Africa: consensus conference recommendations.

C. Stein, NK Mould-Millman, S. de Vries, L.A. Wallis. AfJEM. 2016. 6(3).

This paper reports the consensus outputs arising from the AFEM Out-of-hospital emergency care (OHEC) access consensus meeting held in Cape Town, South Africa in April 2015. The discussion was structured around six dimensions of access to care and tackled both Tier-1 and Tier-2 OHEC systems. In Tier-1 systems, the role of community involvement and support was emphasised. In Tier-2 systems, the consensus group highlighted the primacy of a single toll-free emergency number, matching of Emergency Medical Services resource demand and availability through appropriate planning and the cost-free nature of Tier-2 emergency care, amongst other factors that impact accessibility.

3.24 Lessons learned from the application of mixed methods to an international study of prehospital language barriers.

R.C. Tate, P.W. Hodkinson, A.L. Sussman. J Mix Methods Research. 2016.

Mixed methods research is increasingly common in emergency medical services, but methodological expertise among prehospital researchers has been found lacking. The purpose of this article is to describe unique challenges that the authors encountered in the application of mixed methods to a multisite, international study of prehospital language barriers. Lessons learned include the role of formative research in identifying cultural and organizational norms that affect researcher engagement with emergency medical service agencies, the necessity of developing approaches for member checking and assessing respondent validity, and the importance of promoting mixed methods as a rigorous methodology in international settings.

3.25 Strategies used by prehospital providers to overcome language barriers.

R.C. Tate, P.W. Hodkinson, K. Meehan-Coussee, N. Cooperstein. Prehosp Emerg Care. 2016. 3127.

This study sought to identify the communication strategies, and the limitations of those strategies, used by emergency medical services (EMS) providers when confronted with language barriers in a variety of linguistic and cultural contexts. EMS providers were queried regarding communication strategies to overcome language barriers as part of an international, multi-site, sequential explanatory, qualitative predominant, mixed methods study of prehospital language barriers. A total of 125 telecommunicators and a purposive sample of 27 field providers participated in the study. Telecommunicators identified 3rd-party telephonic interpreter services as the single most effective strategy when available, but also described time delays and frustration with interpreter communications. In the field, all providers reported using similar strategies. Prehospital providers described significant limitations to these strategies, including time delays, breaches of patient confidentiality, and

inaccurate interpretation. Participants suggested various resources to improve communication with language-discordant patients.

3.26 Predicting mortality rates: Comparison of an administrative predictive model (hospital standardised mortality ratio) with a physiological predictive model (Acute Physiology and Chronic Health Evaluation IV) - A cross-sectional study.

R.E. Toua, J.E. de Kock, T. Welzel. J Critical Care 2016. 31(1).

Direct comparison of mortality rates has limited value because most deaths are due to the disease process. This cross-sectional study compared the expected mortality rate as calculated with an administrative model to a physiological model, Acute Physiology and Chronic Health Evaluation IV. A total of 47,982 patients were scored from 1 July 2013 to 30 June 2014, and 46,061 records were included in the analysis. A moderate correlation was shown for the combined cohort, a very good correlation for the less than 10% stratum and a moderate correlation for 0.1 to 0.5 predicted mortality rates. There was no significant positive correlation for the greater than 50% predicted mortality stratum. At less than 0.1, the models are interchangeable, but in spite of a moderate correlation, greater than 0.1 hospital standardized mortality ratio cannot be used to predict mortality.

3.27 Toward an appropriate Point-Of-Care ultrasound curriculum: A reflection of the clinical practice in South Africa.

D.J. van Hoving, H. Lamprecht. J Med Ultrasound. 2016. 24(1).

