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Identifying knowledge needed to improve surgical care in Southern Africa using a theory of change approach

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ABSTRACT

Surgical healthcare has been prioritised in the Southern African Development Community (SADC), a regional intergovernmental entity promoting equitable and sustainable economic growth and socioeconomic development. However, challenges remain in translating political prioritisation into effective and equitable surgical healthcare. The AfroSurg Collaborative (AfroSurg) includes clinicians, public health professionals and social scientists from six SADC countries; it was created to identify context-specific, critical areas where research is needed to inform evidence-grounded policy and implementation. In January 2020, 38 AfroSurg members participated in a theory of change (ToC) workshop to agree on a vision: 'An African-led, regional network to enable evidence-based, context-specific, safe surgical care, which is accessible, timely, and affordable for all, capturing the spirit of Ubuntu[i]' and to identify necessary policy and service-delivery knowledge needs to achieve this vision. A unified ToC map was created, and a Delphi survey was conducted to rank the top five priority knowledge needs. In total, 45 knowledge needs were identified; the top five priority areas included (1) mapping of available surgical services, resources and providers; (2) quantifying the burden of surgical disease; (3) identifying the appropriate number of trainees; (4) identifying the type of information that should be collected to inform service planning; and (5) identifying effective strategies that encourage geographical retention of practitioners. Of the top five knowledge needs, four were policy-related, suggesting a dearth of much-needed information to develop regional, evidenced-based surgical policies. The findings from this workshop provide a roadmap to drive locally led research and create a collaborative network for implementing research and interventions. This process could inform discussions in other low-resource settings and enable more evidenced-based surgical policy and service delivery across the SADC countries and beyond.

Summary box

- While the Southern African Development Community (SADC) has acknowledged that surgery should be a part of universal health coverage, the lack of context-specific knowledge limits the translation of this political prioritisation into effective health programmes that improve surgical healthcare at a population level.
- The AfroSurg Collaborative (AfroSurg), a new network consisting of key stakeholders, connected to the field of surgery, from six countries in sub-Saharan Africa, identified key areas in service delivery and policy where more knowledge is needed through a theory of change approach.
- The five priority knowledge needs included (1) mapping of available surgical services, resources and providers; (2) quantifying the burden of surgical disease; (3) identifying the appropriate number of trainees; (4) identifying the type of information that should be collected to inform service planning; and (5) identifying effective strategies to encourage geographical retention of practitioners.
- There is a common vision for improving surgical services across the SADC nations that can inform a cohesive approach across the region, and knowledge needs identified by AfroSurg collaborators should be used to collect information that will inform the design of these services.

INTRODUCTION

An estimated 90% of people in sub-Saharan Africa (SSA) lack access to safe, timely and affordable surgical care, despite evidence that it would enhance welfare and promote economic growth and sustainable development.[1 2] Poor surgical outcomes in SSA suggest health systems are underperforming.

[i]Ubuntu translates to 'I am because we are' and captures a philosophy of humanity. It is a Nguni Bantu term.

There is a need to strengthen health systems by better understanding and systematically exploring through rigorous research the reasons responsible for suboptimal surgical healthcare in the region.[3] SSA has the highest number of preventable deaths and the largest proportion of disability-adjusted life years (DALYs) globally. Scaling up effective coverage of surgical care in the region will help avert millions of deaths and DALYs.[1 4] However, substantial need for country-specific local knowledge limits the translation of political priorities into implementation of surgical health programmes which match local need and build on existing resources.[5] Although knowledge of needs and resources only form part of the information on which policy makers base decisions, better health service planning decisions could be made with better access to knowledge.[6 7] Ideally, there needs to be a shift in balance towards more evidence-based policy while acknowledging competing health system demands, such as HIV, tuberculosis and pandemics such as COVID-19, which stopped all non-essential surgical services in South Africa for the majority of 2020.[8]

