

FAMILY AND EMERGENCY MEDICINE RESEARCH: 2019

*Department of Family and Emergency Medicine, Faculty of
Medicine and Health Sciences, Stellenbosch University*





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FAMILY AND EMERGENCY MEDICINE RESEARCH: 2019



Family physicians assist with community screening and testing for COVID-19

INTRODUCTION



This booklet presents the research output from the Department of Family and Emergency Medicine, Faculty of Medicine and Health Sciences at Stellenbosch University for the year 2019. The research projects that were completed or published during this year are presented in abstract format. An email address for one of the authors is given for each abstract and a link to the full publication where appropriate.

An important part of the research process is the dissemination of the findings to stakeholders and policymakers, particularly the Department of Health in the Western Cape where the majority of the research was performed.

We realise that many people may even be too busy to read the abstracts and therefore we have tried to capture the essential conclusions and key points in a series of “sound bites” below. Please refer to the abstract and underlying study for more details if you are interested.

We have framed this body of work in terms of a typology suggested by John Beasley and Barbara Starfield:

Basic research: Studies that develop the tools for research

Clinical Research: Studies that focus on a particular disease or condition within the burden of disease.

Health Services Research: Studies that focus on cross-cutting issues of performance in the health services and relate to issues such as access, continuity, co-ordination, comprehensiveness, efficiency or quality.

Health Systems Research: Studies that speak more to the broader health system and development of policy.

Educational Research: Studies that focus on issues of education or training of health workers for primary care.

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“SOUND BITES” FOR POLICY AND DECISION MAKERS

Basic

The amount of published African emergency medicine research is increasing and the African Journal of Emergency Medicine is key to this, as well as providing publication support for junior researchers. Much of the important research is still not easily available in low- and middle-income countries and there is a need for more open access publishing. Research in the prehospital environment is still unusual and the obstacles and affordances to performing such clinical research are described.

Clinical research

HIV and TB

HIV adherence clubs were shown to be effective in retaining people in care: when targeted at stable clients, with more than 20 members, led by a counsellor, using community venues, good communication and provision of pre-packaged medication.

Renal dysfunction was found to be low in new patients with HIV (1.9%) and an uncommon complication in those started on tenofovir (1.7%). Renal dysfunction was more common in those with a very low CD4 count.

In the Witzenberg sub-district, TB contact tracing was deficient; but a typical quality improvement cycle, focusing on the system for contact management, showed an improvement in identification of contacts (27% to 55% of contacts), screening of contacts (55% to 96%) and investigation of those that screened positive (85% to 100%).

Urinary LAM testing is a useful additional test for TB (particularly extra-pulmonary) in HIV positive patients in South Africa. This study showed that point of care (POC) testing for LAM is just as good as laboratory testing, which may save time and cost in clinical practice. Another review showed that abdominal ultrasound has a low sensitivity for abdominal TB and there will be many false negatives.

A quality improvement project on infection prevention and control in the Garden Route showed no improvement, despite support from policy and management. This was attributed to an ability to change healthcare worker behaviour.

Non-communicable diseases

The Health Choices at Work programme was implemented at a commercial power station in the Western Cape and demonstrated a significant effect on risk factors for non-communicable diseases. The programme targeted the whole organisational environment - food vendors, access to physical activity, risk assessment, feedback and counselling by health care workers as well as managerial buy-in and support. There were significant improvements in fruit and vegetable intake, physical activity, alcohol use, blood pressure, cholesterol and psychosocial stress. The intervention appeared very cost-effective (\$1 per employee over 1-year). The workplace should be targeted more actively as a location for health promotion and disease prevention.

Family Medicine had previously developed a model of brief behaviour change counselling based on the 5As and a guiding style for primary care providers. An assessment tool to observe and provide valid and reliable feedback was developed and can be used for both training and research.

Family physicians in sub-Saharan Africa need more training in patient counselling and lifestyle modification and also need to pay more attention to their own healthy lifestyle.

Building on previous work to develop Group Empowerment and Training (GREAT) for diabetes, a study of very uncontrolled people with type 2 diabetes in Khayelitsha showed significant improvement in glycaemic control. This improvement was mainly attributed to the introduction of GREAT for diabetes.

In the Cape Winelands, home-based care from community health workers (CHW) for people with a recent stroke was delayed, brief and fragmented. Caregivers had considerable strain, which persisted over time. Patient and caregiver satisfaction was low, just under half of assisted product needs were met and there were many environmental barriers to improved function. Findings supported the need to train CHWs in helping caregivers and stroke survivors. In African hospitals other research described a lack of access of specialised radiological diagnostic and neurology services for stroke survivors.

Maternal and child health

In the Garden Route a study showed that 41% of pregnant women had post-natal depression. Rates of depression were similar in antenatal care. Screening for depression should be routine in pregnant women.

Violence and trauma

A survey of trauma patients in Northern Namibia showed that they were mostly young men with accidental injuries (68%) from blunt trauma. Alcohol was involved in 29% of cases and most trauma occurred after hours and on weekends. A study in Cape Town also emphasised the importance of alcohol on trauma burden, but found inter-personal (non-accidental) violence was particularly important amongst youth.

Deaths from burns at Tygerberg Hospital burns unit was related to delayed referral, being female and the size of the burns. The Abbreviated Burn Severity Score (ABSI) had a moderate sensitivity (84%) and specificity (86%) for predicting mortality. In Tanzania the mHealth Burns App was found to be useful and acceptable to clinicians, with some limitations from internet and cellphone availability.

Deaths from gunshot injuries were not predicted by a variety of injury severity scores that were tested at Khayelitsha District Hospital.

Trauma is the most common indication for use of emergency blood. Ongoing monitoring of the indications for which emergency blood is used, improved transfusion stewardship and better systems to access emergency blood should be a priority in this setting.

Point of care ultrasound (POCUS) as a diagnostic tool made no difference to the care delivered for patients in hypotensive shock in an international study. Likewise, POCUS did not help to predict outcome in non-traumatic, non-shockable cardiac arrest (asystole).

Marine envenomation and poisonings are surprisingly rare, given the large coastline we have in this country. Likewise, the incidence of severe scorpion stings and toxicity, reported to the poisons unit at Tygerberg Hospital, was low. Care should be taken when children are involved and when calls are received more than six hours after the sting.

Health services and systems

An analysis of primary care performance in South Africa using the Primary Care Assessment Tool found that the poorest aspects of service delivery were first contact access, ongoing care and community orientation. Areas that were moderately weak included first contact utilisation, informational coordination and family orientation. Strongest areas were comprehensiveness, coordination, cultural competence and availability of the team.

The cost-awareness of rural doctors, with regards to the cost of investigations, was poor and only accurate for 23% of investigations. Doctors wanted to be more aware and needed both training on cost awareness as well as easy access to information on cost.

Coordination of referrals in the Western Cape between primary care and hospital outpatients was poor, with feedback available in only 39% of patients and the patient being the main source of feedback in 53% of cases. Effort needs to be made to improve transfer of information between outpatients and primary care.

At a large district hospital, 22% of unplanned visits were avoidable if prior visits had included a longer hospital stay, better management of chronic diseases/HIV or had taken into account decreased mobility. Readmissions (37% of admissions) were related to diagnostic error in the first admission, complications of the first admission or too early discharge from hospital.

A new model for evidence based guidelines in primary care was developed. The model emphasised the need for more evidence and input from primary care in development of guidelines, contextualisation of national guidelines at the organisational level (including adaptation and creation of tools), dissemination and strategies for implementation that included interactive training, audit and feedback.

Six key characteristics of more resilient family physicians were identified: a sense of purpose, 'silver-lining' thinking, having several roles and autonomy, skilful leadership, a supportive network and attention to self-care.

Private general practitioners' attitudes towards national health insurance (NHI) were explored in Cape Town and the Eastern Cape. Rural general practitioners (GP) were more positive than urban GPs about the proposed NHI and saw potential benefits for their patients as well as themselves. All GPs were concerned about government capacity to deliver and needed more information on the package of care, accreditation, remuneration and patient registration. GP were worried about small practices or solo practitioners. More engagement and dialogue was needed with government.

A scoping review of community orientated primary care in Africa identified 9 key principles and several factors influencing implementation. Research was mostly focused on implementation and there were few recent studies on effectiveness.

An international expert panel on mHealth in low resource settings developed consensus recommendations in order to promote the ethical development of and use of mHealth diagnostic tools, in order to safeguard users and patients alike.

A study developed locally appropriate quality indicators for prehospital care, which can help emergency medical services to benchmark themselves and improve performance.

The suboptimal availability and functionality of equipment at district-level and higher is a modifiable barrier to the provision of high quality paediatric emergency care.

Planning for mass gathering events requires estimates of services and risk. The SA Mass Gathering Model, when compared against real events, is not yet fully calibrated and creates the opportunity to refine the model with new data.

Education

At Stellenbosch University, students' expectations and experiences of clinical rotations suggested that rotations were valued for the opportunity to apply knowledge, develop skills as well as professional identity. Students however seemed to lack agency in negotiating participation in the workplace in order to make best use of the opportunity and still expected more traditional teaching.

At Sefako Makgatho University, students were mostly positive about their curriculum, but needed a better support system and better social life. They also needed coordinators to be less authoritarian and more approachable, and to have a more student-centred approach to teaching, with less emphasis on recalling facts.

In postgraduate family medicine training the switch to an e-portfolio was largely positive. The e-portfolio was easy to use and access. It enabled better monitoring of progress and evidence of learning. Feedback was easier and more explicit, but the quality could still be improved. Usage of the e-portfolio was higher than the paper-based version. It should however not replace face to face interaction.

There is a paucity of mentoring resources specifically designed for LMIC settings. We identified several toolkits that focus on aspects of individual mentor-mentee relationships that could be adapted to local contexts. Future work should focus on adaptation and the development of tools to support institutional change and capacity building for mentoring.

BASIC RESEARCH



Members and students of the Division attended a virtual workshop on the use of personal protective equipment.

The psychometric properties of a tool to assess brief behaviour change counselling, South Africa

Jani Fouche, Robert Mash (rm@sun.ac.za), Zelra Malan

Objective: To evaluate the validity and reliability of a tool to assess a new model of brief behaviour change counselling (BBCC) in South Africa.

Methods: Exploratory sequential mixed methods included initial qualitative feedback from an expert panel to assess validity, followed by quantitative analysis of internal consistency, inter- and intra- rater reliability. Six raters assessed 33 randomly selected audiotapes from a repository of 123 tapes of BBCC at baseline and 1 month later.

Results: Changes to the existing tool involved item changes, added items, as well as grammatical and layout changes. The 'ABC tool' had good overall internal consistency (Cronbach alpha 0.955), inter-rater (Intra-class correlation (ICC) 0.813 at follow up) and intra-rater reliability (Pearson's correlation 0.899 and $p < 0.001$). Sub-scores for the Assist (ICC 0.784) and Arrange (ICC 0.704) stages had lower inter-rater reliability than the sub-scores for Ask (ICC 0.920), Alert (ICC 0.925) and Assess (ICC 0.931).

Conclusion: The ABC tool is sufficiently reliable for the assessment of BBCC. Minor revisions may further improve the reliability of the tool, particularly for the sub-scores measuring Assist and Arrange. The ABC tool can be used in clinical training or research studies to assess fidelity to this model of BBCC.

A prehospital randomised controlled trial in South Africa: Challenges and lessons learnt

Willem Stassen, Lee Wallis (leew@sun.ac.za), Maaret Castren, Craig Vincent-Lambert, Lisa Kurland

Abstract: The incidence of cardiovascular disease and STEMI is on the rise in sub-Saharan Africa. Timely treatment is essential to reduce mortality. Internationally, prehospital 12 lead ECG telemetry has been proposed to reduce time to reperfusion. Its value in South Africa has not been established. The aim of this study was to determine the effect of prehospital 12 lead ECG telemetry on the PCI-times of STEMI patients in South Africa. A multicentre randomised controlled trial was attempted among adult patients with prehospital 12 lead ECG evidence of STEMI. Due to poor enrolment and small sample sizes, meaningful analyses could not be made. The challenges and lessons learnt from this attempt at Africa's first prehospital RCT are discussed. Challenges associated with conducting this RCT related to the healthcare landscape, resources, training of paramedics, rollout

and randomisation, technology, consent and research culture. High quality evidence to guide prehospital emergency care practice is lacking both in Africa and the rest of the world. This is likely due to the difficulties with performing prehospital clinical trials. Every trial will be unique to the test intervention and setting of each study, but by considering some of the challenges and lessons learnt in the attempt at this trial, future studies might experience less difficulty. This may lead to a stronger evidence-base for prehospital emergency care.

Publication: Stassen W, Wallis L, Castren M, Vincent-Lambert C, Kurland L. A prehospital randomised controlled trial in South Africa: Challenges and lessons learnt. African journal of emergency medicine. 2019 Sep 1;9(3):145-9.

