CENTER FOR GLOBAL HEALTH DELIVERY–DUBAI
HARVARD MEDICAL SCHOOL

PROCEEDINGS

National Surgical, Obstetric and Anesthesia Planning for High-Level Global, Regional, and Country Authorities and Funders

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National Surgical, Obstetric and Anesthesia Planning for High-Level Global, Regional, and Country Authorities and Funders

Proceedings

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Harvard Medical School Center for Global Health Delivery–Dubai

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Abbreviations

AFAT	Anaesthesia Facility Assessment Tool
AFEM	African Federation for Emergency Medicine
AMR	Antimicrobial Resistance
AUBMC	American University of Beirut Medical Center
C-section	Caesarean section
CEmONC	Comprehensive Emergency Obstetric and Newborn Care
CHPS	Community-based health planning and services
COSECSA	College of Surgeons of East, Central and Southern Africa
CSS	Cambodian Society of Surgery
DALY	Disability-Adjusted Life Year
DGHSM	Department of Global Health and Social Medicine
ECSA	East, Central, and Southern Africa
EMRO	WHO Regional Office for the Eastern Mediterranean
FIGO	Federation of International Gynecology, Obstetrics
FPMRS	Female Pelvic Medicine and Reconstructive Surgery
FRACS	Fellow of the Royal Australasian College of Surgeons
GDP	Gross Domestic Product
GEHIP	Ghana Essential Health Interventions Program
GFATM	Grants to Fight AIDS, TB, and Malaria
GGGI	Global Green Growth Institute
HPE	Health Profession Education
IBRD	International Bank for Reconstruction and Development
ICM	International Congress of Midwives
ICSID	International Centre for Settlement of Investment Disputes
IDA	International Development Association
IFC	International Finance Corporation
IMF	International Monetary Fund
IRD	Interactive Research and Development
ISOFS	International Society of Obstetric Fistula Surgeons
ISS	International Society of Surgery
KOICA	Korea International Cooperation Agency
LCoGS	Lancet Commission on Global Surgery

LIC	Low-income countries
M&E	Monitoring and Evaluation
MDG	Millennium Development Goals
MEEI	Massachusetts Eye and Ear Infirmary
MIGA	Multilateral Investment Guarantee Agency
MMR	Maternal mortality ratio
MoF	Ministry of Finance
MoH	Ministry of health
MONHRSC	Ministry of National Health Regulation, Services, and Coordination
NCD	Noncommunicable Diseases
NGO	Nongovernmental Organization
NSAOP	National Surgical, Anaesthesia, and Obstetrics Plan
NSO	National statistical office
NSOAP	National Surgical Obstetrics and Anaesthesia Plan
NVI	Noncommunicable Diseases, Disability, Violence and Injury
NVSC	Pakistan National Vision for Surgical Care 2025
ODA	Overseas development assistance
PAP	Physician anaesthesia provider
PEPFAR	President's Emergency Plan for AIDS Relief
PGSSC	Program in Global Surgery and Social Change
PISA	Pacific Islands Surgeons Association
PMA	Pakistan Medical Association
PMDC	Pakistan Medical & Dental Council
PMI	President's Malaria Initiative
PNFWH	Pakistan National Forum on Women's Health
POMR	Postoperative Mortality Rate
PSMD	Public Service Management Division
PSOAP	Provincial Surgical, Obstetric, and Anaesthesia Plan
RACS	Royal Australasian College of Surgeons
REC	Regional Economic Communities
RMPC	Rwanda Medical Procedures Coding
SADC	Southern African Development Community
SAFE	Safer Anaesthesia from Education
SDG	Sustainable Development Goals

SOA	Surgical, obstetric, and anaesthesia
SOAP	surgical, obstetric, and anaesthesia plan
SOGP	Society of Obstetrician & Gynecologists of Pakistan
UCSF	University of California San Francisco
UHC	Universal health coverage
UHS	University of Health Science
UNITAR	United Nations Institute for Training and Research
VLO	Value of lost output
VLW	Value of lost welfare
VSL	Value of a statistical life
WBCSD	World Business Council for Sustainable Development
WBG	World Bank Group
WDI	World Development Indicators
WFNS	World Federation of Neurosurgical Societies
WFSA	World Federation of Societies of Anaesthesiology
WHA	World Health Assembly
WHO	World Health Organization
WPRO	WHO Regional Office for the Western Pacific