Knowledge gaps must be better delineated, within a contextually relevant agenda, to facilitate the formulation of health policies and their translation into programmes that improve surgical service delivery.[9] Up to now, most of the strategies for African surgical care have been driven by high-income countries (HICs), with leadership from low-income and middle-income countries (LMICs) less prominent.[10] For SSA nations to strengthen their surgical systems, we must use evidence-based solutions, derived from strong local contextual knowledge. The first step towards achieving this is identifying a locally agreed vision, which is informed by and informs the strategic priorities of governments; further the dependencies for achieving that vision and the knowledge needed to achieve it must be identified. Second, collaborative African networks are needed to strengthen regional research capacity to ensure that the knowledge gaps, once filled, are translated into coordinated initiatives aimed at supporting broader efforts to enhance and scale up surgical healthcare services.[11]

Sixteen Southern African countries are members of the Southern African Development Community (SADC), a regional intergovernmental entity founded to promote equitable and sustainable economic growth and socio-economic development in the region and encourage political cooperation.[12] In November 2018, SADC health ministers and senior officials endorsed a resolution to prioritise surgical healthcare,[13] which recognised the need for national surgical, obstetric and anaesthesia plans (NSOAPs) to facilitate this prioritisation. These countries have acknowledged that surgery should be considered an essential component of universal health coverage (UHC). To build on the 2018 SADC resolution, surgical, obstetric and anaesthesia task force members from six of the SADC countries (Botswana, Malawi, Namibia, South Africa, Zambia and Zimbabwe) and other key stakeholders were invited to be a part of the AfroSurg Collaborative (AfroSurg). These six countries are geographically and economically linked with high inter-regional migration of surgical providers and patients. While they have distinct surgical health systems, each of them has made strong commitments to the goal of improving equitable access to surgical care including developing NSOAPs.

APPROACH

Inaugural conference

The AfroSurg network was established at its inaugural conference held on 16–17 January 2020, at Stellenbosch University in Cape Town, South Africa. At the conference, a theory of change (ToC) workshop was held with participants to agree on a vision for improving surgical care in the region and identify policy and service delivery knowledge needs. All AfroSurg members participated in the workshop. The majority of the 38 participants were established leaders of surgery, anaesthesia, and obstetric research and clinical care in the six SADC countries. Additionally, three UK and six South African global health specialists served on the organising and facilitation team.

The long-term aim of our network was to be a collaborative platform to improve equitable access to quality surgical healthcare in the SADC countries. In order to achieve this aim, the objective of the ToC was to identify knowledge needs essential to improve surgical policy and service delivery in the region.

THEORY OF CHANGE

The ToC methodology was developed by Weiss in 1995 as a theory-based evaluation framework to describe how a prespecified long-term outcome can be achieved through a logical sequence of preconditions.[14 15] Explicit attention is given to links between inputs, mechanisms of change, outputs and outcomes, and regarding external factors. The ToC framework has not previously been used in the context of global surgery but has been shown to be an effective method of identifying priorities to inform the implementation of health policies in LMICs.[16–18] The framework is constructed using a backward-mapping approach, starting with the long-term outcome (the vision statement) and subsequently plotting the proximate needs or ‘elements’ required to achieve these and their more distal dependencies (see online supplemental appendix 2 for definitions of the ToC terminology).[19]

IDENTIFYING A VISION STATEMENT

During the workshop, the participants were orientated to the ToC methodology and randomly divided into four groups of 8–10 people. The groups worked through their tasks and then summarised their findings to all participants for broader discussion and consensus. The first task was to develop an AfroSurg vision statement to reflect the group’s focus on improving equitable access to safe

and timely surgical care across the respective countries, thereby defining the network's future aims. The agreed vision statement of Afrosurg was 'An African-led, regional network to enable evidence-based, context-specific, safe surgical care, which is accessible, timely, and affordable for all, capturing the spirit of Ubuntu.'