Dissemination patterns of scientific abstracts presented at the first and second African Conference of Emergency Medicine

Marlin Abrams, Stevan R. Bruijns, Daniel J. van Hoving (nvhoving@sun.ac.za)

Introduction: Evidence based medicine is the standard of modern health care practices. Ongoing biomedical research is needed to expand existing knowledge and improve quality of care, but it needs to reach clinicians to drive change. Journal articles and conference presentations are dissemination tools. The aim of the study was to establish the publication rate of scientific abstracts presented at the first and second African Conference of Emergency Medicine. The secondary objectives were establishing non-publication dissemination and the factors associated with publication and non-publication. Determining non-publication dissemination patterns and the factors associated with reasons for publishing or non-publication were also investigated.

Methods: Presenters of the 129 scientific abstracts from the first and second African Conference of Emergency Medicine were invited to participate in an online survey. The survey was followed by a manual literature search to identify published manuscripts of authors that did not complete the survey, in order to determine the most accurate publication rate.

Results: Thirty-one presenters responded (24%), of which 18 published in a peer-reviewed journal. An additional 25 publications were identified by the literature search. The overall

publication rate was 33.3% (26.9% from 2012 and 40.3% from 2014). Oral presentations were more likely to be published ($p=0.09$). Sixteen manuscripts (37.2%) were published in the African Journal of Emergency Medicine. Presentations at local academic meetings were the most used platform beyond publication (43%). The main reason to publish was to add to the body of knowledge (100%), while lack of time (57%) was the major obstacle for not publishing.

Conclusion: The overall publication rate for the first and second African Conferences of Emergency Medicine is comparable to other non-African Emergency Medicine conferences. The increasing publication trend between conferences might reflect the development of regional research capacity. Emergency Medicine providers in Africa need to be encouraged to participate in high quality, locally relevant research and to distribute those findings through accessible formats.

Publication: Abrams M, Bruijns SR, van Hoving DJ. Dissemination patterns of scientific abstracts presented at the first and second African Conference of Emergency Medicine. African Journal of Emergency Medicine. 2019 Jun 1;9(2):101-5.

Access to Top-Cited Emergency Care Articles (Published Between 2012 and 2016) Without Subscription

Murad Al Hamzy, Dominique de Villiers Megan Banner,
Hein Lamprecht (hl@sun.ac.za), Stevan R. Bruijns

Introduction: Unrestricted access to journal publications speeds research progress, productivity, and knowledge translation, which in turn develops and promotes the efficient dissemination of content. We describe access to the 500 most-cited emergency medicine (EM) articles (published between 2012 and 2016) in terms of publisher-based access (open access or subscription), alternate access routes (self-archived or author provided), and relative cost of access.

Methods: We used the Scopus database to identify the 500 most-cited EM articles published between 2012 and 2016. Access status was collected from the journal publisher. For studies not available via open access, we searched on Google, Google Scholar, Researchgate, Academia.edu, and the Unpaywall and Open Access Button browser plugins to locate self-archived copies. We contacted corresponding authors of the remaining inaccessible studies for a copy of each of their articles. We collected article processing and access costs from the journal publishers, and then calculated relative cost differences using the World Bank purchasing power parity index for the United States (U.S.), Germany, Turkey, China, Brazil, South Africa, and Australia. This allows costs to be understood relative to the economic context of the countries from which they originated.

Results: We identified 500 articles for inclusion in the study. Of these, 167 (33%) were published in an open access format. Of the remaining 333 (67%), 204 (61%) were available elsewhere on the internet, 18 (4%) were provided by the authors, and 111 (22%) were accessible by subscription only. The mean article processing and access charges were \$2,518.62 and \$44.78, respectively. These costs were 2.24, 1.75, 2.28 and 1.56 times more expensive for South African, Chinese, Turkish, and Brazilian authors, respectively, than for U.S. authors ($p < 0.001$ all).

Conclusion: Despite the advantage of open access publication for knowledge translation, social responsibility, and increased citation, one in five of the 500 EM articles were accessible only via subscription. Access for scientists from upper-middle income countries was significantly hampered by cost. It is important to acknowledge the value this has for authors from low- and middle-income countries. Authors should also consider the citation advantage afforded by open access publishing when deciding where to publish. [West J Emerg Med. 2019;20(3)460–465.]

Publication: Al Hamzy M, De Villiers D, Banner M, Lamprecht H, Bruijns SR. Access to Top-Cited Emergency Care Articles (Published Between 2012 and 2016) Without Subscription. Western Journal of Emergency Medicine. 2019 May;20(3):460.

CLINICAL RESEARCH



*Palliative care ward round at George Hospital
during COVID-19*

The impact of intensified clinical care on glycaemic control in patients with type 2 diabetes at Khayelitsha Community Health Centre, South Africa: Quasi-experimental study

Josh Allerton, Robert Mash (rm@sun.ac.za)

Aim: The aim was to evaluate the effect on glycaemic control of more intensive care for patients with very uncontrolled type-2 diabetes (HbA1c > 10%) at Khayelitsha Community Health Centre, South Africa.

Methods: A pragmatic, quasi-experimental study. Patients with HbA1c > 10% were consecutively selected into a 6-month programme of intensified care involving monthly visits to a doctor, diabetes group education, escalation of treatment, and more frequent HbA1c testing by either point-of-care (POC) or laboratory. Participants were their own controls in a retrospective analysis of usual care during the previous year.

Results: At baseline 236 patients had a mean HbA1c of 12.1%. The mean difference in HbA1c in the intervention group was -1.1% ($p < 0.001$). The intervention group were exposed to group diabetes education (100% vs 0%), more visits (3.8 vs 3.2, $p < 0.001$), more HbA1c tests (2.2 vs 0.9, $p < 0.001$). There was no difference in increased dose of insulin between the groups or between POC and standard laboratory intervention sub-groups.

Conclusion: The introduction of group diabetes education was the most likely explanation for improved glycaemic control in this poor, under-resourced, public sector, peri-urban setting. The study demonstrates a feasible approach to improving diabetes care in the South African context.

Publication: Allerton J, Mash R. The impact of intensified clinical care on glycaemic control in patients with type 2 diabetes at Khayelitsha Community Health Centre, South Africa: Quasi-experimental study. *Primary Care Diabetes*. 2020 Apr 1;14(2):97-103.

Tuberculosis contact management in the Witzenberg sub-district of the Western Cape South Africa: A quality improvement cycle.

Karlien Doubell, Michael Pather (mpather@sun.ac.za)

Background: Tuberculosis places a tremendous burden on our community and on the health care system of South Africa, especially the Western Cape. Much effort should go towards improving tuberculosis control, with subsequent improvement of community health. Contact tracing and management has long been part of the global strategy to control tuberculosis. Objectives of contact tracing and management are early detection and treatment of patients with active tuberculosis, which may decrease morbidity and prevent mortality in the infected patient, as well as interrupt tuberculosis transmission. The aim of this study was to evaluate and improve the tuberculosis contact management programme of the primary health care (PHC) clinics in the Witzenberg sub-district of the Cape Winelands in the Western Cape of South Africa.

Methods: A quality improvement (QI) cycle, evaluating and improving tuberculosis contact management of the PHC clinics was performed; including baseline as well as follow-up programme evaluation, focusing on adequacy assessment and an outcomes evaluation. The study population included adults who had laboratory confirmed pulmonary tuberculosis and who received treatment at the PHC clinics. A multifaceted intervention was implemented by the QI team, with the aim to improve tuberculosis contact management as a whole. The main focus was on improving the proportion of contacts screened, documentation of the symptoms screen and the proportion of symptomatic contacts who had appropriate investigations.

Results: The QI team identified three key areas for improvement, one of which was that the basics of contact management was not being performed: i.e. screening for symptoms, documenting result of screen and investigating symptomatic contacts. A multifaceted change plan to address this gap identified, was implemented. During baseline and follow-up data collection, 198 index patient files and 141 index patient files were reviewed respectively, with 466 contacts identified during baseline data collection and 364 contacts identified during follow-up data collection. At baseline 174 (87.9 %) of index patients and at follow-up 128 (87.9 %) of index patients were interviewed and contacts identified. Total contacts who had been screened for symptoms of tuberculosis improved from 124 (26.6 %) to 198 (54.7 %) ($P < 0.001$), with screened contacts older than 5 years having a documented result improved from 46 (54.8 %) to 156 (96.3 %) ($P < 0.001$). Symptomatic contacts older than 5 years having appropriate special investigations done improved from 17 (85 %) to 28 (100%) ($P = 0.041$). All contacts older than 5 years diagnosed with tuberculosis had been initiated on treatment at baseline and follow-up data collection.

Conclusion: This study suggests that a multifaceted QI approach involving key role-players in tuberculosis contact management at PHC level can improve certain aspects of tuberculosis contact management.

Institutional tuberculosis infection control in a rural sub-district in South Africa: A quality improvement study

Martha B. Mekebeb, Klaus von Pressentin, Louis S. Jenkins (louis.jenkins@westerncape.gov.za)

Background: Tuberculosis (TB) is a major global health challenge, and South Africa is one of the high-burden countries. A national TB infection control (TBIC) guideline has stipulated three areas of infection control at health facilities: work practice and administrative control, environmental control, and personal protection for health workers.

Aim: The aim of this study was to identify the gaps and address the challenges in institutional TBIC. Setting: The district hospital and a primary health care clinic within the Mossel Bay sub-district in the Western Cape.

Methods: According to the national TBIC draft guideline, a quality improvement cycle was used to evaluate and improve TBIC. Each facility had an existing infection and prevention control and occupational health and safety team, which were used as the audit teams.

Results: A baseline assessment was followed by a set of interventions, which did not show a significant improvement in TBIC. The difference between the pre- and post-intervention TB screening rate was not

statistically significant. An assessment of time interval between 101 patients presenting with TB symptoms and diagnosed with TB was 4 days at baseline and post-intervention. Most of the anticipated improvements were dependent on the health workers' adherence to the local TBIC policies, which emerged as an unexpected finding.

Conclusion: We found good managerial commitment reflected by the presence of various policies, guidelines, specific personnel and committees to deal with infection control in general. This study has created awareness about TBIC among staff and pointed out the complexity of health workers' behaviour towards adhering to policies.

Publication: Mekebeb MB, Von Pressentin K, Jenkins LS N. Institutional tuberculosis infection control in a rural sub-district in South Africa: A quality improvement study. Afr J Prm Health Care Fam Med. 2019;11(1), a1971. <https://doi.org/10.4102/phcfm.v11i1.1971>

The real-world performance and inter-observer agreement of urine lipoarabinomannan in diagnosing HIV-associated tuberculosis in an emergency center

Van Hoving DJ (nvhoving@sun.ac.za), Sa'ad L, Jaco LH, Patrick NM, Gary M, Meintjes G.

Background: The urine lipoarabinomannan (LAM) lateral flow assay is a point-of-care test to diagnose HIV-associated tuberculosis (TB). We assessed the performance of urine LAM in HIV positive patients presenting to the emergency center and evaluated the inter-observer agreement between emergency center physicians and laboratory technologists.

Setting: A cross-sectional diagnostic study was performed at the emergency center of a district hospital in a high HIV-prevalence community in South Africa.

Methods: Consecutive HIV-positive adults presenting with ≥ 1 WHO TB symptom were enrolled over a 16-month period. A urine LAM test was done at point-of-care by an emergency physician, and interpreted independently by two physicians. A second test was done in the laboratory, and interpreted independently by two laboratory technologists. The reference standard was a positive TB culture or Xpert MTB/RIF test on sputum, or appropriate extra-pulmonary samples. We compared diagnostic accuracy and reproducibility of urine LAM between point-of-care readers and laboratory readers.

Results: 1388 samples (median, 3 samples/participant) were sent for TB microbiology tests in 411 participants; 170 had confirmed TB (41.4%). Point-of-care and laboratory-performed urine LAM had similar sensitivity (41.8% vs 42.0%, $p=1.0$) and specificity (90.5% vs 87.5%, $p=0.23$). Moderate agreement was found between point-of-care and laboratory testing ($\kappa=0.62$), but there was strong agreement between point-of-care readers ($\kappa=0.95$) and between laboratory readers ($\kappa=0.94$). Positive percent agreement between point-of-care and laboratory readers was 68%, and negative percent agreement 92%.

Conclusion: There is no diagnostic accuracy advantage in laboratory-performed versus point-of-care performed urine LAM tests in emergency care centers in high burden settings.

Publication: van Hoving DJ, Sa'ad L, Jaco LH, Patrick NM, Gary M, Meintjes G. The real-world performance and inter-observer agreement of urine lipoarabinomannan in diagnosing HIV-associated tuberculosis in an emergency center. *JAIDS Journal of Acquired Immune Deficiency Syndromes*. 2019 Mar 29.

Abdominal ultrasound for diagnosing abdominal tuberculosis or disseminated tuberculosis with abdominal involvement in HIV positive individuals.

Van Hoving_DJ (nvhoving@sun.ac.za), Griesel_R, Meintjes_G, Takwoingi_Y, Maartens_G, Ochodo_EA.

