

Identifying Research Priorities in Musculoskeletal Trauma Care in Sub-Saharan Africa

Orthopaedic Research Collaboration in Africa*

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Background: In low and middle-income countries (LMICs), individuals suffer from a disproportionately higher number of musculoskeletal (MSK) injuries compared with those living in a high-income setting. However, despite the higher burden of death and disability from MSK injuries in LMICs, there has been little policy, research, and funding invested in addressing this distinctly overlooked problem. Using a consensus-based approach, the aim of this study was to identify research priorities for clinical trials and research in MSK trauma care across sub-Saharan Africa.

Methods: A modified Delphi technique was utilized; it involved an initial scoping survey, a 2-round Delphi process, and, finally, review by an expert panel with members of the Orthopaedic Research Collaboration in Africa. This study was conducted among MSK health-care practitioners treating trauma in sub-Saharan Africa.

Results: Participants from 34 countries across sub-Saharan Africa contributed to the 2 rounds of the Delphi process, and priorities were scored from 1 (low priority) to 5 (high priority). Public health topics related to trauma care ranked higher than those focused on clinical effectiveness, with the top 10 public health research questions scoring higher than the top 10 questions for clinical effectiveness. Ten public health and 10 clinical effectiveness questions related to MSK trauma care were identified; the highest-ranked questions in the respective categories were related to education and training and to the management of femoral fractures.

Conclusions: This consensus-driven research priority study will guide health-care professionals, academics, researchers, and funders to improve the evidence on MSK trauma care across sub-Saharan Africa and inform funders about priority areas of future research.

There are >5 million deaths per year from traumatic injuries, accounting for 11% of the current global burden of disease¹. By the end of 2021, traumatic injuries were expected to be the third-leading cause of death worldwide, with nearly twice the number of fatalities that result from HIV/AIDS (human immunodeficiency virus/acquired immune deficiency syndrome), tuberculosis, and malaria combined¹. They occur at a disproportionately higher rate in low and middle-income countries (LMICs), in which 90% of injuries and 83% of global deaths occur²⁻⁴. For every injury-related death, up to 50 additional people sustain disabilities, resulting in a loss of >220 million disability-adjusted life years annually^{2,5}. Epidemiological research has reported that nearly 1% of the population in some countries in sub-Saharan Africa (SSA) suffer

from some form of injury-related disability^{6,7}. Musculoskeletal (MSK) injuries account for the majority of these injuries. More than 130 million individuals worldwide sustain fractures per year, and 78% of injury-related disabilities are the result of an MSK extremity injury².

Currently, although there is the obvious substantial burden of death and disability from MSK injuries, there has been little policy, research, and funding invested in addressing this distinctly overlooked problem. Additionally, the evidence underpinning the management of MSK injuries across SSA is poor and is almost exclusively based on evidence from high-income countries, where the resources, health-care training, infrastructure, and presentation of MSK injuries are very different.

*A list of the ORCA members is included in a note at the end of the article.

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One of the challenges faced by surgeons and practitioners wishing to undertake clinical research in SSA is access to funding for high-quality research. The challenge faced by funding institutions is how to identify the priority research questions with the greatest need of funding. Because potential research is often sufficiently disparate, important clinical research ideas may never be disseminated from practitioners to funders.

The Orthopaedic Research Collaboration in Africa (ORCA) in partnership with a nongovernmental organization, the AO Alliance (<https://ao-alliance.org>), is a collaboration that is dedicated to improving MSK health care via research throughout SSA. It comprises surgeons, researchers, nongovernmental organizations, and policymakers from across SSA, the United Kingdom, and the United States with an interest and expertise in MSK trauma-care research. A key goal of the group is to determine the research priorities of orthopaedic surgeons and other health-care practitioners in SSA in order to set the agenda for studies in MSK trauma care throughout SSA that can be presented to funders. This paper describes the methodology that was used in our research and reports the priorities that were identified.

Materials and Methods

A modified Delphi process was utilized to attain a consensus on the research priorities among orthopaedic surgeons and MSK health practitioners in SSA (Fig. 1).