IDENTIFYING KNOWLEDGE NEEDS

The next task was to identify service delivery and policy elements required to achieve the vision, where service delivery is concerned with elements needed to provide surgical healthcare, and policy refers to rules and mandates required to enable better provision of surgical healthcare. Starting with service delivery, each of the four groups discussed elements that embodied the AfroSurg vision statement before consensus was achieved on the four priority service elements. Each group was then assigned one of the main elements to identify dependencies required in order to achieve the element; these were discussed in plenary and modified through consensus. Finally, groups were reconvened to draw from these dependencies and to identify the knowledge needed to inform them and thus achieve each element. The same process was repeated for policy.

The ToC process was depicted by mapping all elements, their dependencies and knowledge needed to ensure equitable access to quality surgical healthcare in the SADC region. As customary for a ToC framework, the schematic gave direction for the research and critical analysis needed to achieve the vision and, in doing so, demonstrated how providing knowledge would be essential to accomplish this. After the workshop, the writing group (DSB, MLO, KC and JD) further analysed and refined the elements, dependencies and knowledge needs, to strengthen and enhance clarity. On completion of the primary diagram, the schematic representation of the ToC was shared and subsequently reviewed by all participants. Participant feedback and comments were considered, and adjustments were made before creating the final diagram.

The final ToC schematic is presented in figure 1. In order to achieve the vision, we selected the highest priority service delivery elements of *information*, *research and sharing*, *quality of care*, *communication* and *access to care*. We identified 37 distal dependencies and 23 knowledge needs related to these four service delivery elements. The highest priority policy elements were *mandatory data sets* and *surgical workforce* followed by *defined packages of care* and *stakeholder input*. Twenty-four distal dependencies and 22 knowledge needs were identified for the policy elements. These are shown in tables 1 and 2.

PRIORITISING KNOWLEDGE NEEDS

In order to prioritise the knowledge needs identified during the ToC exercise, an electronic Delphi exercise was conducted after the workshop with all AfroSurg members. The writing group and organising/facilitation team did not participate in the Delphi exercise. All elements and their knowledge needs—for both policy and service delivery—elicited during the ToC exercise were presented to the group in the Delphi survey. The participants were asked to anonymously rank the knowledge needs from one to five on a Likert scale. A percentage score was calculated by dividing the total achieved score for each knowledge need by the maximum score that could be achieved, allowing us to rank the top 10 knowledge needs.

Of the 30 ToC participants invited to complete the Delphi exercise, 27 (90%) responded. The top 10 knowledge needs identified by Afrosurg collaborators are shown in online supplemental appendix 3; the top 5 (table 3) were (1) mapping of available surgical services, resources and providers; (2) quantifying the burden of surgical disease; (3) identifying the appropriate number of trainees; (4) identifying the type of information that should be collected to inform service planning; and (5) identifying effective strategies to encourage geographical retention of practitioners. Four of the top five prioritised knowledge needs were policy-related, and one was related to service delivery (see table 3).

REFLECTIONS

Using a ToC approach is novel in global surgery. The lack of access to quality surgical care in the SADC region is a multifactorial issue, and the ToC approach is ideal to explore this topic because it allowed the group to acknowledge and then to focus on the service delivery and political processes that underlie health system change. Although others have worked to develop consensus to ultimately benefit surgical care, previous stakeholder meetings have a priori aimed to identify research priorities.[3 20] The ToC approach starts with a participatory process to agree on a common goal which allowed us to collectively construct a vision statement prior to defining priorities and their dependencies in a more structured manner. The main drawback with the use of the ToC was the lack of participant familiarity with the process. However, the initial orientation session to the process and facilitation provided by the senior author (JID) mitigated this. Our aim was not to identify empirical research questions per se, but rather to show where knowledge is lacking which could be filled by conducting empirical research studies or, for example, audits. We are not aware of previous efforts to explicitly link knowledge needs to policy or service delivery. Increasing knowledge through empirical research or practically oriented audit facilitates improved policy and service delivery, which are essential to achieving UHC for surgery.