Background: Accurate diagnosis of tuberculosis in people living with HIV is difficult. HIV-positive individuals have higher rates of extrapulmonary tuberculosis and the diagnosis of tuberculosis is often limited to imaging results. Ultrasound is such an imaging test that is widely used as a diagnostic tool (including point-of-care) in people suspected of having abdominal tuberculosis or disseminated tuberculosis with abdominal involvement.

Objectives: To determine the diagnostic accuracy of abdominal ultrasound for detecting abdominal tuberculosis or disseminated tuberculosis with abdominal involvement in HIV-positive individuals. To investigate potential sources of heterogeneity in test accuracy, including clinical setting, ultrasound training level, and type of reference standard.

Search methods: We searched for publications in any language up to 4 April 2019 in the following databases: MEDLINE, Embase, BIOSIS, Science Citation Index Expanded (SCI-EXPANDED), Social Sciences Citation Index (SSCI), Conference Proceedings Citation Index- Science (CPCI-S), and also Clinical Trials.gov and the WHO International Clinical Trials Registry Platform to identify ongoing trials.

Selection criteria: We included cross-sectional, cohort, and diagnostic case-control studies (prospective and retrospective) that compared the result of the index test (abdominal ultrasound) with one of the reference standards. We only included studies that allowed for extraction of numbers of true positives (TPs), true negatives (TNs),

false positives (FPs), and false negatives (FNs). Participants were HIV-positive individuals. Abdominal ultrasound for diagnosing abdominal tuberculosis or disseminated tuberculosis with abdominal involvement in HIV-positive aged 15 years and older. A higher-quality reference standard was the bacteriological confirmation of *Mycobacterium tuberculosis* from any clinical specimen, and a lower-quality reference standard was a clinical diagnosis of tuberculosis without microbiological confirmation. We excluded genitourinary tuberculosis.

Data collection and analysis: For each study, two review authors independently extracted data using a standardized form. We assessed the quality of studies using a tailored Quality Assessment of Diagnostic Accuracy Studies-2 (QUADAS-2) tool. We used the bivariate model to estimate pooled sensitivity and specificity. When studies were few we simplified the bivariate model to separate univariate random-effects logistic regression models for sensitivity and specificity. We explored the influence of the type of reference standard on the accuracy estimates by conducting separate analyses for each type of reference standard. We assessed the certainty of the evidence using the GRADE approach.

Main results: We included 11 studies. The risks of bias and concern about applicability were often high or unclear in all domains. We included six studies in the main analyses of any abnormal finding on abdominal ultrasound; five studies reported only individual lesions. The six studies of any abnormal finding were cross-sectional or cohort studies. Five of these (83%) were conducted in low- or middle-

income countries, and one in a high-income country. The proportion of participants on antiretroviral therapy was none (1 study), fewer than 50% (4 studies), more than 50% (1 study), and not reported (5 studies). The first main analysis, studies using a higher-quality reference standard (bacteriological confirmation), had a pooled sensitivity of 63% (95% confidence interval (CI) 43% to 79%; 5 studies, 368 participants; very low-certainty evidence) and a pooled specificity of 68% (95% CI 42% to 87%; 5 studies, 511 participants; very low-certainty evidence). If the results were to be applied to a hypothetical cohort of 1000 people with HIV where 200 (20%) have tuberculosis then:

- About 382 individuals would have an ultrasound result indicating tuberculosis; of these, 256 (67%) would be incorrectly classified as having tuberculosis (false positives).
- Of the 618 individuals with a result indicating that tuberculosis is not present, 74 (12%) would be incorrectly classified as not having tuberculosis (false negatives).

In the second main analysis involving studies using a lower-quality reference standard (clinical diagnosis), the pooled sensitivity was 68% (95% CI 45% to 85%; 4 studies, 195 participants; very low-certainty evidence) and the pooled specificity was 73% (95% CI 41% to 91%; 4 studies, 202 participants; very low-certainty evidence).

Authors' conclusions: In HIV-positive individuals thought to have abdominal tuberculosis or disseminated tuberculosis with abdominal involvement, abdominal ultrasound appears to have 63% sensitivity and 68% specificity when tuberculosis was bacteriologically confirmed. These estimates are based on data that is limited, varied, and low-certainty. The low sensitivity of abdominal ultrasound means clinicians should not use a negative test result to rule out the disease, but rather consider the result in combination with other diagnostic strategies (including clinical signs, chest x-ray, lateral flow urine lipoarabinomannan assay (LF-LAM), and Xpert MTB/RIF). Research incorporating the test into tuberculosis diagnostic algorithms will help in delineating more precisely its value in diagnosing abdominal tuberculosis or disseminated tuberculosis with abdominal involvement.

Publication: Van Hoving_DJ, Griesel_R, Meintjes_G, Takwoingi_Y, Maartens_G, Ochodo_EA. Abdominal ultrasound for diagnosing abdominal tuberculosis or disseminated tuberculosis with abdominal involvement in HIV positive individuals. Cochrane Database of Systematic Reviews 2019, Issue 9. Art. No.: CD012777.DOI: 10.1002/14651858.CD012777.pub2.

The prevalence of and risk factors for perinatal depression among women in the Knysna and Bitou sub-districts: a descriptive cross sectional study.

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Background: Perinatal depressive symptoms occur in women during pregnancy, around childbirth and within one year after delivery. Women in low or middle income countries (LMICs) are at risk, screening is poor and the prevalence in the Southern Cape region of South Africa is unknown.

Aim: The aim of the study was to determine the prevalence of and risk factors associated with perinatal depressive symptoms among women in the Knysna and Bitou sub-districts. The objectives are to compare antenatal and postnatal depressive symptoms, to evaluate associated risk factors and compare the effect of multiple versus single risk factors.

Methods: A descriptive cross sectional study design was used. Women aged 18 and above were sampled over a period of 10 months. Participation was voluntary and signed informed consent was obtained. Each participant completed the validated Edinburgh Postnatal Depression Scale (EPDS) and a risk factor assessment questionnaire. All documentation was available in Afrikaans, English and isiXhosa. A positive score for perinatal depressive symptoms was 13 or more. Referral for optional counselling or management was done as needed.

Results: In this study, the prevalence of perinatal depressive symptoms was high at 40.6%. The prevalence was similar for antenatal and postnatal groups with 40.0% and 40.5% respectively. Significant risk factors present among both groups were: no social support, use of alcohol and tobacco, race and a known or previous diagnosis of depression. More than one of the identified risk factors were present in 28.8% of depressed participants.

Conclusion: Perinatal depression risk in the Knysna/Bitou sub-districts, as found using the EPDS screening tool, is high. Both antenatal and postnatal groups showed similar prevalence. Risk factors in this population were lack of social support, substance use, race and a current or previous diagnosis of depression; with the majority of participants having one risk factor. Prevalence was similar for those with no risk factors and two or more risk factors. The results highlight the need for effective screening of all antenatal and postnatal women.

Improving the care for type 2 diabetes mellitus associated with obesity in semirural Lesotho

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Background: Managing diabetes associated with obesity remains challenging in developing countries, including Lesotho.

Aim: The aim of the project was to improve the quality of care of obese diabetic patients attending the St Joseph's Hospital in Maseru district, Lesotho.

Methods: A quality improvement cycle process was followed.

Results: A total number of 122 patients were included in the quality improvement cycle. We proceeded with a baseline audit and set standards that we then re audited after three months of agreed intervention on the same sample of patient. We included three groups of criteria in each audit: structural, process and outcome. The baseline audit indicated that the results in general were not satisfactory with only one achieved structural target standard. From the re-audit, all seven target standards

from structural, two out of four from the process and none of the three from outcome criteria were achieved, although there was a significant drop in the mean BMI ($p < 0.001$) at patient level; during the re-audit, the 95% confidence interval showed that patients had a drop in their BMI measurement of between -4.8 and +1.8 units.

Conclusion: At baseline, the quality of care was poor. After implementing an intervention, there were considerable improvements in the structure and process criteria of care. Although, the improvements in the outcome criteria were not very satisfactory, due to the limited time available for the intervention, there was a reduction in BMI. The quality improvement of the health system is an ongoing process to maintain good performance and improve where targets are not reached. The lessons learnt may be applicable to similar institutions.

A prevalence study of trauma and its associated factors in patients presenting at the Emergency Department, Intermediate Hospital, Oshakati, Namibia

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Background: Trauma is a global health issue with enormous societal and economic consequences. In Namibia, a lack of on-going, systematic trauma surveillance has limited the ability to characterize the profile and associated factors of trauma and to develop prevention programmes.

Aim: To describe the prevalence of trauma and its associated factors in patients presenting at the Emergency Department of the Oshakati Intermediate Hospital, Oshakati.

Methods: This was a descriptive study, administering a validated questionnaire to 300 consecutively sampled participants over 4 months to obtain their characteristics, mechanism, type and outcome of injury. Descriptive and inferential analysis was performed using SPSS.

Results: Of the 300 participants, 65.0% were males, 68.3% < 30 years, 38.0% unemployed and 38.3% dependent. Commonest trauma

type was accidental (68.3%) and commonest mechanism was blunt force trauma (77.3%), Alcohol was implicated in 29% of cases and linked to IPV (66.7%), community violence (56.5%) and MVA (35.9%). There was increased rate of trauma after work hours (37.7%) and during weekends (23.4%). The limbs (78.4%) were the most affected part, followed by head injury (27.3%). 46% of cases were admitted to hospital.

Conclusion: The results obtained in the study provide the basis for evidence-based interventions to reduce the burden of trauma. Proper protective apparels should be in place to reduce accidental injuries and falls. There is a need for policy formulation and campaigning on alcohol consumption to minimize MVAs and violence.

Admission factors associated with the in-hospital mortality of burns patients in resource-constrained settings: A two-year retrospective investigation in a South African adult burns centre

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Objective: Little is known concerning the factors associated with in-hospital mortality of trauma patients in resource-constrained settings, not least in burns centres. We investigated this question in the adult burns centre at Tygerberg Hospital in Cape Town. We further assessed whether the Abbreviated Burn Severity Index (ABSI) is an accurate predictive score of mortality in this setting.

Methods: Medical records of all patients admitted with fresh burns over a two-year period (2015 and 2016) were scrutinized to obtain data on patient, injury and admission-related characteristics. Association with in-hospital mortality was investigated for flame burns using logistic regressions and expressed as odds ratios (ORs). The mortality prediction of the ABSI score was assessed using sensitivity and specificity analyses.

Results: Overall the in-hospital mortality was 20.4%. For the 263 flame burns, while crude ORs suggested gender, burn depth, burn size,

inhalation injury, and referral status were all individually significantly associated with mortality; only the association with female gender, not being referred and burn size, remained significant after adjustments (adjusted ORs=3.79, 2.86 and 1.11 (per percentage increase in size) respectively). For the ABSI score, sensitivity and specificity were 84% and 86% respectively.

Conclusion: In this specialised centre, mortality occurs in one in five patients. It is associated with a few clinical parameters, and can be predicted using the ABSI score

Publication: Boissin C, Wallis LA, Kleintjes W, Laflamme L. Admission factors associated with the in-hospital mortality of burns patients in resource-constrained settings: A two-year retrospective investigation in a South African adult burns centre. *Burns*. 2019 Sep 1;45(6):1462-70.

Improving the quality of care for female rape survivors at Scottish Livingstone Hospital, Molepolole, Botswana: A quality improvement cycle

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Background: Rape is prevalent in Botswana, but there has been limited research undertaken to improve the quality of healthcare for female rape survivors in this clinical setting. Research can not only influence the health outcomes of victims, but also has the potential to inform policy.

Aim: The aim of this study was to improve the quality of care for female rape survivors in Scottish Livingstone Hospital, Molepolole, Botswana.

Setting: The setting was Scottish Livingstone Hospital, Molepolole, Botswana.

Methods: This study was a quality improvement cycle, using the normal steps of performing a baseline audit of clinical practice, planning and implementing changes and re-audit.

Results: A total of 124 patient records were audited, comprising 62 patient records at baseline and re-audit. The mean age of victims was 23 years and the age category with the highest incidence of rape ranged between 12

and 20 years, constituting 47% of patients' records. During the baseline audit, only one out of 10 structural standards was met, while at re-audit eight structural standards were fully met. Although none of the process standards were met during both audits, statistically significant improvements in performance ($p < 0.05$) were shown in six out of 10 criteria at re-audit.

Conclusion: The quality of care for female rape survivors is suboptimal in our setting. However, simple interventions to improve the structure in place for patients and upskilling the entire practice team to align care to current international standards can improve the overall quality of healthcare.