The objective of this study was to establish whether the clinical practice exposure of South African certified point-of-care ultrasound providers reflects the current curriculum content. All South African certified emergency medicine point-of-care ultrasound providers were invited to participate in an online survey. Forty-four providers completed the survey (52.4% response rate). Most respondents were female, working in the Western Cape Province and emergency medicine specialists. The top five modules selected that best match the participants' perceived burden of disease were eFAST (89.2%), DVT (86.5%), FEER (64.9%), first-trimester pregnancy (56.8%), and focused assessment with sonography for human immunodeficiency virus/tuberculosis (43.2%). Most respondents indicated that the curriculum should be expanded to include more than five application modules.

3.28 Major incident triage: A consensus based definition of the essential life-saving interventions during the definitive care phase of a major incident.

J. Vassallo, J.E. Smith, S.R. Bruijns, L.A. Wallis. Injury. 2016. 47(9).

The aim of this study was to define what constitutes a life-saving intervention, in order to facilitate the definition of an adult priority one patient during the definitive care phase of a major incident. This modified Delphi study used a panel of subject matter experts drawn from the United Kingdom and Republic of South Africa with a background in Emergency Care or Major Incident Management and 24 participants completed all three rounds of the Delphi, with 32 life-saving interventions reaching consensus. The consensus definition will contribute to further research into major incident triage, specifically in terms of validation of an adult major incident triage tool.

3.29 A smartphone app and cloud-based consultation system for burn injury emergency care.

L.A. Wallis, J. Fleming, M. Hasselberg, L. Laflamme, J. Lundin. PLoS One. 2016. 11(2).

Expert clinical advice on acute injuries can play a determinant role on clinical outcomes. There is a need for novel approaches that allow for timely access to advice. This group developed an interactive mobile phone application that enables transfer of both patient data and pictures of a burns wound from the point-of-care to a remote burns expert who can provide advice. This article presents the design of the smartphone and server application alongside the type of structured patient data collected with the pictures taken at point-of-care. Challenges, strengths and limitations of the system are identified that may help materialise or hinder the expected outcome to provide a solution for remote consultation on burns that can be integrated into routine acute clinical care.

4 Doctor of Philosophy (PhD) in Emergency Medicine

4.1 Standardisation and validation of a triage system in a private hospital group in the United Arab Emirates.

E. Dippenaar. UCT 2016. Supervisors: S.R. Bruijns, A. Oliver.

The aim of this thesis was to study the reliability and validity of existing triage systems within Mediclinic Middle East, and to use these systems to design, standardise and validate a single, locally appropriate triage system. This single triage system should be able to accurately and safely assign triage priority to adults and children within all of Mediclinic Middle East emergency centres. A System Development Life Cycle process intended for business and healthcare service improvement was expanded upon through an action research design. The emergency centres were found to use a combination of existing international triage systems and this was found to be inappropriate for this environment. Poor reliability and validity performance of the existing triage systems led to the development of a novel, four-level triage system which incorporates early warning scores through vital sign parameters and clinical descriptors. The novel triage system proved to be substantially more reliable and valid than the existing triage systems within the Mediclinic Middle East emergency centres. The triage system is fit to be implemented throughout all the Mediclinic Middle East emergency centres and may be transposed to similar emergency centre settings elsewhere.

4.2 The development and testing of a training intervention designed to improve the acquisition and retention of CPR knowledge and skills in ambulance paramedics.

P. Govender. UCT 2016. Supervisors: K. Sliwa-Hahnle, L.A. Wallis.

Associated publications: K. Govender, K. Sliwa, L.A. Wallis, Y. Pillay. Comparison of two training programmes on paramedic delivered CPR performance. Emerg Med J. 2016. 33(5).

Despite revised training standards, structured CPR training programmes and industry-regulated CPR refresher training schedules, paramedic-delivered CPR during OHCAs is reported to be both inadequate and rarely in line with established resuscitation guidelines. The aim of this study was to investigate the impact of a tailored paramedic delivered CPR training intervention on paramedic delivered CPR performance. Using a mixed-method, multiphase design the study developed, implemented and evaluated the impact of a paramedic delivered CPR training intervention which had been designed to improve the acquisition and retention of knowledge and skills by ambulance paramedics. The proportion of CPR performances rated as competent was significantly higher when training was received from a tailored CPR training intervention, however degeneration in skills occurred as early as 3 months after initial training and in a similar manner to non-tailored conventional training interventions. Regardless of the type of training paramedics receive, it is likely that the traditional two-year period before retraining will contribute to significant skill deterioration, which may be a factor in the widely recognised quality of prehospital care for OHCA.