Phase 1A: Identifying the Research Questions

We used a Google Forms online survey for the following question: "Thinking about your clinical practice in the field of musculoskeletal/orthopaedic trauma surgery and other musculoskeletal/orthopaedic emergencies (infection, etc.), what are the most important clinical questions that need addressing in your setting?" Responses were received as free-text comments and participants were advised to present ideas based around a Population, Intervention, Comparison, and Outcome (PICO) format if interventional proposals were submitted. The survey was distributed via email across the AO Alliance and ORCA network, and responses were collated anonymously. The ORCA network is made up of 1,500 English and 500 French-speaking individuals involved in some aspect of MSK trauma care in SSA. When the predominant language in a particular country was French, all of the surveys were translated into French and circulated. Participants were allowed to submit an unlimited number of research ideas, and anyone

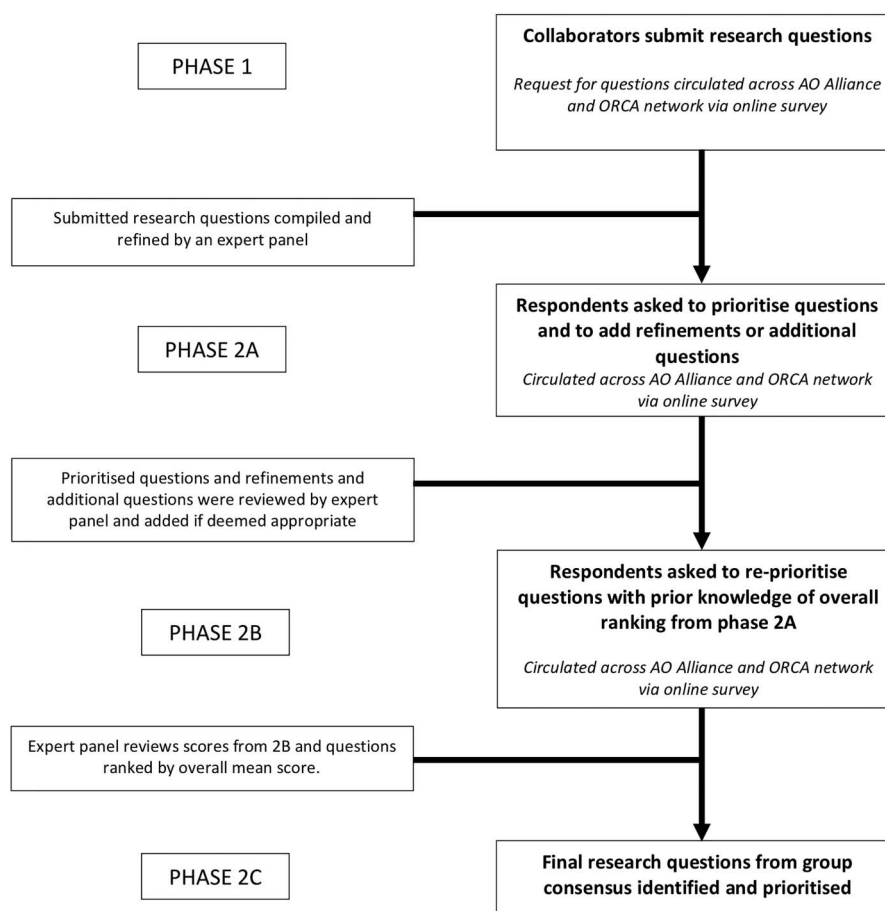


Fig. 1
Summary of the modified Delphi process.