Publication: Debley OA, Malan Z. Improving the quality of care for female rape survivors at Scottish Livingstone Hospital, Molepolole, Botswana: A quality improvement cycle. *Afr J Prm Health Care Fam Med.* 2020;12(1), a2238. <https://doi.org/10.4102/phcfm.v12i1.2238>

Retention in care and factors critical for effectively implementing antiretroviral adherence clubs in a rural district in South Africa

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Introduction: Differentiated models of care that include referral of antiretroviral treatment (ART) clients to adherence clubs, are an important strategy to help clinics manage increased number of clients living with HIV in resource-constrained settings. This study reported on (i) clinical outcomes among ART clients attending community-based adherence clubs and (ii) experiences of adherence clubs and perceptions of factors key to successful adherence club implementation, among clients and healthcare workers.

Methods: A retrospective cohort analysis of routine data and a descriptive analysis of data collected through self-administered surveys completed by data, collected by clients and healthcare workers were completed. Clients starting ART at the study clinic, between January 2014 and December 2015, were included in the cohort analysis and followed up until December 2016. The survey data were collected from August to September 2017. The primary outcome for the cohort analysis was a comparison of loss to follow-up (LTFU) between clients staying in clinic care and those referred to adherence clubs. Survey data reported on client experiences of and healthcare worker perceptions of adherence club care.

Results: Cohort analysis reported on 465 participants, median baseline CD 4 count 374 (IQR : 234 to 532) cells/ μ l and median follow-up time 20.7 (IQR 14.1 to 27.7) months. Overall, 202 (43.4%) participants

were referred to an adherence club. LTFU was lower in those attending an adherence club (aHR =0.25, 95% CI : 0.11 to 0.56). This finding was confirmed on analysis restricted to those eligible for adherence club referral (aHR =0.28, 95% CI : 0.12 to 0.65). Factors highlighted as associated with successful adherence club implementation included: (i) referral of stable clients to the club, (ii) an ideal club size of ≥ 20 members, (iii) club services led by a counsellor (iv) using churches or community halls as venues (v) effective communication between all parties, and (vi) timely delivery of prepacked medication.

Conclusions: This study showed good clinical outcomes, positive patient experiences and healthcare worker perceptions of the adherence club model. Factors associated with successful adherence club implementation, highlighted in this study, can be used to guide implementers in the scale-up of adherence club services across varied high-burden settings.

Publication: Bock P, Gunst C, Maschilla L, Holtman R, Grobbelaar N, Wademan D, Dunbar R, Fatti G, Kruger J, Ford N, Hoddinott G. Retention in care and factors critical for effectively implementing antiretroviral adherence clubs in a rural district in South Africa. *Journal of the International AIDS Society*. 2019 Oct;22(10):e25396.

Renal dysfunction by baseline CD 4 cell count in a cohort of adults starting antiretroviral treatment regardless of CD 4 count in the HIV Prevention Trials Network 071 [HPTN 071; Population Effect of Antiretroviral Therapy to Reduce HIV Transmission (PopART) study in South Africa

Bock P, Nel K, Fatti G, Sloot R, Ford N, Voget J, Gunst C, Grobbelaar N, Louis F, Floyd S, Hayes R.

Objectives: Renal dysfunction is a significant cause of morbidity and mortality among HIV-positive individuals. This study evaluated renal dysfunction in a cohort of adults who started antiretroviral treatment, (ART) regardless of CD 4, count at three Department of Health (DOH) clinics included in the HIV Prevention Trials Network 071 (HPTN 071) Population Effect of Antiretroviral Therapy to Reduce HIV Transmission (PopART) trial.

Methods: A retrospective cohort analysis of routine data for HIV-positive individuals starting ART between January 2014 and November 2015 was completed. Incident renal dysfunction was defined as an estimated glomerular filtration rate (eGFR) < 60 mL/min after ART initiation among individuals with a baseline (pre-ART) eGFR \geq 60 mL/min.

Results: Overall, 2423 individuals, with a median baseline CD 4 count of 328 cells/ μ L [interquartile range (IQR) 195–468 cells/ μ L], were included in the analysis. Forty-seven individuals had a baseline eGFR < 60 mL/min. Among 1634 non-pregnant individuals started on a tenofovir-containing ART regimen and with a baseline eGFR \geq 60 mL/min, 27 developed an eGFR < 60 mL/min on ART. Regression analysis showed lower odds of

baseline eGFR < 60 mL/min at baseline CD 4 counts of > 500 cells/ μ L [adjusted odds ratio (aOR) 0.29; 95% confidence interval (CI) 0.11–0.80], 351–500 cells/ μ L (aOR 0.22; 95% CI 0.08–0.59) and 201–350 (aOR 0.48; 95% CI : 0.24–0.97) compared with baseline CD 4 counts < 200 cells/ μ L.

Conclusions: This study showed low rates of renal dysfunction at baseline and on ART, with lower rates of baseline renal dysfunction among individuals with baseline CD 4 counts > 200 cells/ μ L. Strategies that use baseline characteristics, such as age, to identify individuals at high risk of renal dysfunction on ART for enhanced eGFR monitoring may be effective and should be the subject of future research.

Publication: Bock P, Nel K, Fatti G, Sloot R, Ford N, Voget J, Gunst C, Grobbelaar N, Louis F, Floyd S, Hayes R. Renal dysfunction by baseline CD 4 cell count in a cohort of adults starting antiretroviral treatment regardless of CD 4 count in the HIV Prevention Trials Network 071 [HPTN 071; Population Effect of Antiretroviral Therapy to Reduce HIV Transmission (Pop ART)] study in South Africa. *HIV medicine*. 2019 Jul;20(6):392-403.

Surviving a stroke in South Africa: outcomes of home-based care in a low-resource rural setting

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Background: Little is known of stroke outcomes in low- and middle-income countries with limited formal stroke rehabilitation services and of homebased-stroke services delivered within the primary health care (PHC) context by community health workers (CHWs).

Objectives: To describe and analyze the outcomes of patients with stroke from a rural PHC setting in the Western Cape, South Africa.

Methods: In a longitudinal survey, 93 stroke patients, referred to home and community-based care services (HCBC) between June 2015 and December 2017, were assessed at baseline, one month and three months. Changes in function (Barthel Index (BI)), caregiver strain (Caregiver Strain Index (CSI)), impact of environmental factors and satisfaction with stroke care were measured.

Results: HCBC was delayed, fragmented and brief (median session duration 20 minutes (IQR 15.0–30.0)). Although function improved significantly, dependence remained

high: median BI score changed from 40.0 (IQR 15.0–70.0) to 62.5 (IQR 30.0–81.25) ($p = .019$). A third (33.0% (30/91)) of caregivers initially experienced strain and the median CSI score remained 3.0 (IQR 0.0–7.0) ($p = .672$). Overall, patient and caregiver satisfaction with HCBC was low with only 46.9% (31/66) of caregivers and 17.4% (12/69) of patients satisfied with all aspects of care. Only 47.6% of assistive product needs were met. Environmental factors negatively impacted on patient function and caregiving.

Conclusions: Clinical practice pathways and referral guidelines should be developed for the HCBC platform. Specific training of CHWs, focusing on how to educate, support and train family caregivers, provide assistive devices and refer to health services is needed.

Publication: Elsje Scheffler & Robert Mash (2019): Surviving a stroke in South Africa: outcomes of home-based care in a low-resource rural setting, Topics in Stroke Rehabilitation, DOI: 10.1080/10749357.2019.1623473

Access to acute care resources in various income settings to treat new-onset stroke: A survey of acute care providers

Ramadhan Chunga, Stevan R. Bruijns, Clint Hendrikse

Introduction: Stroke affects 15 million people annually and is responsible for 5 million deaths per annum globally. In contrast to the trend in low- and middle-income countries (LMICs), stroke mortality is on the decline in high-income countries (HICs). Even though the availability of resources varies considerably by geographic region and across LMICs and HICs, evidence suggests that material resources in LMICs to implement recommendations from international guidelines are largely unmet. This study describes and compares the availability of resources to treat new-onset stroke in countries based on the World Bank's gross national incomes, using recommendations of the American Heart Association and the American Stroke Association 2013 update.

Methods: A self-reported cross-sectional survey was conducted on delegates that attended the April 2016 International Conference on Emergency Medicine, using the web-based e-Survey client; Survey Monkey Inc. The survey assessed both pre-hospital and in-hospital settings and was piloted before implementation.

Results: The survey was distributed and opened by 955 delegates and 382 (40%) responded. Respondents from LMICs reported

significantly less access to a prehospital service ($p < 0.001$) or a national emergency number ($p < 0.001$). Access to specialist neurology services ($p < 0.001$) and radiology services ($p < 0.001$) were also significantly lower in LMICs.

Conclusion: The striking finding from this study was that there was essentially very little difference between the responses from LMIC and HIC respondents, with a few notable exceptions. The findings also propose a universal lack of adherence to the 2013 AHA/ASA stroke management guideline by both groups, in contrast to the good reported knowledge thereof. Carefully planned qualitative research is needed to identify the barriers to achieving the 2013 AHA/ACA recommendations.

Publication: Chunga R, Bruijns SR, Hendrikse C. Access to acute care resources in various income settings to treat new-onset stroke: A survey of acute care providers. *African Journal of Emergency Medicine*. 2019 Jun 1;9(2):77-80.

How to transform the workplace environment to prevent and control risk factors associated with non-communicable chronic diseases.

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The underlying causes of premature morbidity and mortality in South Africa (SA) are related to unhealthy lifestyle behaviours, which are modifiable. Chronic non-communicable diseases (cardiovascular disease, respiratory disease, diabetes and cancer) are partly attributed to behavioural risk factors such as tobacco smoking, harmful alcohol use, physical inactivity and unhealthy eating, which if not controlled, results in an increase in metabolic risk factors.

The workplace is highlighted as an important setting for the prevention of non-communicable diseases (NCDs). The work environment directly shapes employee health and health behaviours, and acts as an accelerator or preventer of chronic disease. Very little research in the African context has focused on how to transform the workplace environment to prevent and control the risk factors associated with NCDs. The aim of the research was to design, implement and evaluate a workplace health promotion program (WHPP) to prevent or reduce the risk factors for NCDs, amongst the workforce at a commercial power plant in South Africa. The objectives were to monitor changes in NCD risk factors in the workforce, as well as monitor sick leave absenteeism and evaluate the costs and consequences of the workplace health promotion program.

The abstracts for the four articles presented for the doctoral degree are provided here.

Article 1: Risk factors for non-communicable diseases in the workforce at a commercial power plant in South Africa

Background: Non-communicable diseases (NCDs) account for more than half of annual deaths globally and nearly 40% of deaths in South Africa. The workplace can be an important setting for the prevention of NCDs.

Objectives: The objectives of this study were to describe the prevalence of reported NCDs and previously identified risk factors for NCDs, as well as to assess risky behaviour for NCDs, and the 10-year risk for cardiovascular disease, amongst the workforce at a commercial power plant in the Western Cape province of South Africa.

Methods: A total of 156 employees was randomly selected from the workforce of 1 743. Questionnaires were administered to elicit self-reported information about NCDs, tobacco smoking, alcohol use, diet, physical activity and psychosocial stress. Biometric health screening included measurements and calculations of blood pressure, total cholesterol, random glucose, body mass index (BMI), waist circumference and waist-to-hip ratio (WHR). The 10-year risk for cardiovascular disease was calculated using a chart-based validated non-laboratory algorithm.

Results: The study participants had a mean age of 42.8 (25-64) years; 65.2% were male. A quarter (26.0%) smoked tobacco, 29.4% reported harmful or dependent alcohol use, 73.0% had inadequate fruit and vegetable intake, and 64.1% were physically inactive. Systolic and diastolic blood pressure was raised in 32.7% and 34.6% of the study participants, respectively, 62.2% had raised cholesterol, 76.9% were overweight or obese, and 27.1% had abdominal obesity. Overall, 17.4% were diagnosed with hypercholesterolaemia, 17.7% with hypertension, and 16.2% with depression. Around one third (34.1%) had a moderate-to-high 10-year cardiovascular disease risk.

Conclusion: The prevalence's of both behavioural and physical risk factors for NCDs amongst the power station study participants were high. There is a need for effective workplace interventions to reduce risk for

NCDs. The workplace is ideally suited for targeted interventions.

Article 2: Transforming the workplace environment to prevent non-communicable chronic diseases: Participatory action research in a South African power plant.

Background: The workplace is an important setting for the prevention of non-communicable diseases (NCDs). Policies for transformation of the workplace environment have focused more on what to do and less on how to do it. The aim of this study was to learn how to transform the workplace environment in order to prevent and control the risk factors for NCDs amongst the workforce at a commercial power plant in Cape Town, South Africa.

Methods: The study design utilized participatory action research (PAR) in the format of a cooperative inquiry group (CIG). The researcher and participants engaged in a cyclical process of planning, action, observation and reflection over a 2-year period. The group used outcome mapping to define the vision, mission, boundary partners, outcomes and strategies required. At the end of the inquiry the CIG reached a consensus on their key learning.

