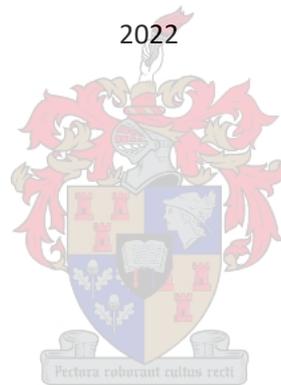


**Mapping research outputs to previously defined research priorities in an
emergency care academic community of practice in Cape Town, South Africa**

by

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*Research assignment presented in partial fulfilment of the requirements
for the degree of Masters of Medicine in Emergency Medicine
in the Faculty of Medicine and Health Sciences at Stellenbosch University*



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DECLARATION

ADDENDUM 1



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LIST OF ABBREVIATIONS

- APC: Article Processing Charges
EM: Emergency Medicine
HIC: High income countries
LMIC: Low- and middle-income countries
MMed: Masters of Medicine
MPhil: Masters of Philosophy
MSc: Masters of Science
PhD: Doctor of Philosophy
SA: South Africa
SU: Stellenbosch University
UCT: University of Cape Town

ARTICLE IN MANUSCRIPT FORMAT

Confidential cover page

Manuscript is blinded in accordance with African Journal of Emergency Medicine guidelines for authors.

Mapping research outputs to previously defined research priorities in an emergency care academic community of practice in South Africa

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Mapping research outputs to previously defined research priorities in an emergency care academic community of practice in South Africa

Abstract

Background: Developing emergency care systems in Africa requires high quality contextual evidence to guide local policies. We sought to map research outputs from the divisions of emergency medicine at the University of Cape Town (UCT) and Stellenbosch University (SU) between 2015-2020 to the list published by van Hoving *et al* (2015) following a modified Delphi study identifying research priorities in South African emergency medicine.

Methodology: This study utilised an evidence mapping approach to map a database of research outputs from UCT and SU Divisions of Emergency Medicine between 2015 and 2020. The Google Scholar, Scopus and the Web of Science databases were searched for research outputs with authors affiliated to either Division. Research outputs were mapped against the proposed research priorities outlined by van Hoving *et al* (2015).

Results: During the study period, 276 publications and 107 dissertations/theses were produced by the Divisions of Emergency Medicine at UCT and SU. In total, 42% of the dissertations/theses had been published in a journal at the time of this study. Only 7% of the research publications mapped to the research priorities identified in the 2015 study in both research statement and study design, while 4% of the publications mapped to the priority list in research statement alone. Only 8,4% of the dissertations/theses mapped to the previously identified research priorities in both research statement and study design and only one mapped to the list by research statement alone. Common themes identified in the research outputs were (i) Prehospital emergency care, (ii) clinical emergency care, (iii) general systems and safety management, (iv) education and training, (v) research and (vi) policies and frameworks.

Conclusion: Few of the research outputs in our database mapped to the proposed research priorities list. This evidence map allows for identification of ongoing knowledge gaps and will inform future agenda setting.

Keywords:

Emergency care, Africa, Research priorities, Evidence-based medicine, Evidence mapping

African relevance:

- Emergency care in Africa is a developing field with many challenges
- There is a disparity between the burden of disease requiring emergency care and research produced in the field
- Research agendas are often set by international funders. The outcomes of these studies may not be relevant and access to this evidence is often limited as the information is published in international journals
- There is a need for high quality contextually relevant research in emergency care to guide local policies

Introduction

Disease processes that frequently require emergency care constitute approximately 50% of the total disease burden in low- and middle-income countries (LMIC) (1). The Disease Control Priorities in Developing countries (DCP-3) suggest that 54% of the 45 million LMIC deaths annually could be addressed with the development of emergency care systems (2). These systems cannot be developed and implemented without high quality contextually relevant evidence generated by research in LMICs. Many emergency care interventions have been developed and validated through research conducted in high income countries (HIC) (1). However, LMICs are faced with a unique set of circumstances and burden of disease (communicable diseases, non-communicable diseases, and traumatic injury)(3). Applying the guidelines developed in a HIC to LMICs has significant constraints: heterogeneity in resources and population demographics, as well as insufficient data availability (1). Therefore, there is a need for relevant, high-quality research in LMICs to formulate and improve emergency care guidelines appropriate for this clinical setting.

Emergency medicine (EM) in Africa exists in various stages of development. The medical literature produced can serve as a surrogate indicator of the development in the field of EM (2). There has been a steady increase in EM literature produced in Africa, which signifies growth in the field (2). Evidence-based approaches to address health problems are recognised as best practice (4) Research provides evidence to stimulate policy change (5). Emergency care research that is contextually relevant to LMICs has the potential to not only positively influence practice but also affect policy making and provide reliable data to be presented to stakeholders to implement change (1). As a result, morbidity and mortality will be greatly impacted (1).

Barriers to research in EM most frequently identified in Africa are lack of funding, lack of research training and lack of time allocated for research (6). Within the research produced there is often a mismatch between research required by policy makers and research produced by academic institutions. In some cases, the research agendas are set by funders and outcomes have more of an international impact than address local health problems (4). There is also less freedom in decision making for local researchers. Therefore, it is necessary for local investigators to drive research that addresses local priorities, and the results to be effectively communicated to policy holders to effect change (5).