TABLE I Summary of the Demographics from Phase 1A Respondents *

Country (N = 29)	Total	Job Role (N = 10)	Total	Subspecialty (N = 14)	Total	Sector (N = 6)	Total
Malawi	19	T&O consultant	87	General	71	Government	77
Ghana	15	Registrar/resident	16	Trauma	27	Government and private	35
Ethiopia	14	T&O fellow	8	Pediatrics	14	Mission/faith based	13
Cameroon	8	T&O clinical officer	6	Arthroplasty	5	Private	5
Togo	8	Medical officer	4	Knee	3	NGO	1
Zimbabwe	8	Junior T&O surgeon	3	Spine	2	OOCF	1
Kenya	7	Nurse	3	Limb reconstruction	2		
Nigeria	7	Consultant general surgeon	2	Soft tissue (knee/sports)	2		
Gambia	6	T&O technologist	2	Arthroplasty/sports	1		
Ivory Coast	4	Did not specify	1	Foot and ankle	1		
Rwanda	4			General surgery	1		
Tanzania	4			Hands	1		
Guinea	3			Orthopaedics	1		
DRC	3			Shoulder and elbow	1		
Uganda	3						
Zambia	3						
Chad	2						
Mozambique	2						
Sierra Leone	2						
CAR	1						
Gabon	1						
Liberia	1						
Mauritius	1						
Namibia	1						
Niger	1						
Senegal	1						
South Africa	1						
South Sudan	1						
Sudan	1						
Total	132		132		132		132

*T&O = trauma & orthopaedics, DRC = Democratic Republic of the Congo, CAR = Central African Republic, NGO = nongovernmental organization, and OOCF = out of clinical practice.

working in SSA who responded was included in the study. This part of the survey was open for a 6-week period from November 20, 2018, until January 1, 2019.

Phase 1B: Determining the Research Questions

The comprehensive list of submitted research questions was compiled into a focused list by an expert panel made up of members of the ORCA research committee (9 members in total, including surgeons, researchers, members of nongovernmental organizations, and policymakers: 5 from SSA, 2 from the U.K., and 2 from the U.S.). Each question was reviewed by 3 members of the expert panel to ensure that the questions were related to research in orthopaedic/MSK trauma care in SSA, and if not, they were classified as “out-of-scope.”

Furthermore, questions focusing on basic science research were excluded and deemed out-of-scope. Any submission by individuals who were not based or actively working in an SSA country were not included. Once all of the “in-scope” questions were determined, comparable or related research questions were merged into a single question by the reviewers. All of the remaining in-scope questions were then searched using evidence that had been published by the National Institute for Health and Care Excellence and the Cochrane Library, as well as evidence from systematic reviews and randomized controlled trials (Level of Evidence I and II). If 3 reviewers from the expert panel believed that the in-scope questions had already been answered by appropriate research in the last 10 years, these questions were removed.

TABLE II Summary of the Demographics from Phase 2A Respondents*

Country (N = 33)	Total	Job Role (N = 18)	Total	Subspecialty (N = 13)	Total	Sector (N = 7)	Total
Tanzania	26	T&O consultant	76	General	77	Government	168
Ethiopia	23	Registrar/resident	53	Trauma	41	Government and private	20
Malawi	23	General surgeon	25	General trauma	26	Private	19
Cameroon	14	Non-clinician	14	Not specified	20	Mission/faith-based	16
Nigeria	12	T&O fellow	14	General surgery	17	Academic	1
South Africa	11	General practitioners	11	Arthroplasty	13	Medical student	1
Togo	11	T&O doctor not in training	7	Pediatrics	9	NGO	1
Burundi	10	T&O surgical assistant	6	Soft tissue (knee/sports)	8		
Ghana	10	Nurse	4	Limb reconstruction	6		
Kenya	10	Consultant general surgeon	4	Hands	3		
Gambia	8	Intern/house officer	3	Foot and ankle	2		
Rwanda	7	Physiotherapist	2	Oncology	2		
Zimbabwe	7	Nurse assistant	2	Spine	2		
Benin	6	Anesthetist	1				
Ivory Coast	6	Assistant medical technician	1				
Zambia	6	General surgical assistant	1				
Gabon	5	Neurosurgeon	1				
Mozambique	4	T&O clinical officer	1				
DRC	4						
Chad	3						
Senegal	3						
South Sudan	3						
Burkina Faso	2						
CAR	2						
Guinea	2						
Botswana	1						
Libya	1						
Mauritius	1						
Namibia	1						
Niger	1						
Sierra Leone	1						
Sudan	1						
Uganda	1						
Total	226		226		226		226

*Non-clinician = clinical officer, nurse practitioner, or bone setter; T&O = trauma & orthopaedics; DRC = Democratic Republic of the Congo; CAR = Central African Republic; and NGO = nongovernmental organization.