Results: Substantial change was observed in the boundary partners: catering services (78% of progress markers achieved), sport and physical activities (75%), health and wellness services (66%), and managerial support (65%). Highlights from a 10-point consensus on key learning included the need for: authentic leadership; diverse composition and functioning of the CIG; value of outcome mapping; importance of managerial engagement in personal and organizational change; and making healthy lifestyle an easy choice.

Conclusion: Transformation included a multifaceted approach and an engagement with the organization as a living system. Future studies will evaluate changes in the risk profile of the workforce, as well as the costs and consequences for the organization.

Article 3: Changes in risk factors for non-communicable diseases associated with a Healthy Choices at Work program at a commercial power plant.

Background: Globally, 71% of deaths are attributed to non-communicable diseases (NCD). The workplace is ideal for interventions aiming to prevent NCDs, however much of the current evidence is from high income countries.

Objective: The aim of this study was to evaluate changes in NCD risk factors associated with a Healthy Choices at Work program (HCW) at a commercial power plant in South Africa.

Methods: This was a before-and-after study in a randomly selected sample of 156 employees at baseline and 2-years. The HCW focused on catering, physical activity, health and wellness services and managerial support. Participants completed questionnaires on their participation in the HCW, tobacco smoking, harmful alcohol use, fruit and vegetable intake, physical activity, psychosocial stress and history of NCDs. Clinical measures included blood pressure, total cholesterol, random blood glucose, body mass index (BMI), waist circumference and waist-to-hip ratio. The 10-year cardiovascular risk was calculated using a validated algorithm. Data was analysed with the Statistical Package for the Social Sciences.

Results: Paired data was obtained for 136 employees. Their mean age was 42.7 years (SD 9.7); 64% were male. The prevalence of sufficient fruit and vegetables increased

from 27% to 64% ($p < 0.001$), those meeting physical activity guidelines increased from 44% to 65% ($p < 0.001$). Harmful alcohol use decreased from 21% to 5% ($p = 0.001$). There were significant improvements in systolic and diastolic blood pressure (mean difference -10.2mmHg (95%CI: -7.3 to -13.2); and -3.9mmHg (95%CI: -1.8 to -5.8); $p < 0.001$) and total cholesterol (mean difference -0.45mmol/l (-0.3 to -0.6)). There were no significant improvements in BMI. Psychosocial stress from relationships with colleagues, personal finances, and personal health significantly improved. There was a non-significant decrease of 4.5% in people with a high 10-year cardiovascular risk.

Conclusion: The HCW was associated with significant reductions in behavioural, metabolic and psychosocial risk factors for NCDs.

Article 4: Cost and consequence analysis of Healthy Choices at Work (HCW) program to prevent non-communicable diseases in a commercial power plant.

Introduction: The workplace is identified as an ideal setting for the implementation of a Healthy Choices at Work program (HCW) to prevent and control NCDs. However, given the limited resources assigned to workplace health promotion programs in LMIC, this study aimed to conduct a cost and consequence analysis using participatory action learning to improve the NCD risk profiles at low cost.

Methods: Incremental costs were obtained from the activities of the Healthy Choices at Work program at the commercial power plant over a two-year period. A total of 156 employees participated in the intervention but

the affect was experienced by all employees. An annual health risk assessment at baseline and follow up was included in the consequence of the study.

Results: The total incremental costs over the two-year period accumulated to \$4015 for 1743 employees. The cost per employee on an annual basis was \$1.15 resulting in -10.2mmHg in systolic blood pressure, -3.87mmHg in diastolic blood pressure, -0.45mmol/l in total cholesterol, significant improvements ($p = 0.001$) for harmful alcohol use, fruit and vegetable intake and physical inactivity. There was no improvement in correlation between sickness absenteeism and risk factors for non-communicable diseases.

Conclusion: The cost to implement the multicomponent HCW programs was considerably low as was the significant consequences in transforming the workplace environment. Findings of this study will be useful for small, medium and large (SML) organisations, the national department of health, and similar settings in LMIC.

Overall conclusion: The high prevalence of behavioral and metabolic risk factors for NCDs amongst participants at the power station resulted in the design of an effective WHPP to reduce risks. A Healthy Choice at Work program (HCW) included a multifaceted approach, and was associated with significant reductions in risk factors for NCDs. The cost to implement the HCW program was low, with significant consequences in transforming the workplace environment, which are useful findings for small, medium and large organizations.

Evaluating trauma scoring systems for patients presenting with gunshot injuries to a district-level urban public hospital in Cape Town, South Africa

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Introduction: Trauma scoring systems are widely used in emergency settings to guide clinical decisions and to predict mortality. It remains unclear which system is most suitable to use for patients with gunshot injuries at district-level hospitals. This study compares the Triage Early Warning Score (TEWS), Injury Severity Score (ISS), Trauma and Injury Severity Score (TRISS), Kampala Trauma Score (KTS) and Revised Trauma Score (RTS), as predictors of mortality among patients with gunshot injuries at a district-level urban public hospital in Cape Town, South Africa.

Methods: Gunshot-related patients admitted to the resuscitation area of Khayelitsha Hospital between 1 January 2016 and 31 December 2017 were retrospectively analysed. Receiver Operating Characteristic (ROC) analysis were used to determine the accuracy of each score to predict all-cause in-hospital mortality. The odds ratio (with 95% confidence intervals) was used as a measure of association.

Results: In total, 331 patients were included in analysing the different scores (abstracted from database n=431, excluded: missing files n=16,

non-gunshot injury n=10, <14 years n=1, information incomplete to calculate scores n=73). The mortality rate was 6% (n=20). The TRISS and KTS had the highest area under the ROC curve (AUC), 0.90 (95% CI 0.83-0.96) and 0.86 (95% CI 0.79-0.94), respectively. The KTS had the highest sensitivity (90%, 95% CI 68-99%), while the TEWS and RTS had the highest specificity (91%, 95% CI 87-94% each).

Conclusions: None of the different scoring systems performed better in predicting mortality in this high-trauma burden area. The results are limited by the low number of recorded deaths and further studies are needed.

Publication: Aspelund AL, Patel MQ, Kurland L, McCaul M, Van Hoving DJ. Evaluating trauma scoring systems for patients presenting with gunshot injuries to a district-level urban public hospital in Cape Town, South Africa. *African journal of emergency medicine*. 2019 Dec 1;9(4):193-6.

Does Point-of-care Ultrasonography Change Emergency Department Care Delivered to Hypotensive Patients When Categorized by Shock Type? A Post-Hoc Analysis of an International Randomized Controlled Trial from the SHoC-ED Investigators

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Introduction: Our previously reported randomized-controlled-trial of point-of-care ultrasound (PoCUS) for patients with undifferentiated hypotension in the emergency department (ED) showed no survival benefit with PoCUS. Here, we examine the data to see if PoCUS led to changes in the care delivered to patients with cardiogenic and non-cardiogenic shock.

Methods: A post-hoc analysis was completed on a database of 273 hypotensive ED patients, randomized to standard care or PoCUS in six centres in Canada and South Africa. Shock categories recorded one hour after the ED presentation were used to define subcategories of shock. We analyzed initial intravenous fluid volumes, as well as rates of inotrope use and procedures.

Results: 261 patients could be classified as cardiogenic or non-cardiogenic shock types. Although there were expected differences in the mean fluid volume administered between patients with noncardiogenic and cardiogenic shock (p -value <0.001), there was no difference between the control and PoCUS groups (mean non-cardiogenic control 1881 mL (95%

CI 1567-2195mL) vs non-cardiogenic PoCUS 1763mL (1525-2001mL); and cardiogenic control 680mL (28.4-1332mL) vs. cardiogenic PoCUS 744mL (370-1117mL; $p= 0.67$). Likewise, there were no differences in rates of inotrope administration nor procedures for any of the subcategories of shock between the control group and PoCUS group patients.

Conclusion: Despite differences in care delivered by subcategory of shock, we did not find any difference in key elements of emergency department care delivered between patients receiving PoCUS and those who did not. This may help explain the previously reported lack of outcome differences between groups.

Publication: Atkinson P, Hunter S, Banerjee A, et al. (November 03, 2019) Does Point-of-care Ultrasonography Change Emergency Department Care Delivered to Hypotensive Patients When Categorized by Shock Type? A Post-Hoc Analysis of an International Randomized Controlled Trial from the SHoC-ED Investigators. *Cureus* 11(11): e6058. DOI 10.7759/cureus.6058

Is point-of-care ultrasound a reliable predictor of outcome during atraumatic, non-shockable cardiac arrest? A systematic review and meta-analysis from the SHoC investigators.

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Aims: To evaluate the accuracy of PoCUS in predicting return of spontaneous circulation (ROSC), survival to hospital admission (SHA), and survival to hospital discharge (SHD) in adult non-traumatic, non-shockable out-of-hospital or emergency department cardiac arrest.

Methods: Medline, EMBASE, Cochrane, CINAHL, ClinicalTrials.gov and the World Health Organization Registry were searched for eligible studies. Data analysis was completed according to PRISMA guidelines. A random-effects meta-analysis model was used with I-squared statistics for heterogeneity.

Results: Ten studies (1486 participants) were included. Cardiac activity on PoCUS had a pooled sensitivity of 60.3% (95% confidence interval 38.1%–78.9%) and specificity of 91.5%(80.8%–96.5%) for ROSC. The sensitivity of cardiac activity on PoCUS for predicting ROSC was 26.1%(7.8%–59.6%) in asystole compared with 76.7% (61.3%–87.2%) in PEA. Cardiac activity on PoCUS, compared to absence, had odd ratios of 16.90 (6.18–46.21) for ROSC, 10.30(5.32–19.98) for SHA and 8.03(3.01–21.39) for SHD. Positive likelihood ratio (LR) was 6.87(3.21–14.71) and negative LR was 0.27(0.12_0.60) for ROSC.

Conclusions: Cardiac activity on PoCUS was associated with improved odds for ROSC, SHA, and SHD in non-traumatic, non-shockable cardiac arrest. We report a lower sensitivity and higher negative likelihood ratio, but greater heterogeneity compared to previous systematic reviews. PoCUS may provide valuable information in the management of non-traumatic PEA or asystole, but should not be viewed as the sole predictor in determining outcomes.

Publications: Lalande, E., Burwash-Brennan, T., Burns, K., Atkinson, P., Lambert, M., Jarman, B., Lamprecht, H., Banerjee, A., Woo, M.Y., Connolly, J. and Hoffmann, B., 2019. Is point-of-care ultrasound a reliable predictor of outcome during atraumatic, non-shockable cardiac arrest? A systematic review and meta-analysis from the SHoC investigators. *Resuscitation*, 139, pp.159-166.

Assault-injured youth in the emergency centres of Khayelitsha, South Africa: Baseline characteristics & opportunities for intervention

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Introduction: Violence is a leading cause of death worldwide for youth (15-29 years). A growing body of literature has described assault-injured youth in United States emergency centres, identifying risk factors for re-injury and mortality, and developing targeted interventions. Despite the fact that low- and middle-income countries are disproportionately affected by violence, little research on assault-injured youth exists in these settings.

Methods: Survey and chart review of 14 to 24-year-old assault-injured patients and non-assault-injured controls to 24-hour emergency centres in Khayelitsha, South Africa over 15 weeks. Patient enrollment occurred 7pm Friday to 7am Monday. Multivariable logistic regression was used to estimate associations of behavioral and other factors with assault injury.

Results: In total 513 patients were enrolled: 324 assault-injured patients and 189 controls (131 medical, 58 unintentional injuries). Overall 28% were female (n = 146) and 72% were male (n = 367). The mean age was 20.5 years. Assault-injured patients of both genders were more likely than controls to give a 30-day history of drinking any alcohol (OR 6.3)

and binge drinking (OR 6.7). They were also more likely to report any physical fight (OR 4.4) or any physical fight requiring medical care in the past 6 months (OR 5.08), and lifetime history of arrest (OR 5.1) or conviction (OR 6.7). Drugs and/or alcohol were used by victims prior to 78% of the assaults. Significant differences were not detected between females (76%) and males (79%). Overall, 47% of assault-injured youth and 15% of controls reported a history of a fight requiring medical treatment in the past 6 months.

Discussion: Violence is a chronic and recurring disease, suggesting opportunities for interventions during health care contacts. Our population of assault-injured youth demonstrated significant rates of alcohol use and binge drinking, as well as alcohol use prior to the assault. Future secondary violence prevention initiatives should consider targeting alcohol use and abuse.

Publication: Leeper S, Myers J, Patel M, Reddy P, Martin IB, van Hoving DJ. Assault-injured youth in the emergency centres of Khayelitsha, South Africa: Baseline characteristics & opportunities for intervention. *Injury*. 2019 Dec 1;50(12):2220-7.

South African Marine Envenomations and Poisonings as Managed Telephonically by the Tygerberg Poisons Information Centre: A 20-Year Retrospective Review

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Introduction: South Africa has an abundance of marine life, and the potential for hazardous exposure to marine life is high. To our knowledge, this is the first epidemiological review regarding marine toxicity that has ever been conducted in sub-Saharan Africa. The aim of this review was to investigate marine toxicology data, as managed telephonically by the Tygerberg Poisons Information Centre.