It has been reported that three-quarters of African emergency care publications are published in international journals and that one in six African emergency care publications between 2010 and 2015

are not accessible outside of institutional library subscriptions (7). This is an indicator that a substantial amount of collaborative research is taking place with external institutes; however, access to these findings by the local community is limited (7). Deciding which evidence is relevant to local clinical practice is of utmost importance as it affects guidelines, clinical protocols, and patient care. It may also be challenging as local researchers may have not been trained on how to critically appraise literature (8). As a result, clinical decisions and policies could be influenced by poor quality or inconclusive evidence.

Given the limited resources available for conducting impactful clinical research in LMICs, it is important to utilise these resources wisely. Modest resources that are well directed can have major health effects (5). Clinical research should address priority research aims as it is a major contributor to informed decision making (9). Also, clinical research should not be undertaken if there is enough data available on a particular research topic (9).

In 2012-2013, van Hoving *et al* (10) conducted a three phased modified Delphi study which generated a list of priority research topics in emergency care in South Africa (SA) (10). It considered SA's unique quadruple burden of disease as well as the need for development of emergency care in SA, to produce a list of research topics which were contextually relevant. The emergency care research priority list generated from this study aimed to guide local researchers toward locally important topics to ensure evidence-based care that is relevant to the SA population (10).

Emergency Medicine was officially recognized as a specialty in 2003 in SA, and therefore local research capacity and outputs are still emerging (11). The Divisions of Emergency Medicine at the University of Cape Town (UCT) and Stellenbosch University (SU) are responsible for a large proportion of research outputs in emergency medicine in SA. The aim of this study is to create an evidence map of the recent research outputs produced by the Divisions of Emergency Medicine at UCT and SU, compare it against a framework of previously identified priority research topics in order to identify ongoing knowledge gaps, and assess whether the previously identified research priorities were successful in guiding research activity within the Divisions.

Methodology

This study adopted an evidence mapping approach. Evidence mapping is an emerging methodology defined as a systematic search of a broad field to identify gaps in knowledge and or future research needs that presents results in a user-friendly format, often a visual figure or graph or a searchable

database (12). Evidence maps are intended to inform research priority setting by providing stakeholders with the tools to engage in evidence-based decision making. Identification of research gaps are important especially in instances where current interventions are not evidence based (13). We have drawn on the work of Saran and White (2018) (13) and Miake-Lye et al. (2016) (12) in designing this study.

The Divisions of Emergency Medicine at UCT and SU have maintained a database of all research outputs including an affiliated author since 2005. This database was utilised for the purposes of this study. In addition, the Google Scholar, Scopus and Web of Science online databases were purposively searched to identify research outputs with at least one author affiliated with the Divisions of Emergency Medicine at UCT or SU published between January 2015 and December 2020. Those outputs not already captured in the database were added. All research outputs produced by the two Divisions between 2015 and 2020 (inclusive) were included in the data analysis. Articles accepted for publication but not yet published, as well as dissertations submitted for marking but not yet passed, were excluded from analysis. Articles not pertaining to emergency medicine, even though the affiliated author was a faculty member of the Divisions of Emergency Medicine at UCT or SU, were excluded.

Research outputs were categorised into six main categories based on common themes identified from the database: (i) Prehospital emergency care, (ii) clinical emergency care, (iii) general systems and safety management, (iv) education and training, (v) research and (vi) policies and frameworks. Outputs were categorised based on review of the title, abstract and keywords. Categorisation of research outputs was performed independently by two reviewers (KM, LK), with a third acting as a deciding reviewer (CS).

The data abstracted from each included research output included:

- Title of the study
- Keywords
- Study design
- Study setting
- Study population
- Year published
- Journal name and open access category

- Journal impact factor
- Whether the UCT/SU affiliated author was listed as a senior author (first or last author)

We compiled an evidence map to illustrate how the research outputs produced during this time mapped to the previously determined research priorities for SA emergency care identified by van Hoving *et al* (2015) (10). The research outputs were divided into published articles and student dissertations and subsequently cross-tabulated by study design against the previously identified research priority list. Descriptive statistics were used to describe research outputs by year, publication practice and broad indicators of collaboration.

Results

During the study period (2015-2020), a total of 276 publications and 107 dissertations and theses were produced by the Divisions of Emergency Medicine at UCT and SU. Of the 107 dissertations and theses produced during this five-year period, 45 (42%) had been published in a medical journal at the time of this study and were also included in the analysis of published research outputs. There has been a steady increase in both the publication ($R^2 = 0.77$) and student outputs ($R^2 = 0.81$) over the study period (Figure 1).