Phase 2A: Delphi Round 1 (Ranking Research Questions)

An additional Google Forms online survey was circulated throughout the ORCA network. This was sent to individuals regardless of their response to phase 1A of the study. Participants were advised to review each of the presented research questions and subsequently rate them on a 5-point Likert scale (low priority [1] to high priority [5]) based on the importance of each question to their current clinical practice in SSA. This survey was available for completion

over an 8-week period from October 1 until December 1, 2019. Reminders were sent by email after 2, 4, and 6 weeks and 24 hours before the survey closed. Participants were also encouraged to submit additional questions and highlight any modifications or improvements to the existing questions.

On completion of phase 2A, 3 reviewers from the expert panel considered all of the suggested refinements and additional questions to ensure that suggestions were in-scope with use of the same process that was discussed regarding phase 1B.

TABLE III Summary of the Demographics from Phase 2B Respondents*

Country (N = 30)	Total	Job Role (N = 18)	Total	Subspecialty (N = 12)	Total	Sector (N = 11)	Total
Ethiopia	37	T&O consultant	140	General	143	Government	213
Malawi	34	Registrar/resident	71	Trauma	57	Private and government	42
South Africa	28	Non-clinician	28	General trauma	31	Mission/faith-based	24
Nigeria	21	T&O fellow	16	Arthroplasty	18	Private	20
Ghana	20	T&O doctor not in training	15	General surgery	18	NGO	3
Kenya	17	General practitioner	12	Pediatrics	15	Para-public	3
Rwanda	16	Nurse	9	Limb reconstruction	9	Academic	2
Gambia	14	Intern/house officer	6	Soft tissue (knee/sports)	8	Other	1
Tanzania	13	Medical assistant	2	Foot and ankle	4	Foundation	1
Zimbabwe	12	T&O technician	2	Spine	4	Student	1
Libya	10	Physiotherapist	2	Hands	3	University	1
Togo	10	Consultant general surgeon	2	Shoulder and elbow	1		
Zambia	10	Anesthesia technician	1				
Cameroon	9	O&G doctor	1				
Burundi	8	Neurosurgeon	1				
Burkina Faso	6	Researcher (non-clinical)	1				
Mozambique	6	Plastic surgeon	1				
Uganda	6	Public health officer	1				
DRC	5						
Ivory Coast	5						
Gabon	5						
Benin	4						
Guinea	4						
South Sudan	4						
Chad	2						
Botswana	1						
Niger	1						
Senegal	1						
Sierra Leone	1						
Sudan	1						
Total	311		311		311		311

*Non-clinician = clinical officer, nurse practitioner, or bone setter; T&O = trauma & orthopaedics; DRC = Democratic Republic of the Congo; O&G = obstetrics & gynecology; and NGO = nongovernmental organization.

Phase 2B: Delphi Round 2 (Reranking Research Questions with Knowledge of Previous Response Outcomes)

A final survey was circulated to those who participated in the first round of the Delphi consensus survey (phase 2A). Additionally, this phase of the survey was distributed across the ORCA network, regardless of whether participants responded in phase 2A. Participants were given a visual graphic display (bar chart) showing the mean responses of all of the participants from the first survey (phase 2A) for each question, with the following instruction: “We will now present the research questions from the previous round and ask you to re-score the questions. We will also show you the scores from participants in

round 1 (phase 2A), which will demonstrate the current state of collective opinion which may help to inform your choices.” Participants then rescored the questions with the knowledge of the group responses in phase 2A.

This phase of the study was open for an 8-week period from April 21 until June 16, 2020. Again, reminders were sent by email after 2, 4, and 6 weeks and 24 hours before the survey closed.