Executive Summary of the National Surgical, Obstetric, and Anesthesia Planning Conference for High-level Global, Regional and Country Authorities and Funders

March 20-21, 2019, Dubai, UAE

On 20-21 March 2019, a multi-disciplinary group of 77 international stakeholders representing nine Ministries of Health, the World Health Organization, the World Bank Group, bilateral and multilateral development agencies, philanthropic organizations, professional societies, non-governmental institutions, and academia gathered in Dubai, United Arab Emirates to discuss global and regional collaboration for National Surgical, Obstetric, and Anesthesia Plan (NSOAP) development, financing, and implementation in Asian, African, and Western Pacific nations.

Recognizing the indispensable role of surgery, obstetrics, and anesthesia ("Surgical Care")** in achieving Sustainable Development Goal 3 (SDG 3) targets and Universal Health Coverage (UHC), this conference addressed the barriers facing NSOAP financing and implementation. Progress on NSOAP development and challenges were presented by representatives from Zambia, Rwanda, Zimbabwe, and Pakistan. Regional efforts from the Southern African Development Community were also highlighted. Participants discussed the role of high-level global and regional authorities in supporting country-led plans for scaling up surgical care as an essential component of health system strengthening in accordance with World Health Assembly Resolution WHA68.15.

By the end of the conference, participants were prepared to support and advocate for NSOAP processes by engaging and informing key national stakeholders while leveraging external support for developing surgical plans; framing financing of surgical care as indispensable to achieving SDG 3 tragets and, UHC and economic development; seeking out strategically aligned financing mechanisms for NSOAPs; and defining concrete next steps for advancing surgical care globally, regionally, and nationally. This statement summarizes the key messages expressed by meeting stakeholders.

** "Surgical care" is an overarching term used to denote care for adults and children delivered by anesthesiologists, obstetricians and gynecologists, surgeons from various backgrounds including, but not limited to, adult and paediatric general surgery, orthopaedics, neurosurgery, urology, eye, ENT, and vascular surgery, as well as nursing, biotechnicians and all allied health professionals.[1]

1 Adapted from "Consensus Statement, Emergency and Essential Surgical Care as a Component of Universal Health Coverage in Pakistan." Islamabad, November 15-16, 2018.

World Health Organization:

WHO Director General Dr. Tedros Adhanom Ghebreyesus welcomed participants by video and highlighted surgery, obstetric, and anesthesia care as essential components of UHC that are closely linked to economic development and the Sustainable Development Goal targets. Dr. Walter Johnson, Lead of the WHO Emergency and Essential Surgical Care Programme, reviewed the progress since Resolution WHA68.15 and outlined key next steps for its implementation. Dr. Teri Reynolds, Lead of the WHO Emergency and Trauma Care Programme, highlighted gaps that exist in pre-hospital care and the importance of timely access to emergency and trauma care as part of the continuum of care for many surgical patients. All agreed that improved coordination within WHO Departments and between WHO Headquarters (HQ), Regional Offices (ROs) and Countries Offices (COs) will be key to surgical system strengthening efforts worldwide.

WHO HQ is committed to engaging with all ROs and COs to support NSOAP development. Dr Johnson discussed opportunities for collaboration with ROs with Dr Hamid Ravaghi, Regional Advisor in the Department of Health System Development in WHO's Eastern Mediterranean Regional Office (EMRO). They agreed that the ROs primary focus is to support UHC efforts, and that subsequently SOA care should be supported within this mandate in alignment with Resolution WHA68.15. The ROs can support countries in developing not only investment cases for surgical care but also the clear theories of change needed to bridge policy, funding, and implementation efforts. Meeting participants were encouraged to approach their corresponding WHO COs and ROs so that these offices can advocate for the advancement of country-specific surgical care agendas throughout WHO and in collaboration with efforts ongoing at WHO HQ.