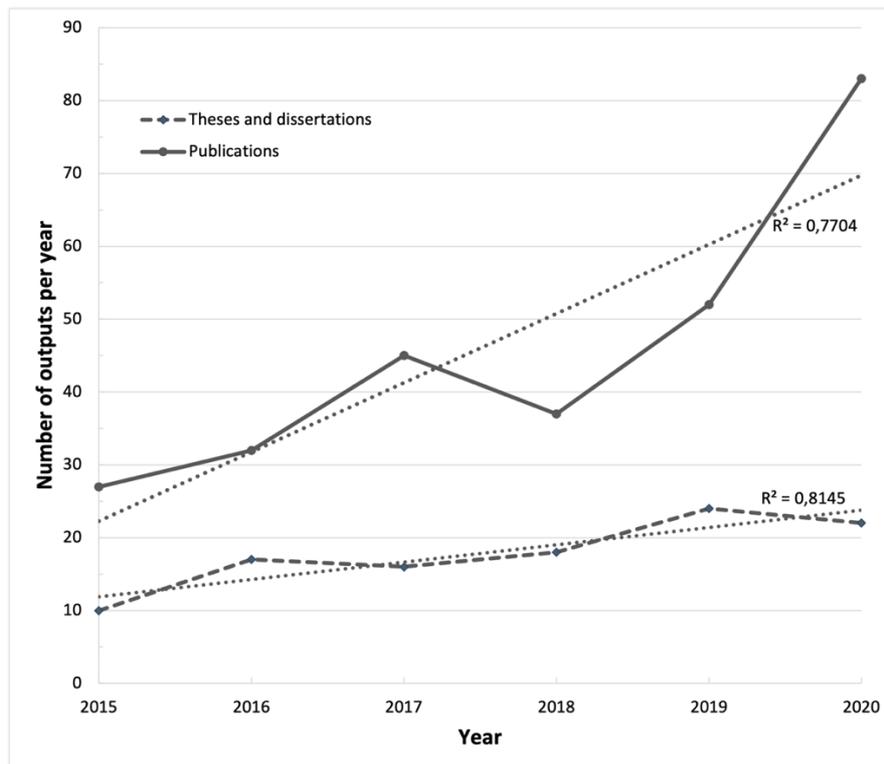


Figure 1: Number of (a) publications and (b) dissertations and theses produced between 2015-2020 by the Divisions of Emergency Medicine at the University of Cape Town and Stellenbosch University

Twenty-eight (10%) of the published outputs were editorials (Table 1). The majority of published outputs were observational study designs with over a third of the published research outputs (107, 39%) following a cross-sectional study design. Only 5% of published outputs were experimental study designs. The majority (52%) of published studies were set in SA, with 39% set specifically in the Western Cape province (Table 1).

The majority of dissertations and theses submitted by students were of a cross-sectional study design (61, 57%), and only 3% of dissertations and theses were experimental study designs (Table 1). Three quarters (80, 75%) of dissertations and theses were submitted by UCT students and the remaining 25% (27) were submitted by SU students. The Masters of Medicine (MMed) in Emergency Medicine (UCT and SU) and the Masters of Philosophy (MPhil) in Emergency Medicine (UCT) programmes produced the majority of dissertations and theses with 43% (46) and 32% (34) of outputs respectively. The Masters of Science in Medicine (MSc) and Doctor of Philosophy (PhD) programmes produced 12% (13) and 13% (14) of the student outputs over the study period. The vast majority of student dissertations and theses (75, 71%) were set in SA, with 51% set specifically in the Western Cape province (Table 1).

Table 1: A breakdown of research outputs by study design and setting

	Research Publications (N=276) % (n)	Dissertations and theses		
		All (N=107) % (n)	Published (N=45) % (n)	Unpublished (N=62) %(n)
		Study design		
Observational				
<i>Case studies</i>	2 (6)	0	0	0
<i>Cross-sectional</i>	39 (107)	57 (61)	60 (27)	55 (34)
<i>Cohort</i>	4 (12)	3 (3)	4 (2)	2 (1)
<i>Case-control</i>	0.4 (1)	0	0	0
<i>Qualitative</i>	5 (14)	15 (16)	9 (4)	19 (12)
<i>Mixed-methods</i>	7 (18)	13 (14)	11 (5)	14 (9)
<i>Consensus</i>	8 (22)	5 (5)	9 (4)	2 (1)
Experimental			2 (1)	0
<i>Randomised, controlled trials</i>	2 (5)	0.9 (1)	0	0
<i>Other experimental</i>	3 (9)	2 (2)	0	3 (2)
Reviews and opinion			0	0
<i>Editorials</i>	10 (28)	0	0	

	<i>Review articles</i>	6 (17)	0	0	
	<i>Evidence synthesis</i>	6 (16)	3 (3)	4 (2)	2(1)
Other		8 (21)	2 (2)	0	3 (2)
<hr/>					
Study setting					
Western Cape, South Africa		39 (107)	50 (54)	44 (20)	55 (34)
South Africa		13 (37)	20 (21)	22 (10)	18 (11)
Africa		15 (41)	15 (16)	11 (5)	18 (11)
Global		23 (63)	15 (16)	22 (10)	9 (6)
<hr/>					

It was noted that 235 (85%) of publication outputs had senior authors affiliated with the Divisions of Emergency Medicine at UCT and SU. In total, 106 (38%) of the articles were published in Emergency Medicine journals, of which the majority (68, 64%) were published in the African Journal of Emergency Medicine (Table 2). A further 22% (60) of the research outputs were published in speciality journals, and 20% (54) in general medical journals. Of the 276 published articles, 229 (83%) were published under open access licences and only 47 (17%) required a paid subscription or institutional account to access (Table 2). The range of impact factors (2021 indicators) for these journals was from 0 to 79,3.