5 Master of Science (MSc) in Emergency Medicine

5.1 Emergency Care Assessment Tool for Health Facilities

C. Bae. UCT 2016. Supervisors: L.A. Wallis, E. Calvello.

The African Federation for Emergency Medicine has developed an assessment tool, specifically for low- and middle- income countries, that assesses the provision of key medical interventions, referred to as essential emergency signal functions. A signal function represents the culmination of knowledge of interventions, supplies, and infrastructure capable for the management of an emergent condition. The Emergency Care Assessment Tool (ECAT) was developed to assess signal functions for six emergency sentinel conditions. This study aimed to administer the ECAT and to develop a refined, standardized, and reliable version of the tool with the potential to accurately and efficiently assess emergency care services in varying facilities across the African continent. The study resulted in the creation of a refined tool using signal functions, categorized by major sentinel conditions, evaluated against discrete barriers to delivery. ECAT focuses on service provision at the individual facility level via the use of signal functions and provides a standardized way to assess the capabilities of the health facility in handling critical emergency conditions. ECAT has the potential to collect meaningful information that can guide effective improvements in the delivery of emergency care.

5.2 Exploring the factors underlying successful publication following participation in an Author Assist service

M. Banner. UCT 2016. Supervisors: S.R. Bruijns, G. Jacquet.

Author Assist is an initiative of the African Journal of Emergency Medicine (AfJEM) that pairs an experienced researcher with an author recently rejected for publication to assist with revision of the rejected article. This study aims to improve Author Assist's ability to facilitate successful publication by identifying potential areas of focus that impact individual researcher development. Participant stories within the African acute care context tend to be consistent with available literature describing current global challenges in overcoming barriers to scientific research and publication. Recounts of the Author Assist process are overwhelmingly positive, and frame the programme as a worthwhile, albeit time consuming, initiative that makes a substantial difference in the professional development of individuals, their ability to take on mentorship roles themselves, and their future success in scientific publication. The findings from this study confirm Author Assist's unique niche within emergency care development, and its effectiveness in supporting individual research careers.

5.3 Out-of-hospital assessment and management of rape survivors by pre-hospital emergency care providers in the Western Cape.

R.T. Gihwala. UCT 2016. Supervisors: L. Martin, N. Naidoo.

The South African incidence of rape ranks amongst the highest worldwide, however no direct policy exists for the emergency care provider management of rape victims in the pre-hospital setting. This study aimed to formulate evidence-informed policy recommendations for a re-contextualised and professional emergency care response to survivors of rape. A qualitative, descriptive approach guided the research in which nine semi-structured voluntary interviews were held with emergency care providers, forensic medical practitioners and emergency consultants. The study found that pre-hospital providers lack knowledge and skills of rape victim identification and management but are desirous of evidence-informed guidelines for treatment and referral in a multidisciplinary approach. The recommendations support a community of practice that is mutually inclusive of specialist rape-care centres, emergency department and pre-hospital providers in the interest of forensic emergency medicine. This study is likely to benefit emergency care regulators, educators and researchers whose professional interest is to promote responsivity of the health system to rape.