The AfroSurg workshop was done with, and led by, surgical providers and stakeholders from six different SADC countries who used their extensive knowledge of the setting to come up with multiple knowledge needs to improve policy and service delivery in the region. This differs from the approach of much global surgery research

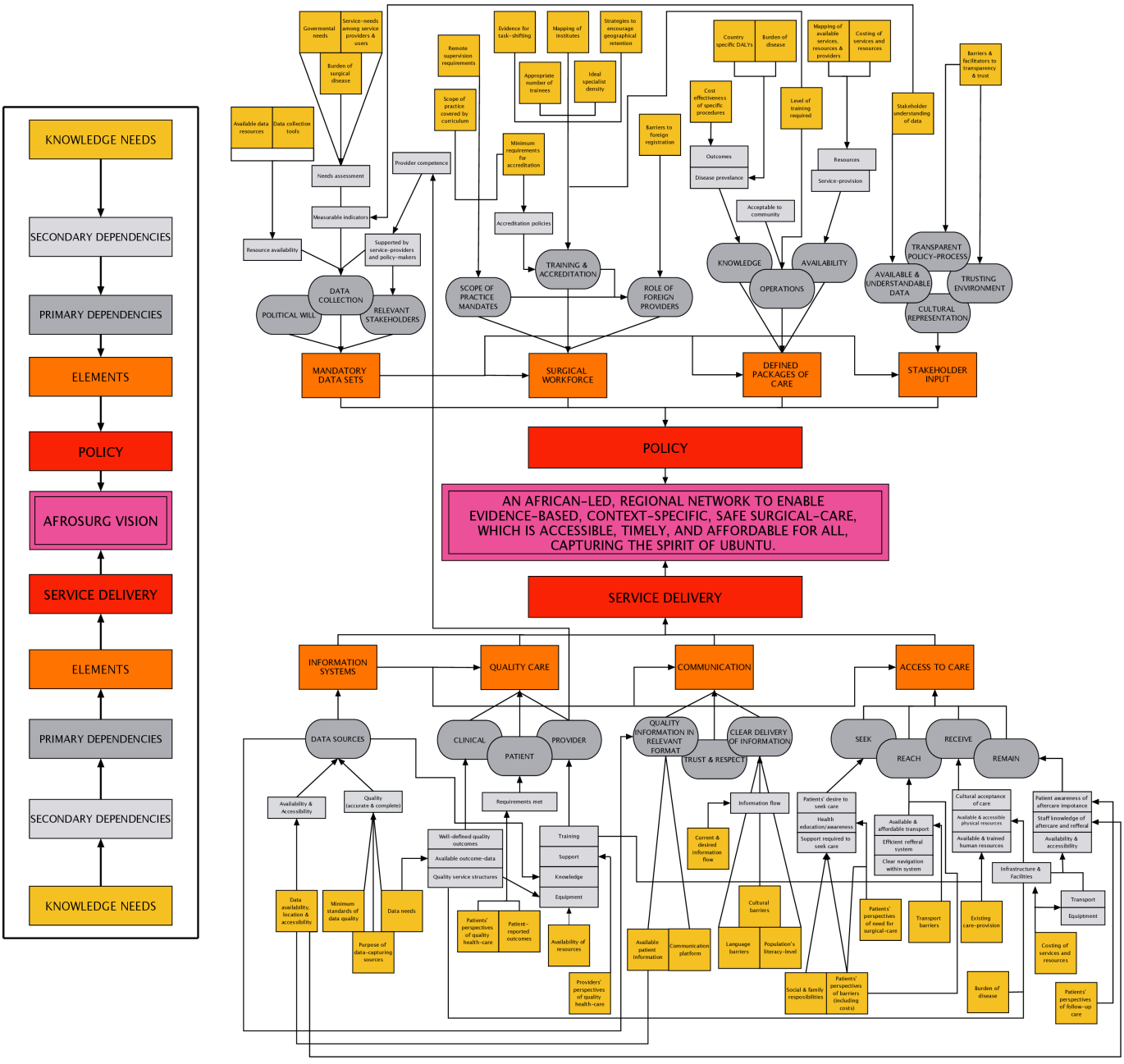

Figure 1 Depicts the long-term vision statement (pink). Policy and service delivery are positioned on either side of the vision statement along with their respective elements (orange), dependencies (grey) and knowledge needs (yellow). Notably, although the order in which the workshop was conducted was from the central to the peripheral aspect, the arrows on the figure direct one from the peripheral to the central aspect according to the order in which the steps would be carried out in practice. Hence, the figure depicts the backward mapping of the ToC methodology. The policy and service delivery side of the ToC are shown separately in the online supplemental appendices and tables 1 and 2 contain expanded information on each knowledge need. ToC, theory of change.

in the region, which has been performed or directed by HICs actors with providers or researchers from LMICs participating, but rarely truly leading.[21 22] To ensure that time spent in acquiring knowledge is invested well and in a way that will inform strategy, reform approaches must be based on and driven by context-sensitive understandings of surgical systems and embedded in local culture.[11 23]

To fulfil the vision of the AfroSurg network, the identified knowledge needs must now be addressed. The top two knowledge needs were mapping of available services, resources, and providers and quantifying the burden of surgical disease. Knowledge of supply (here referring to as available services, resources and providers) and demand (here referring to burden of disease) are essential for planning healthcare systems, but these are not well delineated enough in the region to allow this. While some investigators have aimed to ascertain surgical capacity at facilities[24] and others have aimed to estimate disease burden,[25 26] attendees at the meeting acknowledged that these high-level research findings are not

Table 1 Knowledge needs—service delivery

Service delivery		
Element	**Knowledge needs**	**Explanation**
Information systems	Data availability, location and accessibility	What data sources are available? Where are the data sources located? Who can access the data sources?
	Minimum standards of data quality	What is the quality (accuracy and completeness) of data sources? Is there a minimum standard that would ensure quality (accurate and complete) data?