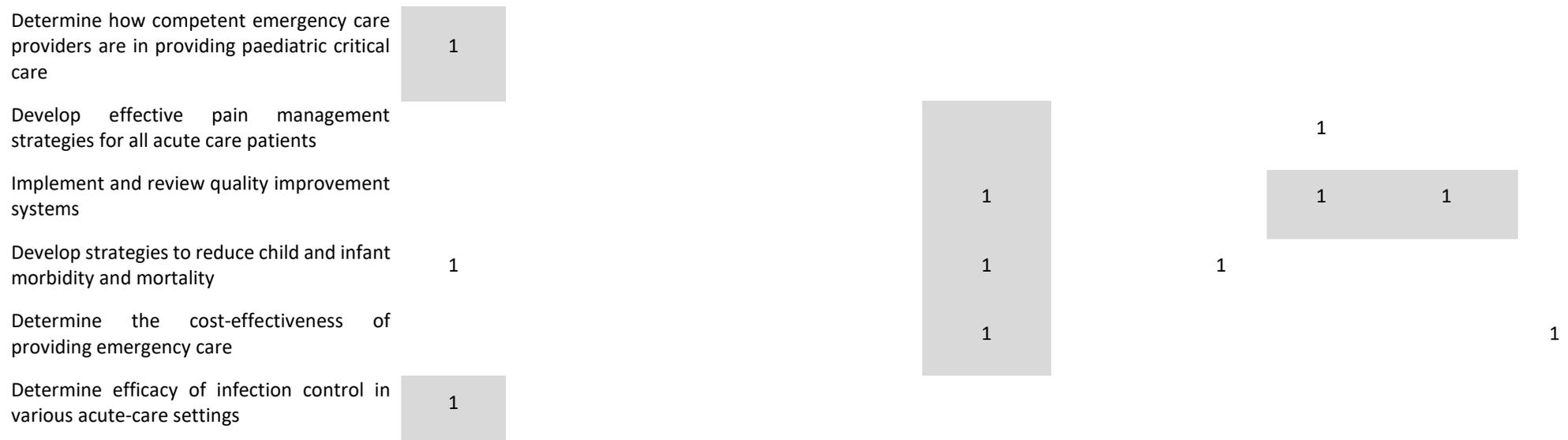
Table 2: A description of publication practices within the Divisions of Emergency Medicine at the University of Cape Town and Stellenbosch University

	Research Publications (N=276)
	% (n)
Journal category	
Emergency Medicine	38 (106)
Speciality journals	22 (60)
General medical	20 (54)
Global Health	4 (12)
Health policy	5 (13)
Prehospital and disaster management	4 (10)
Paediatrics	3 (8)
Nursing	2 (6)
Education and research	1 (3)
Public health	0,7 (2)
Primary health care	0,3 (1)
UCT or SU senior authorship	85 (235)
Published under Open Access	83 (229)

Twenty-four of the 276 publications and 107 theses produced during the study period, mapped to one of the 38 proposed research statements outlined in the van Hoving study in both research statement and design. Nineteen (7%) of the research publications produced during the study period mapped to the research priorities identified in the 2015 van Hoving *et al* (10) study in both research statement and study design (Table 3), while . ten (4%) research publications mapped to the priority list in research statement alone. Of the 107 dissertations and theses produced between 2015 and 2020, five (5%) mapped to the previously identified research priorities in both research statement and study design while only one mapped to the list by research statement alone (Table 4).

Table 3: Research publications from the Division of Emergency Medicine at the University of Cape Town and Stellenbosch University between 2015 and 2020 cross-tabulated against previously identified research priorities

Identified research priorities ^a	Study design										
	Cross-sectional	Case-control	Cohort	Qualitative	Consensus	Systematic review/Meta-analysis	Randomised Controlled Trials	Evaluative	Mixed Methods	Case study or report	Other
Determine which prehospital interventions improve outcomes in trauma or critically ill patients	1										
Determine the most appropriate prehospital management strategies in southern Africa	1										
Optimise the use of resources in terms of transfers and transport in emergency medical services	1			1							
Determine the outcomes of prehospital drug facilitated intubations	1										
Determine an appropriate mass casualty system for South Africa	1										
Determine how competent emergency care providers are in performing common lifesaving skills within their scope of practice			1								
Determine the burden of disease and patient conditions that present to the emergency centre	8								1		
Determine the markers of severity in the trauma or critically ill patient	1			1							
					2						



Only research priorities determined by van Hoving *et al*'s consensus study in 2015 for which at least one publication was a match are indicated here (Total number of priorities identified: 38. Shaded blocks indicate the optimal study design for each research priority. ^a van Hoving DJ, Barnetson BK, Wallis LA. Emergency care research priorities in South Africa. South African Medical Journal. 2015;105: 202-208

Table 4: Dissertations and theses from the Divisions of Emergency Medicine at the University of Cape Town and Stellenbosch University between 2015 and 2020 cross-tabulated against previously identified research priorities

Identified research priorities ^a	Study design										
	Cross-sectional	Case-control	Cohort	Qualitative	Consensus	Systematic review/Meta-analysis	Randomised Controlled Trial	Evaluative	Mixed Methods	Case study or report	Other
Determine the burden of disease and patient conditions that present to the emergency centre	3										
Determine the knowledge and utilisation of non-invasive ventilation by emergency care providers	1										
Determine whether paediatric seizures are managed appropriately by all emergency care providers											1
Implement and review quality improvement systems	1										