Methods: Marine toxicology cases were retrospectively analysed for a 20-y period (January 1, 1995 to December 31, 2014). Data were extracted from archived consultation forms. Descriptive statistics are presented, and post hoc analyses compared age, sex, province, and caller's background with severity and type of toxicology.

Results: A total of 311 calls involved 392 cases. Most calls involved adults (n=317, 81%) and males (n=214, 55%) and presented with no or minor symptoms (n=242, 62%). Poisoning from ingestion (n=239; 61%) was more commonly encountered than was marine envenomation (n=153; 39%), with paralytic

shellfish poisoning (n=118; 30%), scombroid poisoning (n=93; 24%), and envenomation from stingrays (n=36; 9%) and bluebottles (n=33; 8%) occurring often. Healthcare professionals were more likely to consult for severe cases (odds ratio 3.3; 95% CI 1.9_5.9) and poisoning-related cases (odds ratio 1.8; 95% CI 1.1_2.9).

Conclusion: The proportion of marine-related toxicology cases was low. Telephonic consultations by healthcare professionals relating to poisoning were generally of a serious nature. The data can be used to drive public health awareness campaigns.

Publication: Marks, C.J., Van Hoving, D.J., Wium, C.A., Sachno, D., Du Plessis, C.E., Reuter, H. and Muller, G.J., 2019. South African marine envenomations and poisonings as managed telephonically by the Tygerberg Poisons Information Centre: a 20-year retrospective review. *Wilderness & environmental medicine*, 30(2), pp.134-140.

The epidemiology and severity of scorpion envenoming in South Africa as managed by the Tygerberg Poisons Information Centre over a 10 year period

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Introduction: South Africa has a wide distribution of scorpion species, yet limited data are available regarding the incidence and severity of scorpion envenomation. The aim of this study was to analyse South African epidemiological data of scorpion stings and envenomation as reported to the Tygerberg Poisons Information Centre (TPIC).

Methods: A retrospective analysis was conducted of scorpion-related telephonic consultations to the TPIC over a ten year period (1 January 2005 to 31 December 2014). Data were entered onto a Microsoft Excel® spreadsheet and descriptive statistics are presented for all variables. Associations with severity of envenomation are presented as odds ratios (OR) with 95% confidence intervals (95%CI).

Results: During the study period 52,163 consultations were processed by the TPIC of which 740 (1.4%) cases involved scorpion stings. Of these, 146 (19.7%) cases were deemed serious envenomations. Antivenom was recommended to be administered in 131 (90%) of these cases. Healthcare professionals made most calls (63%), but were less likely to phone for non-serious cases (OR 0.16;

95%CI 0.09 to 0.29). The Western Cape Province had the highest incidence of calls (6.9 scorpion-related calls/100 000 people). Adults (> 20 years) were victims in 71.4% of cases, and were more likely to experience less serious stings (OR 0.57; 95%CI 0.37 to 0.86). The TPIC was consulted within six hours of the sting occurring in 356 (48.1%) cases with a significant association to less severity (OR 3.51; 95%CI 1.9 to 6.3). Only 2% (15) of the scorpions were available for identification.

Conclusion: The incidence of severe scorpionism to the TPIC was low. Care should be taken when children are involved and when calls are received more than six hours after the sting. TPIC consultants as well as healthcare professionals working in semi-arid regions should be aware of these high risk populations.

Publication: Marks CJ, Muller GJ, Sachno D, Reuter H, Wium CA, Du Plessis CE, Van Hoving DJ. The epidemiology and severity of scorpion envenoming in South Africa as managed by the Tygerberg Poisons Information Centre over a 10 year period. African Journal of Emergency Medicine. 2019 Mar 1;9(1):21-4.

m-Health for Burn Injury Consultations in a Low-Resource Setting: An Acceptability Study Among Health Care Providers

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Introduction: The rapid adoption of smartphones, especially in low- and middle-income countries, has opened up novel ways to deliver health care, including diagnosis and management of burns. This study was conducted to measure acceptability and to identify factors that influence health care provider's attitudes toward m-health technology for emergency care of burn patients.

Methods: An extended version of the technology acceptance model (TAM) was used to assess the acceptability toward using m-health for burns. A questionnaire was distributed to health professionals at four hospitals in Dar Es Salaam, Tanzania. The questionnaire was based on several validated instruments and has previously been adopted for the sub-Saharan context. It measured constructs, including acceptability, usefulness, ease of use, social influences, and voluntariness. Univariate analysis was used to test our proposed hypotheses, and structural equation modelling was used to test the extended version of TAM.

Results: In our proposed test-model based on TAM, we found a significant relationship between compatibility—usefulness and usefulness—attitudes. The univariate analysis further revealed some differences between subgroups. Almost all health professionals in our sample already use smartphones for work purposes and were positive about using smartphones for burn consultations. Despite participants perceiving the application to be easy to use, they suggested that training and ongoing support should be available. Barriers mentioned include access to wireless internet and access to hospital-provided smartphones.

Publication: Klingberg A, Sawe HR, Hammar U, Wallis LA, Hasselberg M. m-Health for Burn Injury Consultations in a Low-Resource Setting: An Acceptability Study Among Health Care Providers. *Telemedicine and e-Health*. 2020 Apr 1;26(4):395-405.

HEALTH SERVICES AND SYSTEMS RESEARCH



Prof Bob Mash and Dr Klaus von Pressentin at the Hospital of Hope – a field hospital at the CTICC for patients with COVID-19

Community-orientated primary care: a scoping review of different models, and their effectiveness and feasibility in sub-Saharan Africa

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Introduction: Community-orientated primary care (COPC) is an approach to primary healthcare (PHC) that originated in South Africa and contributed to the formulation of the Declaration of Alma-Ata 40 years ago. Despite this, PHC remains poorly developed in sub-Saharan African countries. There has been a resurgence of interest in strengthening PHC systems in the last few years and identifying key knowledge gaps. COPC has been an effective strategy elsewhere, most notably Brazil. This scoping review investigated COPC in the sub-Saharan African context and looked for evidence of different models, effectiveness and feasibility.

Methods: Databases were systematically searched, using a comprehensive search strategy, to identify studies from the last 10 years. A methodological guideline for conducting scoping reviews was followed. A standardised template was used to extract data and compare study characteristics and findings. Studies were grouped into five categories: historical analysis, models, implementation, educational studies and effectiveness.

Results: A total of 1997 publications were identified and 39 included in the review. Most publications were from the last 5 years (n =

32), research (n = 27), from South Africa (n = 27), focused on implementation (n = 25) and involving case studies (n = 9), programme evaluation (n = 6) or qualitative methods (n = 10). Nine principles of COPC were identified from different models. Factors related to the implementation of COPC were identified in terms of governance, finances, community health workers, primary care facilities, community participation, health information and training. There was very little evidence of effectiveness of COPC.

Conclusions: There is a need for further research to describe models of COPC in Africa, investigate the appropriate skills mix to integrate public health and primary care in these models, evaluate the effectiveness of COPC and whether it is included in training of healthcare workers and government policy.

Publication: Mash B, Ray S, Essuman A, et al. Community orientated primary care: a scoping review of different models, and their effectiveness and feasibility in sub-Saharan Africa. *BMJ Global Health* 2019;4:e001489. doi:10.1136/bmjgh-2019-001489

Evaluating the performance of South African primary care: a cross-sectional descriptive survey

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Introduction: In 2018 governments reaffirmed their commitment to implementing primary health care (PHC) in the Astana Declaration. South Africa has introduced a number of health reforms to strengthen PHC and enable universal health coverage (UHC). UHC requires access to quality primary care and progress needs to be measured. This study aimed to evaluate the quality of South African primary care using the Primary Care Assessment Tool (PCAT).

Methods: A descriptive cross-sectional survey used data derived from a previous analytical observational study. Data from 413 patients, 136 health workers and 55 managers were analysed from 30 community health centres, across four provinces of South Africa. Scores were obtained for 10 key domains and an overall primary care score. Scores were compared in terms of respondents, provinces and monthly headcount.

Results: Patients rated first contact accessibility, ongoing care and community orientation as the poorest performing elements (< 50% scoring as 'acceptable to good'); first

contact utilisation, informational coordination and family-centredness as weaker elements (< 66% scoring as 'acceptable to good'); and comprehensiveness, coordination, cultural competency and availability of the PHC team as stronger aspects of primary care ($\geq 66\%$ or more scoring as 'acceptable or good'). Managers and providers were generally much more positive about the performance of PHC.

Conclusion: Gaps exist between PHC users' experience of care and what PHC staff believe they provide. Priorities to strengthen South African primary care include improving access, informational and relational continuity of care, and ensuring the implementation of community-orientated primary care. The PCAT is a useful tool to measure quality of primary care and progress with UHC.

Publication: Bresick G, Von Pressentin KB, Mash R. Evaluating the performance of South African primary care: a cross-sectional descriptive survey. *South African Family Practice*. 2019 May 4;61(3):109-16.

The quality of feedback from outpatient departments at referral hospitals to the primary care providers in the Western Cape: a descriptive survey

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Background: Coordinating care for patients is a key characteristic of effective primary care. Family physicians in the Western Cape formed a research network to enable them to perform practical research on key questions from clinical practice. The initial question, selected by the network, focused on evaluating the quality of referrals to and feedback from outpatient departments at referral hospitals to primary care providers in the Western Cape.

Methods: A descriptive survey combined quantitative data collected from the medical records with quantitative and qualitative data collected from the patients by questionnaire. Family physicians collected data on consecutive patients who had attended outpatient appointments in the last three months. Data were analysed using the Statistical Package for the Social Sciences.

Results: Seven family physicians submitted data on 141 patients (41% male, 59% female; 46% metropolitan, 54% rural). Referrals were to district (18%), regional (28%) and tertiary hospitals (51%). Referral letters were predominantly biomedical. Written feedback

was available in 39% of patients. In 32% of patients, doctors spent time obtaining feedback; the patient was the main source of information in 53% of cases, although many patients did not know what the hospital doctor thought was wrong (36%). The quality of referrals differed significantly by district and type of practitioner, while feedback differed significantly by level of hospital.

Conclusion: Primary care providers did not obtain reliable feedback on specialist consultations at referral hospital outpatients. Attention must be given to barriers to care as well as communication, coordination and relationships across the primary– secondary interface.

Publication: Mash R, Steyn H, Bello M, Von Pressentin K, Rossouw L, Hendricks G, Fouche G, Stapar D. The quality of feedback from outpatient departments at referral hospitals to the primary care providers in the Western Cape: a descriptive survey. South African Family Practice. 2019 Nov 18;61(6):252-9.

At What Cost? A descriptive study evaluating cost awareness of laboratory investigations among doctors working in district hospitals in the West Coast and Cape Winelands districts.

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Background: Globally the cost of health care is steadily increasing, and in South Africa it is no different. The budget for health care in the 2018 / 2019 financial year is R205 billion and is expected to increase by 7.8%. International research has found cost awareness amongst doctors to be poor and there is limited research in South Africa. Improving cost awareness amongst clinicians has shown to have a cost saving effect.

Aim: To evaluate cost awareness of laboratory investigations among doctors working in district hospitals.

Setting: Nine district hospitals within the West Coast and Cape Winelands Districts.

Methods: A descriptive cross-sectional study in the form of a questionnaire was used. This questionnaire was adapted from previous international research.

Results: A response rate of 90% was obtained. Doctors accurately estimated cost in 23.5% (95% CI 21.1 – 26.0) of 30 commonly requested investigations. Age, gender, years of experience, position held, and district of practice, had no significant impact on cost awareness. On a scale of 0-10; doctors rated their cost awareness as 5.5, previous training 3.0, access to information on cost as 4.9, cost influencing their decision making as 6.7 and increasing cost awareness would change their ordering as 7.6.

Conclusion: Cost awareness was found to be poor amongst doctors working in the West Coast and Cape Winelands and was not influenced by their demographic factors. Doctors acknowledged this, however, and reported that they had received minimal cost awareness training and that they had limited access to information about cost.

Factors associated with recurrent unplanned hospital visits amongst adult medical patients at Khayelitsha District Hospital (KDH), Cape Town, South Africa.

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Background: There is a worldwide trend towards decreasing the length of hospital stay as a result of bed pressure and an attempt to decrease hospitalization costs. Khayelitsha has a high population density, with a high disease and social burden. Khayelitsha District Hospital (KDH) needs a rapid bed turnover to meet local demands. This arguably occurs at the price of decreased quality of care and perpetuation of the revolving door phenomenon. The 30 day readmission rate is becoming a benchmark for hospital quality of care assessment. Repeated unplanned hospital visits occur commonly among medical patients at KDH.

Aim: To identify the factors associated with unplanned hospital visits amongst adult medical patients at KDH.

Setting: The internal medicine department at KDH.