Within EMRO, Pakistan is at the forefront of NSOAP development and is the first country in Asia to accomplish this. EMRO agreed to strengthen their support for Pakistan's efforts and to assist other countries in the region to follow.

Multilateral and Bilateral Development Organizations:

Dr Khama Rogo, Lead Health Sector Specialist and Programme Head of the Health In Africa Initiative at the World Bank Group (WBG) presented on strategies for countries to work with the WBG to promote NSOAP development and implementation globally. He highlighted the crucial role that surgical care plays in improving human capital as well as the need to involve the private sector in surgical systems strengthening, but also noted that existing operating rooms in many settings were often grossly underutilized. He encouraged professional associations and ministries of health to seek the WBG to maximize already existing available resources to improve care delivery. A panel on mobilizing global resources for NSOAP development and implementation included participation from USAID, KOICA, AECID and the World Bank Group. Each organization gave an overview of their funding priorities and funding mechanisms and discussed issues such as siloing of funds and underfunding of surgical care. Each organization's representative understood the need to support surgical system strengthening as part of UHC and committed to facilitating bilateral funding efforts and promoting innovative financing mechanisms for investing in surgery. Furthermore, they are available to provide information and guidance to countries seeking funding for surgical strengthening. They agreed that funding must shift from disease-specific efforts to more comprehensive surgical strengthening initiatives. Therefore, funding organizations agreed to support coordinated efforts

from Ministries of Health and Finance to develop more cohesive health policies.

International Professional Societies:

International professional societies represented included the International Federation of Gynecology & Obstetrics (FIGO), World Federation of Neurosurgical Societies (WFNS), World Federation of Societies of Anesthesia (WFSA), the Royal Australasian College of Surgeons (RACS), the International Society of Obstetric Fistula Surgeons (ISOFS), and the the Global Initiative for Children's Surgery (GICS). Representatives of each organization highlighted their role in supporting surgical systems through support of country-specific professional societies, training programs, and clinical guidelines. First, they agreed to working more closely with Ministries of Health to support surgical system strengthening efforts. Second, they discussed the importance of improved interprofessional collaboration and agreed to more effectively collaborate efforts between societies of different surgical, obstetric, and anesthesia specialties to promote NSOAP development. Third, they will work to assist in promoting data collection, monitoring, and evaluation of surgical programs. Fourth, they will continue to promote the development of training programs and standards to develop a skilled surgical, obstetric, and anesthesia workforce. Finally, they agreed to include other allied health professionals in surgical system strengthening and NSOAP priority setting efforts.

Asia-Country Representatives:

Countries from across Asia represented at the NSOAP meeting included Cambodia, Lao PDR, Sri Lanka, Vietnam, Bangladesh, Nepal, Indonesia, Malaysia, Myanmar and Pakistan. Each representative gave a brief synopsis of the state of surgical care in their country. Exemplary priority issues identified were the high morbidity and mortality associated with road traffic incidents, poor access to maternal and obstetric care, and discoordination of services in rural areas. As a collective, they agreed to improve coordination of surgical system strengthening across the region; to seek opportunities to fund and incorporate surgical care into horizontal programs, rather than vertical or disease specific programs; to seek technical assistance and support from WHO COs and ROs to fulfill Resolution WHA68.15; to coordinate with WHO Headquarters; and to work with surgical, obstetric, and anesthesia professional societies to improve development of standards, data collection efforts, and workforce training.

Western Pacific-Country Representatives:

The Western Pacific Islands were represented by participants from Fiji, Solomon Islands, Tonga, and Papua New Guinea. Participants gave an overview of surgical systems in the context of isolated Pacific Islands with a particular focus on surgical indicator collection across the region. Representatives reviewed data that several Pacific Island nations had collaborated together to gather around the six Lancet Commission on Global Surgery indicators and publish in preparation for NSOAP development. Each representative then shared specific tasks for advancing surgical care in their country. Among them, they agreed to advocate to Ministries of Health to write letters to WHO requesting support for NSOAP development; to utilize the recent advancement of UHC in 2018 as a policy window for including surgical care planning; and to establish a WHO Collaborating Center to better support research activities around surgical care in the region.