Only research priorities determined by van Hoving *et al's* consensus study in 2015 for which at least one dissertation was a match are indicated here (Total number of priorities identified: 38. Shaded blocks indicate the optimal study design for each research priority. ^a van Hoving DJ, Barnetson BK, Wallis LA. Emergency care research priorities in South Africa. South African Medical Journal. 2015;105: 202-208

Discussion

This study presents an evidence map of the recent research outputs produced by the Divisions of Emergency Medicine at UCT and SU, mapped against a framework of priority research topics previously identified by van Hoving *et al* (10) in order to assess whether the previously identified research priorities were successful in guiding recent research activity within the Divisions. The most important finding of this study was that only 24 of the 276 publications and 107 theses produced during the study period, mapped to any of the 38 proposed research statements outlined in the van Hoving study (10). This indicates that most of the research undertaken by the Divisions of Emergency Medicine at UCT and SU between 2015 and 2020 did not use the proposed research priority list to guide their choice of research question.

Health research priority setting processes assist researchers and policymakers in effectively targeting research that has the greatest potential public health benefit (14). Setting priorities for health research is essential to maximize the impact of investments, which is especially relevant in resource-poor environments (14). A proposed explanation for the malalignment of research outputs with consensus research priorities observed in this study, could be because of incongruencies in research interests between investigators and stakeholders or funders that could consequently lead to a misdirection of research to low priority areas, or failure to address the needs of the stakeholders (15). Research may have been conducted out of curiosity or a need for understanding of a particular area of interest, even though the outcomes are not of clinical significance (16). Funders can greatly influence agenda setting and this can result in subsequent outcomes that may not be relevant to the local population that is being studied(4). Unfamiliarity with the Hoving study could be another reason why this research priorities list was not utilised for its intended purpose – to guide research agendas and produce contextually relevant data to inform the development of health policies (9).

The research priorities list outlined in the van Hoving study was very specific regarding research topic and design (10). The study priorities are very clinical focused and were likely strongly influenced by the stage of development of EM within SA in terms of both the providers and the immaturity of the academic programs. In the current study, some research studies matched the research priority topic but not the proposed study design. The study designs suggested by the priorities list largely consist of systematic reviews/meta-analyses, descriptive and non-consensus studies. Our database revealed that only a few systematic reviews were undertaken. Barriers to conducting systematic reviews include, lack of time and financial resources as well as limited knowledge and skill to conduct systematic reviews (17). In some instances, several studies mapped to a single listed research priority.

The van Hoving study identified three main research priority areas: prehospital emergency care, clinical emergency care and general systems and safety management (10). From the research conducted during this 5-year period, four additional categories were identified as common themes: research, education and training, policies and frameworks as well as human resources.

It has been noted that African research is largely supported by international collaboration. Research has shown that 40% of African emergency care publications included authors from outside of Africa and only 12% from countries within Africa (18). This shows that there is a high rate of international collaboration with African research projects (7, 18). We have noted that most of the publications (85%) produced had senior authorship from the divisions of emergency medicine at UCT and SU. This is a good indicator that research is being initiated and driven by local investigators and is an indication of the increased capacity to produce research that is contextually relevant. Local researchers have a greater understanding of the needs of their community and the impact the results will have on emergency care.

While there has been an increase in the amount of research produced in low- and middle-income countries, often the usefulness of the information generated is limited.(4). There is a need to increase the quality of research and reduce research waste in order to have an impact on clinical practice. Research waste can be reduced by asking the right research questions as well as being aware of existing bodies of evidence so that studies are not duplicated. There should be a focus on improving the quality of research. This can be achieved by making sure the appropriate study design and analysis is used and ensuring that research is reported correctly and that the outcomes are transparent (9).

An interesting finding is that just over 40% of the theses produced during this 5-year period were published at the time of this study indicating a low publication rate for student research. A study by Grossman *et al* (19) looking at MMed dissertations in SA from 1996-2017, observed that the publication rate was between 30-60%. Notably MMed dissertations during this period in EM in SA had a publication rate of 67% (19).

A study by van Hoving *et al* (6), showed that not only is a lack of funding a barrier to conducting research but has also limited the publication of research produced. This study identified respondents who would not publish in open access journals if it required publication fees or would only consider publishing if the publication fee was sponsored (6). In addition to this, the publication process comes at the expense of time. It poses the challenge of dedicating time for research while juggling academic curriculum and an overwhelming clinical workload and therefore may not be a priority (20). Registrars who have completed their training and dissertation, simply may have no interest in sacrificing time to

work on journal submission procedures(19). African universities are understaffed with 50% more students per lecturer in Sub-Saharan Africa than the global average (21). Academic supervisory staff shortages means that more students are assigned to one supervisor, this in combination with their academic workload and clinical duties can contribute to publication lag or possibly failure to publish altogether (21).

Open access licences help us to connect to a global community and encourages dissemination of current evidence-based medicine that is considered be “best practice”. Accessibility impacts population health outcomes as it results in better translation of knowledge which can be used to inform future research priority and agenda setting (7). A study by Bruijns *et al.* (7) noted that one in six African emergency care publications are inaccessible to African researchers due to paywalls and costs (7). Our study noted that 83% of the publications were accessible to the reader without subscription or purchasing the article. Open access journals allow free access of published research to the public without a subscription. This often comes at a cost to the author who is responsible for paying article processing charges (APC) to allow access and dissemination of the published work. Grants and waivers are not always accessible, especially to first-time researchers (22).