Design: A descriptive cross-sectional study was conducted by means of folder reviews, evaluating medical admissions and unplanned hospital visits (UHV) during the preceding 30 days of medical admissions over a 2-month period. The prevalence of UHVs during the preceding 30 days of medical admissions was measured. Factors associated with UHVs prior to admission were identified and reasons for avoidable readmissions were determined.

Results: A total of 407 patient folders were evaluated. The prevalence of UHV was 21.9%. Avoidable readmissions accounted for 37.1% of admissions. Chronic diseases, poorly managed HIV, decreased mobility and shorter hospital stay, were the drivers for recurrent hospital visits. Diagnostic errors (39.0%), complications of admission (24.2%) and too early prior discharge (15.1%) ($p < 0.001$), were the most common reasons for avoidable admissions.

Conclusion: More than 20% of medical admissions visited the hospital in the preceding 30 days and more than one third of these admissions were avoidable. Chronic diseases, poorly managed HIV, decreased mobility and shorter hospital stay were the drivers for recurrent hospital visits. Diagnostic errors, complications of admission and too early discharge were the most common reasons for avoidable admissions. Recurrent hospitalisation was associated with increased morbidity and mortality. Early identification of patients at risk of readmission may guide interventions to reduce readmissions. Decreasing the readmission rate by better clinical care and discharge planning may be a viable strategy to improve hospital efficiency in terms of cost reduction and improved quality of care.

Lifestyle, cardiovascular risk knowledge and patient counselling among selected sub-Saharan African family physicians and trainees

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Background: Cardiovascular disease (CVD) related deaths in sub-Saharan Africa (SSA) are on the rise, and primary care physicians could facilitate the reversal of this trend through treatment and prevention strategies.

Aim: The aim of this study was to determine the relationship between physician lifestyle practices, CVD prevention knowledge and patient CVD counselling practices among family physicians (FPs) and family medicine (FM) trainees, affiliated to FM colleges and organisations in SSA. Setting: FPs and FM trainees affiliated to FM colleges and organisations in Anglophone SSA.

Methods: A web-based cross-sectional analytical study was conducted using validated, self-administered questionnaires. Following collation of responses, the relationship between the participants' CVD prevention knowledge, lifestyle practices and CVD counselling rates was assessed.

Results: Of the 174 participants (53% response rate), 83% were married, 51% were females and the mean age was 39.2 (standard deviation [SD] 7.6) years. Most of the participants responded accurately to the CVD prevention knowledge items, but few

had accurate responses on prioritising care by 10-year risk. Most participants had less than optimal lifestyle practices, except for smoking, vegetable or fruit ingestion and sleep habits. Most participants (65%) usually counselled patients on nutrition, but less frequently on weight management, exercise, smoking and alcohol. The region of practice and physicians with poor lifestyle were predictive of patient counselling rates.

Conclusion: Training on patient counselling and self-awareness for CVD prevention, may influence patient counselling practice. Promoting quality training on patient counselling among FPs as well as a healthy self-awareness for CVD prevention, is thus needed. The complex relationship between physician lifestyle and patient counselling warrants further study.

Publications: Ameh PO, Yakubu K, Miima M, Popoola O, Mohamoud G, Von Pressentin KB. Lifestyle, cardiovascular risk knowledge and patient counselling among selected sub-Saharan African family physicians and trainees. *Afr J Prm Health Care Fam Med.* 2019;11(1), a1701. <https://doi.org/10.4102/phcfm.v11i1.1701>

The perceptions of general practitioners on National Health Insurance in Chris Hani district, Eastern Cape, South Africa

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Background: National Health Insurance (NHI) intends to provide universal health coverage to all South Africans, with equity and quality as its tenets. The participation of private general practitioners (GPs) in NHI is essential. The aim was to explore perceptions of GPs on NHI in Chris Hani district, Eastern Cape, South Africa.

Methods: A descriptive phenomenological qualitative study using semi-structured individual interviews of 12 GPs from six municipalities, was undertaken. Data analysis used the framework method assisted by Atlas.ti software.

Results: GPs in Chris Hani district felt that NHI would improve health and benefit society and be of particular benefit to poor and rural people, as it will improve access to healthcare. Lack of governmental administrative capacity and a human resource plan were seen as barriers to implementation. They believed that NHI would benefit them through a single purchaser system and support more comprehensive care. GPs were concerned

about a lack of information on primary care packages, accreditation, remuneration and patient allocation. They thought that NHI might disadvantage solo GPs. NHI implementation could be improved by actively engaging with GP organisations. Improvement of existing government health facilities and continued medical education were seen as possible ways to better implement NHI.

Conclusion: GPs in this study were generally positive about NHI and thought it would benefit both patients and providers. However, they had concerns regarding the capacity of government to implement NHI and the implications for solo GPs, and needed more information. Government needs to actively engage GPs.

Publication: Gaqavu MM, Mash R. The perceptions of general practitioners on National Health Insurance in Chris Hani district, Eastern Cape, South Africa. *South African Family Practice*. 2019 May 4;61(3):102-8.

Exploring the beliefs and attitudes of private general practitioners towards national health insurance in Cape Town, South Africa

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Background: Private general practitioner (GP) participation in the national health insurance (NHI) is necessary to address doctor shortages and achieve universal health coverage. An indepth understanding of GP's views on the NHI is needed to inform implementation strategies.

Aim: To explore the beliefs and attitudes of GPs towards the proposed NHI system. Setting: Cape Town, South Africa.

Methods: This was a descriptive, exploratory, qualitative study using semi-structured interviews. Eleven GPs were recruited using purposeful snowball sampling from different practices and communities. Thematic data analysis was conducted using the framework approach and Atlas.ti software.

Results: Although GPs saw the need for NHI, they felt that the government was antagonistic towards the private sector and had not engaged in a dialogue. They were wary of integration into a nurse-led primary care system and of being coerced. They felt that the public sector lacked the necessary financial and administrative capacity, and

were concerned about the level, efficiency and sustainability of reimbursement, and the criteria to be used to accredit practices. General practitioners anticipated that the NHI would favour multidisciplinary teams and group practices. They also had mixed ideas about the impact on practice, with some expecting higher workloads, stress and costs with reduced quality of care, while others saw more comprehensive care, better incomes and increased patient satisfaction.

Conclusions: While GPs are essential for the success of the NHI, there are many concerns regarding government policy, plans for implementation and the consequences for GP practice. Many of the concerns expressed could be tackled by greater policy dialogue and clarification.

Publication: Mathew S, Mash R. Exploring the beliefs and attitudes of private general practitioners towards national health insurance in Cape Town, South Africa. *Afr J Prm Health Care Fam Med.* 2019;11(1), a2189. <https://doi.org/10.4102/phcfm.v11i1.2189>

Family physicians' experience and understanding of evidence-based practice and guideline implementation in primary care practice, Cape Town, South Africa

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Background: In primary care, patients present with multi-morbidity and a wide spectrum of undifferentiated illnesses, which makes the application of evidence-based practice (EBP) principles more challenging than in other practice contexts.

Aim: The goal of this study was to explore the experiences and understanding of family physicians (FP) in primary care, with regard to EBP and the implementation of evidence-based guidelines. The study was conducted in Cape Town primary care facilities and South African university departments of Family Medicine.

Methods: For this phenomenological, qualitative study, 27 purposefully selected FPs from three groups were interviewed: senior academic FPs; local FPs in public-sector practice; and local FPs in private-sector practice. Data were analysed using the framework method with the assistance of ATLAS.ti, version 6.1.

Results: Guideline development should be a more inclusive process that incorporates more evidence from primary care. Contextualisation should happen at an organisational level and may include adaptation as well as the development of practical or integrated

tools. Organisations should ensure synergy between corporate and clinical governance activities. Dissemination should ensure that all practitioners are aware of and know how to access guidelines. Implementation should include training that is interactive and recognises individual practitioners' readiness to change, as well as local barriers. Quality improvement cycles may reinforce implementation and provide feedback on the process.

Conclusion: Evidence-based practice is currently limited in its capacity to inform primary care. The conceptual framework provided illustrates the key steps in guideline development, contextualisation, dissemination, implementation and evaluation, as well as the interconnections between steps and barriers or enablers to progress. The framework may be useful for policymakers, health care managers and practitioners in similar settings.

Publication: Pather MK, Mash R. Family physicians' experience and understanding of evidence based practice and guideline implementation in primary care practice, Cape Town, South Africa. *Afr J Prm Health Care Fam Med.* 2019;11(1), a1592. <https://doi.org/10.4102/phcfm.v11i1.1592>

Exploring resilience in family physicians working in primary health care in the Cape Metropole

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Background: Despite the high prevalence of burnout among doctors, studies have shown that some doctors who choose to remain in primary healthcare (PHC) survive, even thrive, despite stressful working conditions. The ability to be resilient may assist family physicians (FPs) to adapt successfully to the relatively new challenges they are faced with. This research seeks to explore resilience through reflection on the lived experiences of FPs who have been working in PHC.

Aim: To explore the resilience of FPs working in PHC in the Cape Metropole. Setting: The study was conducted among FPs in PHC in the Cape Town metropole, Western Cape province, South Africa.

Methods: A phenomenological qualitative study involved interviewing 13 purposefully selected FPs, working in the public sector PHC in the Cape Metropole. Data were analysed using the framework method.

Results: The mean resilience scale was moderate. Six key aspects of resilience were identified: having a sense of purpose, 'silver lining' thinking, having several roles with autonomy, skilful leadership, having a support network and self-care.

Conclusion: The aspects that contribute to FP resilience are multi-faceted. It entails having a sense of purpose, 'silver lining' thinking, having several roles with autonomy, skilful leadership, having a support network and valuing self-care. Our exploration of resilience in FPs in the Cape Metropole corroborates the findings of previous studies. To ensure physician wellness and improved patient outcomes, we recommend that individual and organisational strategies should be implemented in the absence of long-term policy changes.

Publication: Wagner L, Pather MK. Exploring resilience in family physicians working in primary health care in the Cape Metropole. *Afr J Prm Health Care Fam Med.* 2019;11(1), a1982. <https://doi.org/10.4102/phcfm.v11i1.1982>

Identifying quality indicators for prehospital emergency care services in the low to middle income setting: The South African perspective

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Introduction: Historically, performance within the Prehospital Emergency Care (PEC) setting has been assessed primarily based on response times. While easy to measure and valued by the public, overall, response time targets are a poor predictor of quality of care and clinical outcomes. Over the last two decades however, significant progress has been made towards improving the assessment of PEC performance, largely in the form of the development of PEC-specific quality indicators (QIs). Despite this progress, there has been little to no development of similar systems within the low- to middle-income country setting. As a result, the aim of this study was to identify a set of QIs appropriate for use in the South African PEC setting.

Methods: A three-round modified online Delphi study design was conducted to identify, refine and review a list of QIs for potential use in the South African PEC setting. Operational definitions, data components and criteria for use were developed for 210 QIs for inclusion into the study.

Results: In total, 104 QIs reached consensus agreement including, 90 clinical QIs, across 15 subcategories, and 14 non-clinical QIs across

two subcategories. Amongst the clinical category, airway management (n=13 QIs; 14%); out-of-hospital cardiac arrest (n=13 QIs; 14%); and acute coronary syndromes (n=11 QIs; 12%) made up the majority. Within the non-clinical category, adverse events made up the significant majority with nine QIs (64%).

Conclusion: Within the South Africa setting, there are a multitude of QIs that are relevant and appropriate for use in PEC. This was evident in the number, variety and type of QIs reaching consensus agreement in our study. Furthermore, both the methodology employed, and findings of this study may be used to inform the development of PEC specific QIs within other LMIC settings

Publication: Howard I, Cameron P, Wallis L, Castrén M, Lindström V. Identifying quality indicators for prehospital emergency care services in the low to middle income setting: The South African perspective. African Journal of Emergency Medicine. 2019 Dec 1;9(4):185-92.

Utilisation of emergency blood in a cohort of South African emergency centres with no direct access to a blood bank

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Introduction: The transfusion of emergency blood is an essential part of haemostatic resuscitation. Locally, where direct access to a blood bank is limited, emergency blood is stored within emergency centres. It was previously suggested that stored blood provides inadequate volumes compared to what is needed. Minimal data are available regarding indications for emergency blood usage. We aimed to describe the utilisation of emergency blood in selected Cape Town emergency centres.

Methods: A cross-sectional study was carried out at three secondary level emergency centres (no blood bank), and one tertiary centre (with a blood bank). Data from emergency blood recipients were recorded over a three-month study period. Indications for transfusion, number of units and location of transfusion were recorded. Indications and usage location were described in numbers and proportions.

Results: A total of 329 emergency blood units were transfused to 210 patients. Trauma accounted for 39% (n=81) of cases and other surgical conditions for 22% (n=47), particularly upper gastrointestinal 11% (n=24) and perioperative bleeding 8%

(n=16). Medical conditions accounted for 15% (n=31), with anaemia 13% (n=27), the most prevalent indication. Gynaecological conditions accounted for 15% (n=32), mostly ectopic pregnancy 8% (n=17). The majority of emergency blood, 77% (n=253) were used in the emergency centres or operating theatres, 6% (n=21).