	Purpose of data-capturing sources	What is the main purpose of the data-capturing sources (are they used in clinical audit, reporting to politicians, to inform local policy, etc)?
	Data needs	What type of information should be captured (clinical, patient-reported, process-based, etc)?
Quality care	Patients' perspectives of quality healthcare	What do patients want in terms of care processes and experiences (what does success look like to them)?
	Patient-reported outcomes	What do patients want in terms of clinical outcomes (what does clinical success look like for them)? Are outcomes well defined in the region?
	Availability of resources	What necessary resources are available for providers to provide quality care?
	Providers' perspectives of quality healthcare	What does quality healthcare look like to providers?
Communication	Available patient information	What information is available to patients to assist them in making decisions about their surgical care?
	Communication platform	What current and alternative communication platforms exist in surgical healthcare?
	Current and desired information flow	What is the current and desired process by which information is delivered and integrated?
	Language barriers	Are there language barriers that prevent patients from understanding information about surgical healthcare? If so, how can they be overcome?
	Cultural barriers	Are there cultural sensitivities that exist around surgical healthcare experience? If so, what are the conditions that can be put in place so they are better respected?
	Population's literacy-level	What is the literacy level of the surgical population and how does this affect patient–provider communication?
Access to care	Social and family responsibilities	What are the social/family responsibilities that hinder patients from seeking care?
	Patients' perspectives of barriers (including costs)	Patients' perspectives of barriers (including costs)
	Patients' perspectives of need for surgical care	What are patients' perspectives concerning surgical conditions and surgical treatment, including invasive procedures?
	Transport barriers	What are barriers to efficient use of prehospital transport (ambulance, public, personal, interfacility, etc)?
	Existing care provision	What care-provision resources are currently available (situational analysis of facilities, staff availability and knowledge, referral systems)?
	Burden of disease	What is the burden of disease?
	Costing of services and resources	What is the cost of services and resources that ensure quality care?
	Patients' perspectives of follow-up care	What are patients' experiences, perceptions and desires concerning follow-up care?