The open access EM study by Al Hamzy *et al.* (23) showed that the cost of access was much higher for low and lower middle-income countries, and that the cost was 2.24 times more expensive for SA authors than for authors from the United States of America. This study also revealed that the mean APC was \$2518.62, which is a significant expense to a local researcher(23). Although open access is supported by the scientific community the cost implications to the researcher is an important factor that influences the type of journal selected for publication and remains one of the main reasons why research is not published(6, 22).

Limitations

A total of 5 studies were excluded from the data analysis due to limited or incomplete data.

Conclusion

Only 7% of the publications and 5% of the theses produced by the divisions of emergency medicine at UCT and SU mapped to the pre-determined research priorities list outlined in the van Hoving *et al.* (10) in both topic and study design. Possible reasons for this could include a mismatch in research interests between researchers and stakeholders or funders, unfamiliarity with the priorities study or the priorities list. Reasons for this may vary. The results of this evidence map can be used for future research agenda setting.

Dissemination of results

These findings have been shared with the relevant stakeholders at the Divisions of Emergency Medicine at SU and UCT.

Authors contribution

Authors contributed as follow to the conception or design of the work; the acquisition, analysis, or interpretation of data for the work; and drafting the work or revising it critically for important intellectual content: *KM contributed 70%, LLK 10%, HG 10%, CS 10%*. All authors approved the version to be published and agreed to be accountable for all aspects of the work.

Declaration of Competing Interest

The authors declare no conflict of interest.

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APPENDICES

Appendix 1: Author guidelines - African Journal of Emergency Medicine

This manuscript was formatted in accordance with guidelines for authors from the African Journal of Emergency Medicine.

The guidelines are available here: <https://www.elsevier.com/journals/african-journal-of-emergency-medicine/2211-419X/guide-for-authors>

Appendix 2: Research Proposal

Mapping research outputs to previously defined research priorities in an emergency care academic community of practice in South Africa.

Proposal for a study in partial fulfilment of the MMed degree

Principal Investigator (MMed candidate): Dr Kirby Meyer

Division of Emergency Medicine,

Stellenbosch University

Supervisors:

Dr Colleen Saunders

Division of Emergency Medicine,

University of Cape Town

Professor Heike Geduld

Division of Emergency Medicine,

University of Stellenbosch

Dr Lauren Lai King

Division of Emergency Medicine,

University of Cape Town



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ADDENDUM 1

Plagiaatverklaring / *Plagiarism Declaration*

- 1 Plagiaat is die oorneem en gebruik van die idees, materiaal en ander intellektuele eiendom van ander persone asof dit jou eie werk is.
Plagiarism is the use of ideas, material and other intellectual property of another's work and to present is as my own.
- 2 Ek erken dat die pleeg van plagiaat 'n strafbare oortreding is aangesien dit 'n vorm van diefstal is.
I agree that plagiarism is a punishable offence because it constitutes theft.
- 3 Ek verstaan ook dat direkte vertalings plagiaat is.
I also understand that direct translations are plagiarism.
- 4 Dienooreenkomstig is alle aanhalings en bydraes vanuit enige bron (ingesluit die internet) volledig verwys (erken). Ek erken dat die woordelike aanhaal van teks sonder aanhalingsstekens (selfs al word die bron volledig erken) plagiaat is.
Accordingly all quotations and contributions from any source whatsoever (including the internet) have been cited fully. I understand that the reproduction of text without quotation marks (even when the source is cited) is plagiarism.
- 5 Ek verklaar dat die werk in hierdie skryfstuk vervat my eie oorspronklike werk is en dat ek dit nie vantevore in die geheel of gedeeltelik ingehandig het vir bepunting in hierdie module/werkstuk of 'n ander module/werkstuk nie.
I declare that the work contained in this assignment is my original work and that I have not previously (in its entirety or in part) submitted it for grading in this module/assignment or another module/assignment.

Studentenommer / Student number 14601540	Handtekening / Signature 
Voorletters en van / Initials and surname KF Meyer	Datum / Date 31 March 2021

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1. Introduction

1.1 Background

Disease processes that frequently require emergency care constitute approximately 50% of the total disease burden in Low-to-Middle-Income Countries (LMIC).(1) The Disease Control Priorities in Developing countries describe that 54% of the 45 million LMIC deaths annually could be addressed with the development of emergency care systems.(2) These systems cannot be developed and implemented without high quality contextually relevant evidence generated by research in LMICs. Many emergency care interventions have been developed and validated through research conducted in high income countries (HIC).(1) LMICs are faced with a unique set of circumstances and burden of disease (communicable diseases, non-communicable diseases and traumatic injury).(3) Therefore there is a need for relevant, high quality research in LMICs to formulate and improve emergency care guidelines appropriate for this clinical setting. Applying the guidelines developed in a HIC to LMICs has its constraints: heterogeneity in resources and population demographics, as well as insufficient data availability.(1) Emergency care research that is contextually relevant to LMICs will not only positively influence practice but also affect policy making and provide reliable data to be presented to stakeholders to implement change.(1) By conducting emergency care research in LMICs, morbidity and mortality will be greatly impacted.(1)