Conclusion: Trauma remains a major indication for emergency blood transfusion in this setting. This study questions the use of emergency blood for certain non-urgent diagnoses (i.e. anaemia). Given the scarcity of this resource and limitations to access, appropriate use of emergency blood needs to be better defined locally. Ongoing monitoring of the indications for which emergency blood is used, improved transfusion stewardship and better systems to access emergency blood, should be a priority in this setting.

Publication: Morris D, van Hoving D, Stander M, Bruijns S. Utilisation of emergency blood in a cohort of South African emergency centres with no direct access to a blood bank. *African Journal of Emergency Medicine*. 2019 Sep 1;9(3):114-8.

A Cross Sectional Study of the Availability of Paediatric Emergency Equipment in 24 hour Cape Town Emergency Centres

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Background: Healthcare facilities are often not equipped to deliver effective paediatric emergency care, despite a significant paediatric emergency patient burden. The availability of paediatric emergency equipment potentially impacts on morbidity and mortality.

Objective: To describe the availability of essential, functional paediatric emergency resuscitation equipment on the resuscitation trolley, in 24-hour emergency centres within the Cape Town Metropole.

Methods: A cross sectional study was conducted over a 6-month period in government funded hospitals (district-level and higher), within the Cape Town Metropole, providing 24-hour emergency paediatric care. A standardised data collection sheet of essential resuscitation equipment expected to be available on the resuscitation trolley, was used. Items were considered to be available if at least one piece of equipment was present.

Functionality of equipment available on the resuscitation trolley was defined as: equipment that hadn't expired, whose original packaging was not outwardly damaged or compromised and all components were present and intact. Comparisons were done using the χ^2 -test.

Results: Overall, a mean of 43% (30/69) of equipment was available across all hospitals. Mean availability of functional equipment was 42% overall, 41% at district-level hospitals, and 45% at regional/tertiary hospitals ($p=0.91$). The overall mean availability of equipment in the resuscitation area was 49% across all hospitals. There was no difference between emergency centres run by emergency physicians and those run by non-emergency physicians (43% versus 41%, $p=0.95$).

Conclusion: The suboptimal availability and functionality of equipment at district-level and higher is a modifiable barrier to the provision of high quality paediatric emergency care.

Use of Predictive Modeling to Plan for Special Event Medical Care During Mass Gathering Events

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Objectives: In 2010, South Africa (SA) hosted the Fédération Internationale de Football Association (FIFA) World Cup (soccer). Emergency Medical Services (EMS) used the SA mass gathering medicine (MGM) resource model to predict resource allocation. This study analysed data from the World Cup and compared them with the resource allocation predicted by the SA mass gathering model.

Methods: Prospectively, data were collected from patient contacts at 9 venues across the Western Cape province of South Africa. Required resources were based on the number of patients seeking basic life support (BLS), intermediate life support (ILS), and advanced life support (ALS). Overall patient presentation rates (PPRs) and transport to hospital rates (TTHR) were also calculated.

Results: BLS services were required for 78.4% (n = 1279) of patients and were consistently overestimated using the SA mass gathering model. ILS services were required for 14.0% (n = 228), and ALS services were required for 3.1% (n = 51) of patients. Both ILS and ALS services, and TTHR were underestimated at smaller venues.

Conclusions: The MGM predictive model overestimated BLS requirements and inconsistently predicted ILS and ALS requirements. MGM resource models, which are heavily based on predicted attendance levels, have inherent limitations, which may be improved by using research-based outcomes.

Publication: Allgaier RL, Shaafi-Kabiri N, Romney CA, Wallis LA, Burke JJ, Bhangu J, Thomas KC. Use of predictive modeling to plan for special event medical care during mass gathering events. *Disaster medicine and public health preparedness*. 2019 Dec;13(5-6):874-9.

Targeting ethical considerations tied to image-based mobile health diagnostic support specific to clinicians in low-resource settings: the Brocher proposition

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Background: mHealth applications assist workflow, help move towards equitable access to care, and facilitate care delivery. They have great potential to impact care in low-resource countries, but have significant ethical concerns pertaining to patient autonomy, safety, and justice.

Objective: To achieve consensus among stakeholders on how to address concerns pertaining to autonomy, safety, and justice among mHealth developers and users in low-resource settings, in particular for the application of image-based consultation for diagnostic support.

Methods: A consensus approach was taken during a three-day workshop using a purposive sample of global mHealth stakeholders (n = 27) professionally and geographically spread. Throughout a series of introductory talks, group brainstorming, plenary reviews, and synthesis by the moderators, lists of actions were generated that address the concerns engendered by mHealth applications on autonomy, justice and safety, taking into account the development, implementation, and scale-up phases of an mHealth application lifecycle.

Results: Several types of actions were recommended: building in risk mitigation measures from the development stage, establishing inclusive consultation processes, using open sources platform whenever possible, training all clinical users, and bearing in mind that the gold standard of care is face-to-face consultation with the patient. Recommendations of patient, community and health system participation and of governance were identified as cutting across the mHealth lifecycle.

Conclusion: Priorities agreed-upon at the meeting echo those put forward concerning other domains and locations of application of mHealth. Those more forcefully articulated are the need to adopt and maintain participatory processes, as well as promoting self-governance. They are expected to cut across the mHealth lifecycle and are prerequisites to the safeguard of autonomy, safety and justice.

Publication: Laflamme L, Chipps J, Fangerau H, Juth N, Légaré F, Sawe HR, Wallis L. Targeting ethical considerations tied to image-based mobile health diagnostic support specific to clinicians in low-resource settings: the Brocher proposition. *Global health action*. 2019 Jan 1;12(1):1666695.

EDUCATIONAL RESEARCH



Student teaching on intercostal drains during COVID-19 epidemic

Designing faculty development: lessons learnt from a qualitative interpretivist study exploring students' expectations and experiences of clinical teaching

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Background: Clinical teaching plays a crucial role in the transition of medical students into the world of professional practice. Faculty development initiatives contribute to strengthening clinicians' approach to teaching. In order to inform the design of such initiatives, we thought that it would be useful to discover how senior medical students' experience of clinical teaching may impact on how learning during clinical training might be strengthened.

Methods: This qualitative study was conducted using convenience sampling of medical students in the final two months of study before qualifying. Three semi-structured focus group discussions were held with a total of 23 students. Transcripts were analysed from an interpretivist stance, looking for underlying meanings. The resultant themes revealed a tension between the students' expectations and experience of clinical teaching. We returned to our data looking for how students had responded to these tensions.

Results: Students saw clinical rotations as having the potential for them to apply their knowledge and test their procedural abilities in the environment where their professional practice and identity will develop. They expected engagement in the clinical workplace. However, their descriptions were of tensions between prior expectations and actual experiences in the environment. They

appreciated that learning required them to move out of their "comfort zone", but seemed to persist in the idea of being recipients of teaching rather than becoming directors of their own learning. Students seem to need help in participating in the clinical setting, understanding how this participation will construct the knowledge and skills required as they join the workplace. Students did not have a strong sense of agency to negotiate participation in the clinical workplace.

Conclusions: There is the potential for clinicians to assist students in adapting their way of learning from the largely structured classroom based learning of theoretical knowledge, to the more experiential informal workplace-based learning of practice. This suggests that faculty developers could broaden their menu of offerings to clinicians by intentionally incorporating ways not only of offering students affordances in the clinical learning environment, but also of attending to the development of students' agentic capability to engage with those affordances offered.

Publication: Blitz J, De Villiers M, Van Schalkwyk S. Designing faculty development: lessons learnt from a qualitative interpretivist study exploring students' expectations and experiences of clinical teaching. BMC medical education. 2019 Dec;19(1):1-9.

Optimising the learning environment for undergraduate students in the Department of Family Medicine at Sefako Makgatho Health Sciences University

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Background: An important determinant of a medical student's behaviour and performance is the department's teaching and learning environment. Evaluation of such an environment can explore methods to improve educational curricula and optimise the academic learning environment.

Aim: The aim is to evaluate the educational environment of undergraduate students in the Department of Family Medicine as perceived by students.

Setting: This descriptive quantitative study was conducted with one group of final-year students (n=41) enrolled in 2018, with a response rate of 93% (n=39). Students were in different training sites at SMU.

Methods: Data were collected using the Dundee Ready Educational Environmental Measure (DREEM) questionnaire. Total and mean scores for all questions were calculated.

Results: The learning environment was given a mean score of 142/200 by the students. Individual subscales show that 'academic self-perception' was rated the highest (25/32), while 'social self-perception' had the lowest score (13/24). Positive perception aspects

of the academic climate included: student competence and confidence; student participation in class; constructive criticism provided; empathy in medical profession; and friendships created. Areas for improvement included: provision of good support systems for students; social life improvement; course coordinators being less authoritarian and more approachable; student-centred curriculum with less emphasis on factual learning and factual recall.

Conclusion: Students' perceptions of their learning environment were more positive than negative. The areas of improvement will be used to draw lessons to optimise the curriculum and learning environment, improve administrative processes and develop student support mechanisms in order to improve students' academic experience.

Publication: Govender I, De Villiers M. Optimising the learning environment for undergraduate students in the Department of Family Medicine at Sefako Makgatho Health Sciences University. *South African Family Practice*. 2019 Aug 23;61(4):136-43.

Implementing and evaluating an e-portfolio for postgraduate family medicine training in the Western Cape, South Africa

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Background: In South Africa it is compulsory to submit a satisfactory portfolio of learning to gain entrance to the national exit examination of the College of Family Physicians and to qualify as a family physician. A paper-based portfolio has been implemented thus far and the need for an electronic portfolio (e-portfolio) was identified. The aim of the study was to describe and evaluate the implementation of an e-portfolio for the training of family medicine registrars in the Western Cape province of South Africa.

Methods: Mixed methods were used. A quasi-experimental study evaluated paper- and e-portfolios from the same 28 registrars in 2015 compared to 2016. Semi-structured interviews were conducted with 11 registrars or supervisors to explore their experiences of using the e-portfolio. Quantitative data was analysed in the Statistical Package for Social Sciences and qualitative data in Atlas.ti.

Results: Most respondents found the e-portfolio easier to use and more accessible. It made progress easier to monitor and provided sufficient evidence of learning. Feedback was made easier and more explicit. There were concerns regarding face-to-face feedback being negatively affected. It was suggested to

have a feedback template to further improve feedback. Several aspects were significantly better in the e-portfolio, such as feedback on the registrar's general behaviour, alignment with learning outcomes, less feedback based on hearsay and acknowledgement of the feedback by the registrar. Although not statistically significant, there was an increase in the usage of the e-portfolio, compared to the paper portfolio.

Conclusion: In general, the e-portfolio is an improvement on the paper-based portfolio. It is easier to access, more user-friendly and less cumbersome. It makes feedback and monitoring of progress and development of registrars easier and more visible and provides sufficient evidence of learning. Its implementation throughout South Africa is recommended.

Publication: De Swardt M, Jenkins LS, Von Pressentin KB, Mash R. Implementing and evaluating an e-portfolio for postgraduate family medicine training in the Western Cape, South Africa. BMC medical education. 2019 Dec 1;19(1):251.

Global Health Mentoring Toolkits: A Scoping Review Relevant for Low- and Middle-Income

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Introduction: Capacity building in low- and middle-income country (LMIC) institutions hinges on the delivery of effective mentorship. This study presents an overview of mentorship toolkits applicable to LMIC institutions identified through a scoping review.

Methods: A scoping review approach was used to 1) map the extent, range, and nature of mentorship resources and tools available and 2) to identify knowledge gaps in the current literature. To identify toolkits, we collected and analysed on-line data that met the following criteria: written in English and from organizations and individuals involved in global health mentoring. We searched electronic databases, including PubMed, Web of Science, and Google Scholar, and Google search engine. Once toolkits were identified, we extracted the available tools and mapped them to pre-identified global health competencies.

Results: Only three of the 18 identified toolkits were developed specifically for the LMIC context. Most toolkits focused on individual mentor–mentee relationships. Most focused on the domains of communication

and professional development. Fewer toolkits focused on ethics, overcoming resource limitations, and fostering institutional change. No toolkits discussed strategies for group mentoring or how to adapt existing tools to a local context.

Conclusion: There is a paucity of mentoring resources specifically designed for LMIC settings. We identified several toolkits that focus on aspects of individual mentor–mentee relationships that could be adapted to local contexts. Future work should focus on adaptation and the development of tools to support institutional change and capacity building for mentoring.

Publication: Hansoti B, Kalbarczyk A, Hosseinipour MC, Prabhakaran D, Tucker JD, Nachege J, Wallis L, Stiles JK, Wynn A, Morrioni C. Global health mentoring toolkits: a scoping review relevant for low-and middle-income country institutions. *The American journal of tropical medicine and hygiene*. 2019 Jan 10;100(1_Suppl):48-53.



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