5.4 An analysis of health facility preparedness for major incidents in Kampala.

J. Kalanzi Kajubi. UCT 2016. Supervisors: W.P. Smith, L.A. Wallis.

Major incidents occur commonly in Uganda, but little is known about local hazards that risk causing major incidents, or health system preparedness for such events. This cross-sectional study was conducted across four teaching hospitals in Kampala using a local geographic area Hazard Vulnerability Analysis (HVA) for each site combined with a key informant questionnaire and standardized facility checklist. Only one of the four hospitals was found to have had an operational major incident plan. Incidents involving human hazards specifically bomb threats, road crash mass casualty incidents, civil disorder and epidemics posed the highest risk to all four hospitals and yet preparation and response measures were inadequate. Hospitals in Kampala face a wide range of hazards and frequent major incidents but despite this they remain under-prepared to respond. Large gaps were identified in staffing, equipment and infrastructure.

6 Master of Medicine (MMed) dissertations

6.1 The assessment of acceptance and identification of barriers to use of electronic medical records by doctors in emergency centres in Cape Town, South Africa

M. Chagani. SUN 2016. Supervisors: R. Allgaier, J. Fleming.

This study aimed to assess acceptance and barriers to use prior to implementation of electronic medical records (EMRs) using the Unified Theory of Acceptance and Use of Technology model. A self-administered questionnaire-based survey was sent to emergency centre (EC) doctors working in district hospitals in the Cape Town metropolis. Participants believed that EMRs would be useful in their practice and improve their productivity. However, the participants felt that the necessary resources would not be available, specifically a lack of financial investment, training and support as well as poor infrastructure and project management skills.

6.2 Work Stress in Two Health Systems: An International Survey

S. de Haan. SUN 2016. Supervisor: H. Lamprecht.

This study examined workplace stress experiences for trainees and certified EM specialists in settings where the specialty of EM is new (South Africa) and established (Canada). An online cross-sectional survey of EM trainees and physicians in both countries was conducted using the validated Management Standards Indicator Tool. There were 89 South African and 515 Canadian respondents. Risk factors for work-related stress are higher in all domains among South African EM trainees compared with Canadian trainees, and differ from South African EM specialists. Canadian EM trainees reported a lack of role clarity. Canadian specialists had lower work control, but better peer support and work relationships than SA specialists.

6.3 An evaluation of the compliance to the ventilation aspects of airborne infectious disease control in Cape Town, South Africa.

C. Groenewald. UCT 2016. Supervisors: B. Morrow, J. Meintjies.

Health Care Workers in Emergency Centres (ECs) are at high risk of nosocomial Tuberculosis (TB) infection. The aim of this study was to determine whether the isolation rooms (IRs) in emergency centres, for patients with diagnosed or suspected TB, comply with set National Core Standards. This cross-sectional descriptive study of ECs in the Cape Town Metropolitan area measured the characteristics of IRs with regards to air changes per hour (ACH), negative pressure ventilation and appropriate discharge of air outdoors or via filters before recirculation. None of the 19 IRs in 8 ECs evaluated complied fully with the National Core Standard's ideal requirements for IRs. Five complied with minimal requirements. The ventilation aspects of airborne infectious disease control are generally poorly implemented. This may contribute to, and fail to mitigate, the high risk of nosocomial transmission of airborne infectious diseases to staff and other patients utilising emergency facilities in the TB endemic areas of Cape Town. New Hospitals should place a high priority on the amount, positioning and maintenance of IRs when planning their facility.

6.4 The availability of alternative devices for the management of the difficult airway in public Emergency Centres in the Western Cape.

W.J.L Jooste. SUN 2016. Supervisor: D.J. van Hoving.

The failed or difficult airway is a rare, but life-threatening situation. Alternative airway devices to direct laryngoscopy are essential aids to manage the failed or difficult airway. The objective of this study was to determine which alternative airway devices are currently available in public emergency centres in the Western Cape Province, South Africa. Twenty-six different types of alternative airway devices were documented in the 15 emergency centres studied. Most centres stocked supraglottic airways (only one centre had paediatric sizes). Tracheal tube introducers were available in five centres. Four centres had video-laryngoscopes, but none had optical laryngoscopes. Retroglottic devices and needle cricothyroidotomy equipment were available in two centres. Although surgical cricothyroidotomy equipment was available, the equipment was widely dispersed and only three centres had pre-packed sets available. None of the specialised paediatric centres had needle cricothyroidotomy equipment readily available. This study demonstrated that Western Cape public emergency centres are currently inadequately stocked with regards to alternative airway devices.