Conclusion:

Meeting participants recognized the need for surgical system strengthening and support NSOAP development and implementation. Participants will continue to engage with key national, regional, and international stakeholders to advocate for the financial and technical support needed to ensure surgical, obstetric, and anesthesia care are incorporated into national health planning and Universal Health Coverage efforts in accordance with Resolution WHA68.15.

> "Surgical, Obstetrics and Anesthesia care is an essential part of every health system. No country can achieve Universal Health Coverage unless its people have access to safe, timely and affordable surgical services... It's therefore vital that countries invest in surgery."
>
> – Dr. Tedros Adhanom Ghebreyesus
> Director General, World Health Organization
> March 20, 2019
> Dubai, UAE

1 Introduction

On March 20th and 21st, 2019, a group of global experts in surgery, obstetrics and anaesthesia convened for the workshop *National Surgical, Obstetric and Anesthesia Planning for High-Level Global, Regional, and Country Authorities and Funders.* The workshop was held at the Harvard Medical School Center for Global Health Delivery–Dubai. Box 1-1 provides an overview of the Center's mission and activities.

John Meara, Director, Program in Global and Social Change and Plastic Surgeon-in-Chief, Department of Plastic & Oral Surgery, Boston Children's Hospital, welcomed participants to the workshop. He explained that the Harvard Medical Center for Global Health Delivery-Dubai has sponsored a series of meetings that have been transformative for the global surgery community. The first was the meeting for the Lancet Commission on Global Surgery in 2014. Two years later, the workshop Global Surgery: Towards Equitable Surgical Systems was convened and two years after that, the Center held a workshop on the process of creating and planning an NSOAP, with a particular focus on nations in Africa. This technical workshop led to the publication of the policy brief *National Surgical Obstetric and Anaesthesia Planning: Process and Consensus Recommendations as well as the National Surgical, Obstetric and Anesthesia Planning Manual.*[2] The present workshop is somewhat different. Today, a number of countries have already rolled out NSOAPs and regional efforts have coalesced around regional SOA planning efforts in the South African Development Community (SADC) and the Pacific Island Region.

Dr. Tedros Adhanom Ghebreyesus, WHO Director-General, addressed the workshop participants by video. Surgery, obstetric, and anaesthesia care are essential to every health system, he said. No country can achieve universal health coverage (UHC) unless its citizens have access to safe, timely, and affordable surgical care and nine of the targets of SDG 3 cannot be achieved without improved surgical care. However, five billion people—about 68% of the world's population—currently lack that access. Investment in strengthening SOA systems is an urgent necessity. WHO has estimated that a $350 billion investment will be needed between 2016-2030 to build appropriate surgical systems. This pales in comparison to the losses of more than $12 trillion that could result from the failure to make those investments. As part of its ongoing transformation, WHO will engage in strategic dialogue with countries to support them in identifying health systems gaps to ensure that all countries invest in strengthening their surgical systems.

World Bank former President Jim Kim also addressed the workshop participants by video. He reiterated that five billion people around the world cannot access safe, affordable surgical care, with 90% of people in LMICs unable to access basic surgical care. The report from the LCoGS illustrates how to close this gap. He noted that time-bound indicators are critical, because they can motivate governments to provide needed care for their populations. However, he warned that failure to address this problem will have catastrophic impacts on the physical and economic wellbeing across the world. An estimated 33 million people face catastrophic expenditures for surgical and anaesthesia care each year, with an additional 48 million cases of catastrophic expenditures attributable to the non-medical costs of accessing surgical care. Further, an estimated 81 million people are plunged into poverty every year by the costs associated with surgical care. There is evidence that LMICs will suffer economic productivity losses in the next fifteen years if these access gaps persist, he cautioned.