Emergency medicine (EM) in Africa exists in various stages of development. The medical literature produced can serve as a surrogate indicator of the development in the field of EM.(2) There has been a steady increase in EM literature produced in Africa, which signifies growth in the field.(2) In a scoping review conducted by Mould-Millman et al. describing EM research in Africa over a 15 year span (1999-2014), it was noted that published research in the field of emergency medicine had increased by ten-fold. The majority of the studies (75%) were noted to be observational studies.(2)

Barriers to research in EM most frequently identified in Africa are: Lack of funding, lack of research training and lack of time allocated for research.(4) There are various other research barriers in the LMIC setting. There is often difficulty in defining long term research outcomes due to resource limitations. Research outcomes in this setting are usually defined by results available within hours of the intervention, long term morbidity and mortality is usually not measured. Data collection and analysis is often challenging in this setting; data collection is mainly impacted by the acute time sensitive nature of the intervention along with the dynamic overburdened infrastructure. Data analysis is often impacted by symptoms-based diagnoses, the availability of triage information and other confounding factors. Data capturing is not often prioritized in these overburdened resource poor settings and there is also an underutilization of diagnostic codes.(5) Ethical concerns arising from research in LMICs range from privacy to the ability to obtain informed consent in the

emergency setting. (5) Another perceived barrier to research in LMIC is the capacity for research in emergency medicine. Emergency care in many LMICs remains a hospital service with no academic backing from universities and therefore emergency care research is often not prioritized. (5)

Given the limited resources available for conducting impactful clinical research in LMICs, it is important to utilize these resources wisely. Research waste is created when the wrong or irrelevant research questions are being asked.(6) Clinical research needs to add value to the population being studied and should not be undertaken merely out of curiosity. Clinical research has to have priority research aims as it is a major contributor to informed decision making.(6) Also, clinical research should not be undertaken if there is enough data available on a particular research topic.(6). Evidence mapping can be used to depict which areas are well studied and which areas require further research as it can act as a tool to help in identifying knowledge gaps and in turn help set agendas for future research.(7)

In 2012-2013, van Hoving et al. conducted a three phased modified Delphi study which generated a list of priority research topics in emergency care in South Africa.(8) It took into account SA's unique quadruple burden of disease as well as the need for development of emergency care in SA to produce a list of research topics which were contextually relevant. Thirty-nine statements related to emergency care were identified as high priority in the South African setting. These statements formed part of three main categories: Prehospital emergency care, clinical emergency care and general system and safety management.(8) The emergency care research priority list generated from this study is aimed to guide local researchers toward locally important topics to ensure evidence based care that is relevant to the South African population. (8)

Emergency Medicine was officially recognized as a specialty in 2003 in South Africa, and therefore local research capacity and outputs are still emerging.(9) The University of Cape Town (UCT) was the first South African institution to offer a specialist exit degree in Emergency Medicine and hosts the largest emergency medicine training program in Africa.(9) The Division of Emergency Medicine at UCT runs five postgraduate programmes of which four require research outputs as part of their fulfilment criteria. The Divisions of Emergency Medicine at UCT and Stellenbosch University are responsible for a large proportion of research outputs in emergency medicine in South Africa. (9)

Researchers and students at these two divisions have published more than 200 research articles since the van Hoving et al. publication in 2015.(8) It is unclear whether the research outputs produced after the publication of the Delphi study, conducted by van Hoving et al. match those on the outlined priority topic list. Reviews and evaluations of an evidence-base can take various forms including systematic reviews, meta-analyses, and scoping reviews.(7) Another emerging method is that of evidence mapping. Evidence mapping is defined as a systematic search of a broad field to identify gaps in knowledge and or future research needs, that presents

results in a user-friendly format, often a visual figure or graph or a searchable database.(7) Mapping the 5-year research outputs from the Divisions of Emergency Medicine at UCT and Stellenbosch University against the research priorities identified previously will allow evaluation of the progress in filling these knowledge gaps and building a locally relevant emergency care evidence base.

1.2 Aims and Objectives

The aim of this study is to create an evidence map of the recent research outputs produced by the Divisions of Emergency Medicine at UCT and Stellenbosch University against a framework of previously identified priority research topics in order to identify ongoing knowledge gaps.

The following objectives are outlined as follows:

- 1) To map the research outputs between January 2015 and December 2020 against a framework of priority research topics identified in a previous Delphi study (van Hoving et al, 2015)
- 2) To identify continuing knowledge and research gaps in priority areas that needs to be addressed.

2. Methodology

2.1 Study design

The proposed study is an evaluative study design using an evidence mapping approach. This is an emerging methodology and we have drawn on the work of Saran and White (10) and Miake-Lye et al. (7) in designing this study.

2.2 Data collection

The research outputs database captures all research outputs including an affiliated author since 2005. The Google Scholar, Scopus and Web of Science online databases will be purposively searched to identify research outputs published between January 2015 and December 2020 with at least one author affiliated with the Divisions of Emergency Medicine at UCT or Stellenbosch University and ensure that the database is as complete as possible. All research outputs produced by the two Divisions from 2015 to 2020 will be included in the data analysis. Articles accepted for publication but not yet published, as well as dissertations submitted for marking but not yet passed, will be excluded from analysis.

The research outputs will be categorised into four main categories: Prehospital emergency care, clinical emergency care, general systems and safety management as well as “other” for research that does not fall into any of the three categories outlined on the research priorities list. Outputs will be categorised based on review

of the title, abstract and keywords. Categorisation of research outputs will be performed independently by two reviewers, with a third acting as a deciding reviewer.