6.5 An analysis of the usage patterns of the 'Cape Town Emergency Medicine' closed Facebook group.

S. Singh. SUN 2016. Supervisors: A. Oosthuizen, M. Stander.

A closed Facebook group, "Cape Town Emergency Medicine", was created by the Division of Emergency Medicine of the Western Cape to provide an educational platform and virtual community for the Division's dispersed registrars and faculty. The objective of this observational, retrospective, descriptive study was to describe the usage patterns of this Facebook group. A total of 241 posts were reviewed over two sampling windows of three months one year apart. There was an increase in total posts in the sample windows from 2013 (114 posts) to 2014 (127 posts). Although clinically directed posts accounted for the least number of total posts, they generated the largest percentage of comments (36.1%), suggesting that they generate greater engagement.

7 Masters of Philosophy (MPhil) dissertations

7.1 A qualitative study on 6th year medical students' perceptions of and self-reported competence in clinical practice after receiving Resuscitation-Based Simulation training.

M. Jansen. UCT 2016. Supervisors: R. Weiss, H. Geduld.

Despite practicing resuscitation skills in a simulation environment, medical students often express anxiety about having to participate in patient resuscitation in the clinical environment. The aim of the study is to explore 6th year medical students' perceptions and self-reported competence for clinical practice after receiving Resuscitation-Based Simulation training. During this research project three focus group interviews were conducted with sixth year MBChB students at the University of Cape Town (UCT) Clinical Simulation Centre. The interviews were audio-recorded, transcribed and analysed using a Grounded Theory approach. Final year medical students were found to perceive that resuscitation-based simulation training is valuable in that it provides a safe non-threatening environment in which to learn the foundational 'hands-on' knowledge necessary for resuscitation, and opportunities to receive feedback on their learning. They also expressed that Resuscitation-based simulation training increased their confidence to participate in resuscitation during clinical practice, and improved their technique. However, the final year medical students have a reluctance to lead during resuscitations in the clinical environment, and expressed a need for more exposure to resuscitation both in the simulation training and the clinical setting. This feedback is useful for developing the simulation programme to be more aligned both to students' needs and the clinical reality, in order to prepare them for managing resuscitations in the clinical environment.

7.2 A description of practices of analgesia administration by Advanced Life Support paramedics in the City of Cape Town

R. Matthews, UCT 2016. Supervisor: W.P. Smith.

The aim of this retrospective descriptive survey was to describe and document pre-hospital pharmacological analgesia administration practices by PEC providers in the City of Cape Town. A retrospective descriptive survey of analgesic drug administration by advanced life support (ALS) paramedics was undertaken. Patient care records (PCRs) generated in the City of Cape Town containing administration of Morphine, Ketamine, Nitrates and 50% Nitrous Oxide/Oxygen were randomly sampled over an 11-month period. A total of 530 PCRs were included. ALS providers in the Western Cape appear to use low doses of Morphine, with most analgesia administered as a single dose. Chest pain is an important reason for drug administration in acute prehospital pain. Paramedics do not appear to be using a weight based nor a titration based strategy.

7.3 Assessment of hospital-based adult triage at emergency receiving areas in hospitals in northern Uganda.

K. Opiro, UCT 2016. Supervisors: L.A. Wallis, M. Ogwang.

This descriptive study aimed to determine how adult hospital-based triage is performed in hospitals in northern Uganda. A survey was conducted using 5-6 health professional staff working in emergency receiving areas in 6 hospitals in the Acholi region. Thirty-three participants from 6 hospitals including 5 doctors, 4 physician assistants, 11 registered nurses, 9 enrolled nurses and 4 nursing assistants consented and participated in the study. Lack of training, variation of triage protocols from one hospital to another, shortage of staff on duty, absence of national guidelines on triage and poor administrative support were the major barriers to improving/developing formal triage in all these hospitals. Formal adult, hospital-based triage is widely lacking in northern Uganda, and staff do perform subjective "eyeball" judgments to make triage decisions. Most hospitals do not have specifically allocated emergency departments which risks disorganization in the flow of patients, crowding and consequently worse patient outcomes.