2 Forthcoming from WHO/PGSCC

Box 1-1. Harvard Medical School Center for Global Health Delivery–Dubai

Salmaan Keshavjee, Professor of Global Health and Social Medicine and Director of the Harvard Medical School Center for Global Health Delivery–Dubai, explained that the mission of Harvard Medical School is to nurture a diverse, inclusive community dedicated to alleviating suffering and improving health and well-being for all through excellence in teaching and learning, discovery and scholarship, and service and leadership. The Harvard Medical School Center for Global Health Delivery–Dubai contributes to this mission through its focus on the last phase of health care delivery. The Center is addressing some of the most pressing health challenges in the region by focusing on research, medical education, and training that promises to improve health care delivery systems and patient outcomes for diseases prevalent in the United Arab Emirates, Middle East, North Africa, and neighboring regions in Africa, Asia, and Europe. The Center's areas of focus include diabetes, surgical care, infectious disease, and mental illness. The Center has tried to maintain a dual focus on praxis—taking theories and putting them into practice—and accompaniment, by helping colleagues and policy makers through process. Research conducted by the center feeds into high-level workshops that are designed to create a meaningful impact. In the education domain, the Center strives to drive an ecosystem of change in health care delivery. It grants cooperative research awards and hosts workshops, major courses, and symposia, it funds individuals to attend Harvard University summer programs that optimize the last phase of health care delivery, and it delivers a one-month Global Health Delivery Internship Program.

1.1 WORKSHOP AIMS AND OBJECTIVES

The objectives of the workshop were threefold:

- To understand the current landscape of global surgery and anaesthesia and the key steps to a National Surgical Obstetrics and Anaesthesia Plan (NSOAP) including implementation options and tools;
- To explore the role that WHO HQ, WHO Regional Offices and other high-level authorities can play in supporting the NSOAP process in Member States; and
- To explore innovative financing mechanisms for surgical system strengthening.

The workshop was designed to enable participants to:

- Support NSOAP planning processes by engaging and informing key national stakeholders while leveraging external support for developing surgical plans;
- Frame financing of surgical, obstetric, and anaesthesia (SOA) care as indispensable to achieving UHC and economic development;
- Seek strategically aligned financing mechanisms for NSOAPs; and
- Define concrete next steps for advancing NSOAPs globally, regionally, and nationally.

1.2 ORGANIZATION OF THE WORKSHOP AND THE PROCEEDINGS

The workshop took place over two days, with presentations, panels, and open discussions among panelists and participants. The first day featured presentations on the Lancet Commission on Global Surgery and the case for NSOAPs, progress on Resolution WHA

68.15 and the role of WHO, the theoretical framework for NSOAPs, adapting the NSOAP framework to the Pakistani context, the SADC resolution and a regional approach to NSOAP development, and the macroeconomics of surgical care. The first day's panels explored milestones in NSOAP development and implementation in Africa, global surgical indicator tracking, and a fireside chat about the role of WHO regional offices in the NSOAP process. Day 2 of the workshop included presentations on strategies for working with the World Bank to promote NSOAP development and implementation globally and on WHO resources for emergency and trauma care implementation. The second day also featured four panels: global resources for NSOAP development and implementation; the role of professional societies in NSOAPs, the way forward in South Asia, and the way forward in the South Pacific. The full workshop agenda is detailed in Appendix 1. and the biographies of workshop participants are provided in Appendix 2.

These workshop proceedings are structured into five chapters. Chapter 2 describes the case for NSOAPs, the current landscape, and theoretical framework. Chapter 3 provides an overview of global-level NSOAP mandates and activities. Chapter 4 covers NSOAP financing and resource mobilization and Chapter 5 provides updates on NSOAP progress at the regional and national levels.