Table 2 Knowledge needs—policy

Policy		
Element	**Knowledge needs**	**Explanation**
Mandatory data sets	Available data resources	What data sources are currently available?
	Data collection tools	What are the needs of service providers around data collection tool use?
	Governmental needs	What are the governmental needs concerning data collection?
	Burden of surgical disease	What is the burden of disease?
	Service needs among service providers and users	What are the needs of service providers and users to enable data sets to capture relevant outcomes?
Surgical workforce	Scope of practice covered by curriculum	What scope of practice should be covered by the curriculum?
	Remote supervision requirements	Which specialty levels/procedures require remote supervision? What is the best way to provide remote supervision?
	Evidence for task shifting	Does evidence support task shifting in the local setting?
	Minimum requirements for accreditation	What are the minimum requirements for accreditation of surgical providers? What constitutes locally appropriate continuous medical education?
	Appropriate number of trainees	What number of providers need to be trained to appropriately provide for the local need?
	Mapping of institutes	What is the current and desired geographical location of training institutions?
	Ideal specialist density	What is the ideal number of each surgical cadre (including specialist physicians, trainee specialists, trainees and other providers)?
	Strategies to encourage geographical retention	What will successfully encourage practitioners to remain in their geographical areas?
	Barriers to foreign registration	What are the barriers to registration of foreign providers?
Defined packages of care	Cost effectiveness of specific procedures	What is the acceptability and cost effectiveness of specific procedures?
	Country specific DALYs	What are countries' experienced disability-adjusted-life years for surgical conditions?
	Burden of disease	What is the burden of disease?
	Level of training required	What local level of training is required in order to perform different procedures?
	Mapping of available services, resources and providers	What services, resources (funding, equipment, infrastructure, etc) and providers (numbers, knowledge, etc) are currently available to provide surgical care?
	Costing of services and resources	What are the costs of services and resources that will be necessary to ensure adequate packages of care?
Stakeholder input	Stakeholder understanding of data	Do patients and providers understand surgical data well enough to inform policy?
	Barriers and facilitators to transparency and trust	What are the barriers and facilitators to enable involvement of patients and providers in policy making?

granular enough to improve surgical care at the local level. Wide-scale use of tools at facilities can help to provide knowledge on readiness or capacity to provide surgical care. Examples include the WHO Service Availability and Readiness Assessment survey, Service Provision Assessment and the WHO Surgical Situational Analysis Tool.[27–29] These should ideally be used at the national level to urgently assess supply. In addition, the pooling of data at the regional level could help develop a large-scale data warehouse to facilitate use of advanced data-science tools, enabling forecasting, benchmarking and actionable insights.

Ascertaining information on the burden of surgical disease is more challenging. In health systems where financial and access barriers are minimal, the prevalence of conditions treated at health facilities closely matches the prevalence in the population.[30] However, when care is unaffordable or are when patients are unaware of available services,[1] such as in many African countries,[31 32] the health facility disease burden may underestimate population prevalence. Disease

Table 3 Top five knowledge needs to improve surgical care in southern Africa

Explanation	Knowledge need	Element	Percentage score	Average score
What services, resources (funding, equipment, infrastructure, etc) and providers (numbers, knowledge, etc) are currently available to provide surgical care?	Mapping of available services, resources and providers	Defined packages of care*	87.2%	4.36
What is the burden of disease?	Burden of surgical disease	Mandatory data sets*	86.9%	4.35
What number of providers need to be trained to appropriately provide for the local need?	Appropriate number of trainees	Surgical workforce*	86.4%	4.32
What type of information should be captured (clinical, patient-reported, process-based, etc)?	Data needs	Information systems†	85.9%	4.30
What will successfully encourage practitioners to remain in their geographical areas?	Strategies to encourage geographical retention	Surgical workforce*	85.6%	4.28

*Policy.
†Service delivery.

burden modelling can be inaccurate,[33] and data collection from household surveys using validated tools may be needed to obtain accurate estimates of the burden of surgical conditions in SADC countries.