Phase 2C: Final Research Questions

The research questions that were scored in phase 2B were ranked based on the overall mean score per question. The

TABLE IV Top 10 Priority Research Questions Focused on Clinical Effectiveness in Trauma Care

Mean Score	Clinical Effectiveness in Musculoskeletal/Orthopaedic Trauma Care
4.34	Is surgical fixation more clinically and cost effective than nonoperative care in the management of femur shaft fractures in a resource limited setting?
4.27	What is the most appropriate treatment in a resource limited setting of the delayed presentation of the sequelae of childhood chronic osteomyelitis/septic arthritis of the hip?
4.23	What is the clinical and cost-effectiveness of training patients and/or caregivers in physiotherapy/rehabilitation protocols following traumatic injuries compared with no physiotherapy/rehabilitation?
4.03	Does an urgent surgical debridement decrease the infection rate in low velocity gunshot fractures compared with treating these fractures as closed fractures?
3.98	What is the clinical outcome of internal fixation versus external fixation for the definitive treatment of delayed presentation of open tibia fractures?
3.97	Following an open tibia fracture where no plastic surgery support is available, is vacuum-assisted wound therapy more clinically and cost-effective than simple dressing in definitive wound management with soft tissue loss?
3.96	What is the clinical and cost-effectiveness of amputation versus bone transport using an external fixator for the management of significant bone loss in the tibia in a resource-limited setting?
3.95	What is the clinical and cost-effectiveness of internal fixation versus primary fusion for the management of delayed (>2 months) presentation of unstable ankle fractures?
3.94	What is the clinical and cost-effectiveness of surgical fixation versus nonoperative care for the treatment of pelvic ring and acetabular injuries?
3.87	Is hemiarthroplasty/total hip replacement more clinically and cost-effective than nonoperative care in the management of intracapsular neck of femur fractures in elderly (>60 years) patients in a low-income setting?

research committee reviewed the scores and produced a list of the questions in an order of priority that was determined from the modified Delphi process described above. Questions were grouped into the themes of “Clinical Effectiveness in Musculoskeletal/Orthopaedic Trauma Care” and “Musculoskeletal/Orthopaedic Public Health Care.”

Source of Funding

This study was not funded; however, it was supported by the AO Alliance.

Results

Phase 1A: Identifying the Research Questions

In the initial phase, a total of 256 questions were submitted from 132 respondents across 29 SSA countries. A summary of the demographics of the people who submitted questions can be seen in Table I.

Phase 1B: Determining the Research Questions

Three members of the expert panel refined the initial 256 questions that had been submitted to produce a list of

TABLE V Top 10 Priority Research Questions Focused on Public Health and Trauma Care

Mean Rank	Musculoskeletal/Orthopaedic Public Health Care
4.53	Do orthopaedic education and teaching courses improve orthopaedic care in a resource limited setting?
4.51	Which organisms are predominant causes of orthopaedic infections in sub-Saharan Africa and what antibiotics are best used to treat them?
4.48	What is the socioeconomical impact to the patient and health care system of a chronic osteomyelitis and its sequelae in Africa?
4.44	What are the most cost-effective preventative strategies to reduce avoidable mortality and morbidity from road traffic accidents in a low-income country?
4.40	What is the social economic cost to the patient and health care system of trauma in Africa?
4.38	What are the most common causes of orthopaedic trauma in Africa and are these preventable?
3.93	What are the prevalence and economic cost of hand injuries in Africa?
3.92	In Africa, what are the incidence and prevalence of venous thromboembolism and pulmonary embolism in adult orthopaedic patients who have lower limb trauma?
3.83	What is the ideal ratio of orthopaedic surgeons per head of population to manage the burden of trauma in low- and middle-income countries?
3.74	Can current functional and patient recorded outcome measures be translated into a low- or middle-income setting?