7.4 Recommendations on the safety and effectiveness of Ketamine for induction to facilitate advanced airway management in head injured patients in South Africa by pre-hospital professionals: A rapid review

P. Smit. UCT 2016. Supervisors: M. McCaul, L.A. Wallis.

Recent evidence has challenged some preconceptions regarding the use and safety of Ketamine in head injuries. To determine the evidence of effectiveness and safety of intravenous/intraosseous (IV/IO) Ketamine as an induction agent for adult patients with traumatic brain injury, the authors aimed to determine the all-cause mortality at 30 days, adverse events/effects, morbidity and rate of successful intubation associated with ketamine administration, as compared to standard induction agents. This review followed a tiered approach, where Tier 1 searched for Clinical Practice Guidelines (CPGs), tier 2 for Systematic Reviews (SRs) and tier 3 for Randomised Controlled Trials (RCTs) relating to the research question. The authors could not find any studies to include (CPGs, SRs or RCTs) in this review which would answer the research question. A lack of empirical evidence at RCT level has led to substantial knowledge gaps regarding our understanding of Ketamine and its effects in traumatic brain injury patients.

7.5 Rapid review of drug management for paediatric seizure termination in the emergency setting

J. Stockigt. UCT 2016. Supervisor: B. Cheema

Benzodiazepines (BDZ's) are integral to acute seizure management. This study aims to consolidate the available literature and formulate recommendations for the use of BDZs as emergent treatment for paediatrics. A tiered rapid review was performed. Current evidence appears to support Midazolam as first line treatment for acute seizure management in children. Midazolam performed better than both Lorazepam and Diazepam with faster seizure termination, more discharges and shorter ICU stays. Lorazepam was not superior to Diazepam and had higher sedation rates with slower return to baseline function.

7.6 Descriptive study of maternal outcomes in a near-miss cohort at Kagadi District Hospital, Uganda.

M. Suuna. UCT 2016. Supervisors: L.A. Wallis, M. Florence.

This study aims to (i) Describe the prevalence and short term outcomes of obstetric near misses and, (ii) Evaluate the level of care through comparative analysis of obstetric near misses and maternal mortality in Kagadi district hospital, Uganda. A facility based retrospective review of obstetric near miss cases and maternal deaths was conducted. There were 7169 admissions to the maternity ward with 4366 deliveries, 752 near misses and 12 maternal deaths. The prevalence of maternal near misses was 10.7%. Maternal near miss and maternal mortality ratio were 177.1 per 1000 and 282 per 100,000 live births respectively. Dystocia was the leading cause of obstetric near miss but hypertension and haemorrhage were associated with poor maternal outcome. Although most obstetric complications develop at home, a comparative analysis of morbidity and mortality at the health facility shows substandard care.

7.7 Waveform capnography in the South African prehospital setting: Knowledge assessment of qualified advanced life support paramedics.

C. Wylie. UCT 2016. Supervisors: T. Welzel, P. Hodkinson.

Capnography is now used in many prehospital services for confirmation of intubation, and optimization of resuscitation and ventilation. The aim of this study was to describe the knowledge of paramedics who use waveform capnography in an out of hospital environment. A cohort of 78 advanced life support paramedics in a private ambulance service in South Africa undertook a web-based survey around their background, training and use of capnography. Paramedics report using waveform capnography extensively when it is available in the South African out-of-hospital environment. Although the knowledge around capnography and its usage was found to be good in most areas, more complicated scenarios exposed flaws in the knowledge of many practitioners and suggest the need for improved and ongoing training.