Estimating the number of trainees needed to deliver surgical services to match the burden of disease was the third highest priority. Without accurate data on the true disease burden, this will be a challenging knowledge need to fill. Knowledge of effective incentives to encourage practitioners to remain in their geographical areas and prevent 'brain drain' was our fifth priority and an issue that affects many African countries.[34] Appraisal of initiatives that have been implemented elsewhere[35] (ie, use of monetary incentives, binding contracts or training programmes that are delivered in key areas of need) can inform consensus on the best solutions to minimise 'push' and 'pull' factors for physician/surgeon movement in SADC countries.

Of the top five knowledge needs, four were policy-related, suggesting a dearth of much-needed information to develop evidenced-based effective surgical policies in the region. The only service delivery knowledge need prioritised among the top five at our meeting was to define service planning information. These results can also inform health system planning at the local and national levels. Importantly, all indicators that will be chosen cannot be difficult to collect. There was an acknowledgement during the workshop that although robust data collection is needed, indicators should be easy to obtain (eg, those collected already as part of routine clinical care) so as not to overwhelm existing scarce human resources.

Even though the need for improving access to safe, affordable surgical care has been previously articulated, there has been a lack of political priority to improve this.[6] Shiffman and Smith has described four key components required to achieve political priority in global health: actor power (the strength of individuals and organisations concerned with the issue), ideas (the ways in which those involved with the issue understand and portray it), political contexts (the environments in which actors operate) and issue characteristics (features of the problem).[7] AfroSurg has made progress to ensure that these four key components are met in our region. In our ToC, the need to collect more data to inform issue characteristics was clearly articulated, both for health systems and policy. Our group stopped short of defining indicators to understand the size of the problem and to monitor progress, given there is an ongoing global initiative to do this.[36 37] Moreover, AfroSurg, which brings together actors from six different African countries, with support rather than leadership from HICs, aims to improve surgical care in the region with local actor power. Political contexts in the SADC region are already favourable with many countries having embarked on the NSOAP process. The ideas element of Shiffman and Smith's framework states that a clear message on the problem is needed. AfroSurg and the ToC workshop were initial steps towards achieving strong internal framing around the needs to improve access to quality surgical care and practicalities needed to enable this change, emanating from regional key actors.

NEXT STEPS

AfroSurg is a small network, but the participants at the first meeting had a broad range of backgrounds related to surgical care from providers, policy makers and researchers. The network fulfils several of Shiffman and Smith's requirements to improve political priority, but not all. In future meetings, we plan to identify where some knowledge needs have been filled, how we can prioritise data collection to fill remaining knowledge needs and discuss at what intervals to conduct audits to ascertain whether remaining knowledge needs have been filled.

Many of the AfroSurg stakeholders are leaders in service delivery and policymaking in their respective countries and will communicate the findings from this workshop to their country's surgical stakeholders. In addition, we plan to secure funding to meet annually and update the ToC after 5 years, after which many of the knowledge gaps should be filled and new evidence generated. We also recognise the need to invite more local interested stakeholders such as political actors, civil society organisations and service users to our meetings in order create a seamless line connecting the community to services and policy to ensure that we are working towards a shared agenda.

CONCLUSION

AfroSurg, launched in January 2020, is a new Southern African network consisting of key stakeholders from six countries. During a 2-day workshop, a joint vision statement for the network was created and a ToC approach was used to identify 45 knowledge needs in policy and service delivery, which should inform future research priorities in order to improve surgical care in the region. An electronic Delphi revealed that the top knowledge need is mapping of available surgical services, resources and providers. This work fulfils the critical need for a transnational African-based collaboration in global surgery. The findings from this workshop provide a vision and roadmap to drive locally led research and create a collaborative network for implementing research and interventions. Even though the network is regional, the findings could be transferable and be used to inform policy and research priorities for surgical care in other parts of SSA. Additionally, the ToC approach can be used in other settings or areas to come up with context-specific priorities to improve healthcare.

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