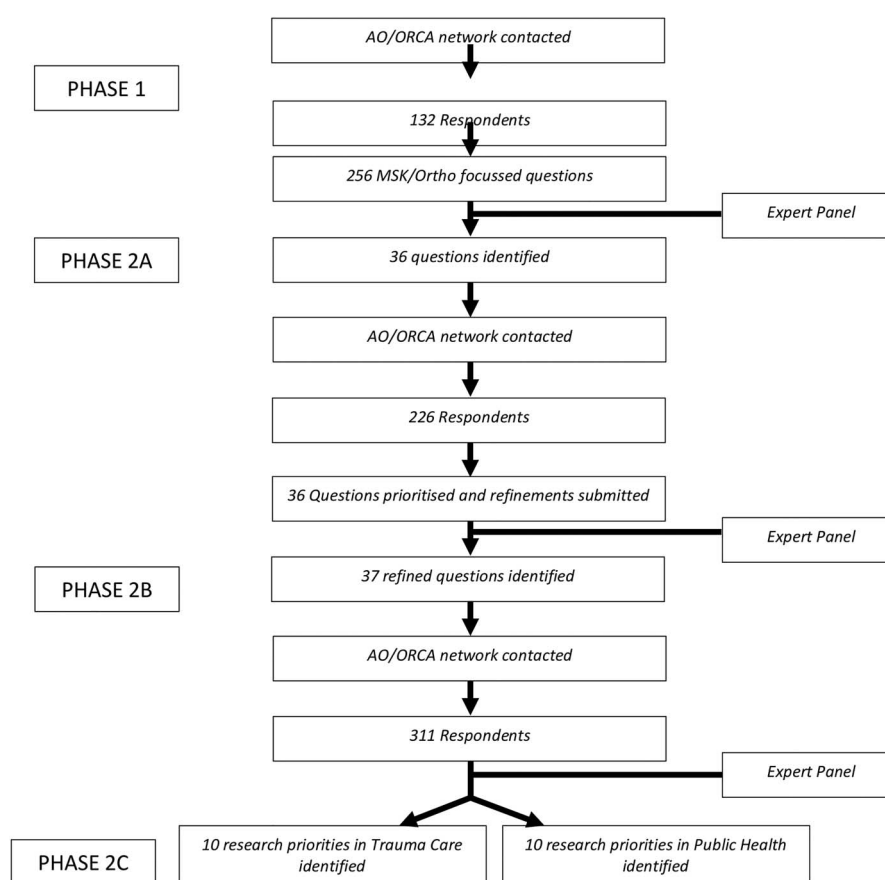


Fig. 2
Summary of results from the Delphi process.

questions for distribution during phase 2A. First, questions that had been deemed out-of-scope were removed, leaving 153 questions. All duplicate questions were removed (77 questions), and similar questions were combined (32 questions). Entries from individuals who were not based in an SSA country (8 questions) were also removed, leaving a total of 36 research questions that were distributed in the next phase of the Delphi process.

Phase 2A: Delphi Round 1 (Ranking Research Questions)

A total of 226 respondents completed this round of the Delphi process (Table II). No refinements were made to the presented questions, and 1 additional question was suggested by the respondents. After considering the new question, the expert panel added it to the next phase of the study. This additional question was clearly highlighted in the next round of the Delphi process.

Phase 2B: Delphi Round 2 (Reranking Research Questions with Knowledge of Previous Response Outcomes)

Following the addition of the new question, 37 questions were rescored by 311 respondents during phase 2B of the Delphi process (Table III). All of the respondents scored each question. The mean score for the “relative degree of importance” of the posed questions was 3.81.

Phase 2C: Final Research Questions Based on Group Consensus

The scored questions were then reviewed by all members of the expert panel. The final mean scores for the relative degree of importance of all of the posed questions was 3.85. It was evident that the ranked questions fell into 2 clear themes. One theme focused on clinical effectiveness in trauma care and the other focused on general trauma and public health care. The uncertainties involving general trauma public health care were ranked higher than those focusing on clinical effectiveness in trauma care, with the top 10 general trauma public health research questions scoring higher than the top 10 questions for clinical effectiveness in trauma care. Given the range of the awarded scores, 10 research questions regarding clinical effectiveness in trauma care and 10 research questions regarding public health and trauma care were prioritized (Tables IV and V). A summary of the complete modified Delphi process can be seen in Figure 2.

Discussion

To our knowledge, this is the first study to determine the clinical research priorities for MSK trauma care across SSA. Taking into account the large number of participants from 34 of 46 countries in SSA, the results are likely to be broadly

representative of MSK practitioners and health-care providers within the region.