The data abstracted from each included research output will include:

- Title of the study
- Keywords
- Study design
- Study setting
- Study population and sample size
- Year published
- Journal name and open access category
- Journal impact factor and metrics
- Affiliated author listed as 1st or last author

2.3 Data analysis

The research outputs will be cross-tabulated by study design against the previously identified research priority list outlined in the van Hoving et al. (2015) study (8). Four such tables (see example Table 1) will be generated, one for each of the following categories: Prehospital emergency care, Clinical emergency care and general systems and safety management (8).

Descriptive statistics will be used to describe research outputs by year, publication practices and broad indicators of collaboration.

Table 1: Sample table for cross-tabulation of research outputs in prehospital emergency care

Priority research topics	Controlled Trial	Experimental	Observational analytic: cohort	Observational analytic: cross-sectional	Observational analytic: case-control	Descriptive	Evaluative
Prehospital interventions to improve outcomes in trauma or critically ill patients							
Appropriate prehospital management strategies							
Evidence based guidelines for the critical care transfer of patients							
Outcomes of prehospital drug facilitated intubations							
Appropriate mass casualty system for southern Africa							
Define the role of aeromedical transport in rural areas							

3. Ethical considerations

All research outputs included in this study will be in the public domain. No human participants, nor sensitive data from human participants, will be included in this study. There are therefore no risks to participants and ethical approval is not required for this study.

4. Strengths and limitations

The evidence map generated will help to identify research gaps and help agenda setting for future research. It will provide critical information to sponsors and stakeholders as to the number of studies already undertaken in a particular field or the lack thereof, thereby minimising research waste and encourages relevant research to be undertaken.

The research priority study conducted by van Hoving et al. represented expert consensus from all provinces in South Africa. This study only looks at research outputs produced by the Divisions of Emergency Medicine at UCT and Stellenbosch University and is not a representation of research in South Africa as a whole. This study provides a road map for future research but does not guarantee that the research gaps will be filled in the future.

5. Reporting and implementation of results

The findings of this study will help to identify research gaps in emergency care in the Western Cape and provide stakeholders with information regarding the current body of evidence available so that future research is relevant and useful. The findings will be written up in thesis format and shared with local stakeholders. The findings will be used to inform the development of a research strategy for the Divisions of Emergency Medicine at UCT and Stellenbosch University.

6. Resource utilisation and budget

Item	Cost
Principal Investigator (Compensation)	R0.00
Consulting services	R0.00
Statistical Services	R0.00
Transport	R0.00
Internet & Telephone	R1500
Printing and copying	R0.00

7. Timeline

EMDRC Approval	December 2020
Ethical Approval	April 2021 - May 2021
Data Collection and Analysis	December 2020 - May 2021
Write up	May 2021 - July 2021

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Appendix 3: University of Stellenbosch Health Research Ethics Committee letter of approval



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Approval Notice

New Application

04/08/2021

Project ID: 22066

HREC Reference No: X21/04/008

Project Title: Mapping research outputs to previously defined research priorities in an emergency care academic community of practice in South Africa.

Dear Dr. Kirby Meyer

The **New Application** received on 15/04/2021 05:27 was reviewed by members of **Health Research Ethics Committee** via **minimal risk review** procedures on 04/08/2021 and was approved.

Please note the following information about your approved research protocol:

Protocol Approval Date: 04 June 2021

Protocol Expiry Date: 03 June 2022

Please remember to use your Project ID 22066 and Ethics Reference Number X21/04/008 on any documents or correspondence with the HREC concerning your research protocol.

Please note that the HREC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

After Ethical Review

Translation of the informed consent document(s) to the language(s) applicable to your study participants should now be submitted to the HREC.

Please note you can submit your progress report through the online ethics application process, available at: [Links Application Form Direct Link](#) and the application should be submitted to the HREC before the year has expired. Please see [Forms and Instructions](#) on our HREC website (www.sun.ac.za/healthresearchethics) for guidance on how to submit a progress report.

The HREC will then consider the continuation of the project for a further year (if necessary). Annually a number of projects may be selected randomly for an external audit.

Please note that for studies involving the use of questionnaires, the final copy should be uploaded on Infonetica.

Provincial and City of Cape Town Approval

Please note that for research at a primary or secondary healthcare facility, permission must still be obtained from the relevant authorities (Western Cape Department of Health and/or City Health) to conduct the research as stated in the protocol. Please consult the Western Cape Government website for access to the online Health Research Approval Process, see: <https://www.westerncape.gov.za/general-publication/health-research-approval-process>. Research that will be conducted at any tertiary academic institution requires approval from the relevant hospital manager. Ethics approval is required BEFORE approval can be obtained from these health authorities.

We wish you the best as you conduct your research.

For standard HREC forms and instructions, please visit: [Forms and Instructions](#) on our HREC website <https://applyethics.sun.ac.za/ProjectView/Index/22066>

If you have any questions or need further assistance, please contact the HREC office at 021 938 9677.

Yours sincerely,

Mrs. Brightness Nxumalo
HREC 2 Coordinator

National Health Research Ethics Council (NHREC) Registration Number:

REC-130408-012 (HREC1)•REC-230208-010 (HREC2)