The top 10 priorities relating to public health in MSK trauma care scored higher than those related to clinical effectiveness in trauma care (mean scores, 4.27 versus 4.01). This may reflect an understanding that public health approaches to injury have the potential to yield greater overall impact than improving outcomes for specific injuries. The top priorities regarding public health included questions concerning teaching and education, infection, socioeconomic impact of trauma, trauma prevention and causes, outcome measures, and resources. Furthermore, priorities around the treatment of femoral, ankle, tibial, hip, and open fractures were prominent in the top questions related to clinical effectiveness and rehabilitation. These results reflect important clinical problems that MSK health practitioners frequently confront where current evidence is substantially lacking.

The Delphi process that was used in this study is an iterative process that has been shown to be an effective and efficient approach for gathering informed judgments and ideas to achieve consensus from a large group of participants⁸. Increasingly, this approach has been utilized to highlight and present research priorities in health care^{9,10}. The methodology that was used in this study is more accurately described as a modified Delphi approach because it combines the Delphi process to generate a ranked list with an expert panel to guide the production of the questions and subsequent consensus through structured communications¹¹. This approach has been used successfully in the U.K. to develop research priorities in orthopaedic research that have been successfully funded to produce high-level research that focuses on improving and changing practice¹¹.

A substantial burden of death and disability from MSK injuries exists in LMICs, but the amount of funding, infrastructure, and research that is dedicated to MSK injury is infinitesimally small when compared with other important global health problems, including HIV/AIDS, malaria, and tuberculosis, despite the fact that traumatic injuries cause 60% more deaths than all communicable diseases combined². Therefore, little is known about the burden, health-care provisions, health-care systems, and wider impact of MSK injuries in LMICs. SSA has a higher (if not the highest) proportion of MSK injuries than other regions in the world¹². This is in addition to a higher number of clustered LMICs than in any other region globally. Extrapolating this evidence, although not documented, SSA is

likely to have the highest incidence of MSK injuries of any region in the world. It is our hope that this prioritization process will highlight the essential areas of future research that are needed to address this considerably neglected problem.

One of the main limitations of this study is the fact it did not have a proportional number of participants from each country; instead, some countries contributed more than others. This could have potentially resulted in the priorities of a particular country being overrepresented, therefore not reflecting the wider SSA community. Furthermore, we recognize that some providers of MSK trauma care in areas with limited resources might not have been reached by our communications, limiting the ability of the survey to capture these practitioners and pertinent research priorities. We acknowledge this issue because these are commonly the areas where the need is greatest.

Our group has a long-term vision that MSK trauma care across the world should be safe, accessible, effective, and appropriate based on the resources of local health-care systems. Setting research priorities was a key goal of the ORCA so that we can coordinate collaborative research in MSK trauma care across SSA. It is essential to develop a strategic agenda to enable researchers to focus their efforts on priorities that are important to African stakeholders and those treating these injuries on daily basis. Additionally, these questions will hopefully assist funding bodies to prioritize where research funding may be best used. ■

Note: The Orthopaedic Research Collaboration for Africa (ORCA) includes Simon Matthew Graham, MBChB, MRCS, MSc(Res), FRCS(Tr&Orth), PhD, Orthopaedic Research Unit (ORU), University of Cape Town, Cape Town, South Africa, and Associate Professor of Orthopaedic Trauma, Oxford Trauma and Emergency Care, Nuffield Department of Orthopaedics, Rheumatology & Musculoskeletal Sciences, University of Oxford, Oxford, United Kingdom (simon.graham@ndorms.ox.ac.uk); Luke Renda, MBBS, MRCS, BSc(Hons); David W. Shearer, MD, MPH; Saam Morshed, MD, PhD, MPH; Linda Chokotho, MBBS, FCS(ECSA)ORTH, MPH, PhD; Maritz Laubscher, MBChB(UFS), DipPEC, FCOOrth(SA), MMedOrtho(UCT); Robert Dunn, MBChB(UCT), MMed(Orth), FCS(Sa)Orth; Nando Ferreira, BSc, MBChB, FCOOrth, MMed, PhD; Daniel Christopher Perry, FRCS(Orth), PhD; Sithombo Maqungo, FCOOrth, MMed, MBChB; Nyengo Mkwandawire, BMBS, MChOrth, FCS, FRCS; Matthew L. Costa, PhD, FRCS; Clara Chikumbuto Mpanga, MBBS, MSc, MMed; Michael Held, MD, PhD, MMedOrth, FCOOrthSA; William James Harrison, BNBCh, FRCS(Tr&Orth); Billy Thomson Haonga, MD; Chris Lavy, MD, MCh, FRCS; Grace Drury, MA; Cornelius Mukuzungu, MBBS, FCSOrtho(COSECESA); Ishaq Bamidele Ojodu, MBBS, FWACS; Laurence Wicks, MBChB, FRCS(Tr&Orth); Michael Oluoyinka Okunola, MBBS(Ibadan), FWACS(Ortho); Santa-Maria Venter, MSc(SportsMed), MBChB, BA, LLB; Ashtin Doorgakant, MBBS, FRCS(Tr&Orth); Akpati Ugochuku, MBBS(Ibadan), FMCOrth; Aderaw Getie Mewohagn, MD; Alimaw Bitew, MD; Nguene Nyemb, MD; Daniel Yeomans, MBChB, MRCS; Nohakhehla Nyamulani, MBBS, MSc, FCS; Dominic Konadu-Yeboah, MBChB, MPH, FGCS, FWACS; Reuben Kwesi Sakyi Ngissah, FGSC(OrthoGhana), MBChB(UGGhana); Joseph Mwanga, MSc(Orth); Tchaia Hodaibalo Towoezini; Ijuma M. Mkwazu, MMed(Orth&Tr); Deepa Bose, MBBS, FRCS(Tr&Orth); Adebayo Olamijuwon Adewale, MB, BS, FMCOrth; Mabvuto Chawinga, BS(Tr&Orth); Logizomai E.K. Chipasha, BSChB, MBChB, MMed(Ortho); Marie Virginie Mengue Edu; Elsadig Ibrahim Mohammed Arab, MD(Tr&Orth); Mesfin Etsub Kassahun, MD, FCSOrth, FCS; Tom Siekei Mogire, MBChB, MMedSurgery, HDipOrth, FCSOrth; Steve Mannion, FRCS(Tr&Orth); Forster Amponsah-Manu, MD, FGCS; Anthony Ayotunde Olasinde, FWACS, MPH; Guifo Marc Leroy, MD; Abdoulie Bah, MBChB; Mustafa Muzahir Khanbhai, MBChB, MMedOrtho; Idrissa Seidou Mohamed, DES; Stefan Swanepoel, MBChB, MMed(UCT), FCOOrth(SA); Ajibola Babatunde Olandiran, MBBS(Ibadan), FWACS(Ortho), DipOrtho(SICOT); Anthony Olasinde, FWACS; Kevin Lakati, MBChB, ChM(Tr&Orth), FCSORTH(ECSA); Martin Thomas Gumeni, MD; Alexis Dun Bo-ib Buunaaim, FCS(ECSA), FGCPs; Insa Bamba; George Manjolo; Partheina Dogossou; Edmund Ndalama Eliezer, MD, MMed; Chol William Malkwan, MBBS, MD(Ortho); Vincent Lewis Mkoichi, FCS(ECSA), MSc, MBBS; Chigblo Pascal, MD; Jeremy Bates, FCS(ECSA) Orth; Baidoo Richard Ogirma, MBBS, FWACS; Reuben Ngissah, MBChB(UG), FGCS(Ghana); Dieme Charles Bertin, PhD; Murtaza Mustafa, MMed(Ortho), MBChB; Fadimu Abidemi Abiola, MBBS, FWACS; Nguilabanda Lendibi Leandre, MD; Lambert Dusingizimana Rutayisire, MMed, FCS(ECSA) Orth; Martin T. Gumeni, MD; Viseslav Boskovic, MBChB(UCT); Misganaw Alemu Adimass; Christopher C. Ogbuagu, MBBS, MCh, PGCertMedEd; and Claude Martin Jr., MD.

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