2 The case for NSOAPs: current landscape and theoretical frameworks

2.1 A BANNER YEAR FOR GLOBAL SURGERY IN 2015

Walter Johnson, Head, Emergency and Essential Surgical Care Program, World Health Organization, explained that 2015 was a banner year for global surgery, with four major catalyzing events occurring within a few months during the spring of that year. Prior to these events, surgery had been—in the words of Paul Farmer and Jim Kim—the "neglected stepchild" of global health.[3]

In 2015, the World Bank Group and the Gates Foundation produced the nine-volume series Disease Control Priorities, 3rd Edition (DCP-3). The first two editions had not included been single volumes with single chapters on surgical care. In this third edition, Volume 1 is devoted to Essential Surgical Care[4] and identifies 44 surgical procedures that address substantial needs while also being cost-effective and feasible to implement in LMICs. Volume 1 also lays out the health economics of surgical care. That same year, the Lancet Commission on Global Surgery (LCoGS) released *Global Surgery 2030: Evidence and Solutions for Achieving Health, Welfare, and Economic Development*.[5] More information about the LCoGS framework of recommendations, indicators, and targets to promote universal access to safe and affordable SOA care is provided in the next sections of this chapter. The publication changed the paradigm in terms of understanding the unmet global needs of surgical care, including the global lack of access, the global need for additional surgeries, the financial burden borne by (especially poor) patients, health workforce needs, and further economic benefits of SOA care. Crucially, the publication frames surgical care as an investment rather than a cost. The UN transitioned in 2015 from the Millennium Development Goal (MDG) era to the Era of Sustainable Development in 2015. MDGs had three goals related to surgical care; the Sustainable Development Goals (SDGs) of the UN Agenda for Sustainable Development 2030 has at least eight targets related to surgery within SDG-3 alone. The other SDGs also touch on improvement through better surgical care delivery systems. In 2015, the World Health Assembly unanimously passed Resolution WHA68.15, *Strengthening Emergency and Essential Surgical Care and Anaesthesia as a Component of Universal Health Coverage.*

Johnson noted that the momentum of global surgery has skyrocketed since the 2015, as the case for NSOAPs has been made resoundingly on multiple fronts. The economic cases have been made through the DCP-3 and the LCoGS; political cases have been made by the UN SDGs and by Resolution WHA68.15; and needs cases have been overwhelmingly documented.

2.2 THE EVOLUTION OF GLOBAL SURGERY (1980-2019)

John Meara opened his presentation with statements from two World Health Organization (WHO) Directors General—made forty years apart—that underscore the importance of broadening access to SOA care across the world. Director-General Mahler was the first global leader to link SOA to social justice, in 1980. Meara emphasized that Resolution WHA68.15 called for strengthening surgical care not as a vertical intervention, but as a component of UHC. Thirty years later, WHO Director-General Tedros Adhanom Ghebreyesus also recognized the importance of SOA as a core component of UHC, social justice, and health equity.

3 Farmer and Kim 2008
4 Debas et al 2015
5 Meara et al 2015

"The vast majority of the world's population has no access whatsoever to skilled surgical care and little is being done to find a solution. I beg of you to give serious consideration to this most serious manifestation of social inequity in health care."

–Dr. Halfdan Mahler (1980)

"No country can achieve Universal Health Coverage unless its people have access to safe timely and affordable surgical services. It's therefore vital that countries invest in surgery."

–Dr. Tedros Adhanom Ghebreyesus (2019)

2.3 THE LANCET COMMISSION ON GLOBAL SURGERY

Meara explained that the LCoGS was convened to develop key messages, indicators, and guidance for integrating SOA planning as part of countries' national health plans. The efforts were driven by the vision of universal access to safe, affordable surgical and anaesthesia care when needed. The Commissioners considered multiple dimensions: workforce training and education; information management; finance and economics; and healthcare delivery and management. The five key messages that emerged from the LCoGS are summarized in Box 2-1. During his presentation, Meara considered each of the five key messages in greater detail.

Box 2-2. Key messages from the Lancet Commission on Global Surgery

In 2015, the LCoGS developed five key messages about the status of surgical care worldwide.

- An estimated 5 billion people lack access to safe, affordable surgical and anaesthesia care when needed.
- An estimated 143 million additional surgical procedures are needed each year to save lives and prevent disability.
- An estimated 33-81 million individuals face catastrophic health expenditure due to payment for surgery and anaesthesia each year.
- Investment in surgical and anaesthesia care is affordable, saves lives and promotes economic growth. An investment of $350 billion would contribute to economic growth of an estimated $12 trillion.
- Surgery is an indivisible, indispensable part of healthcare.

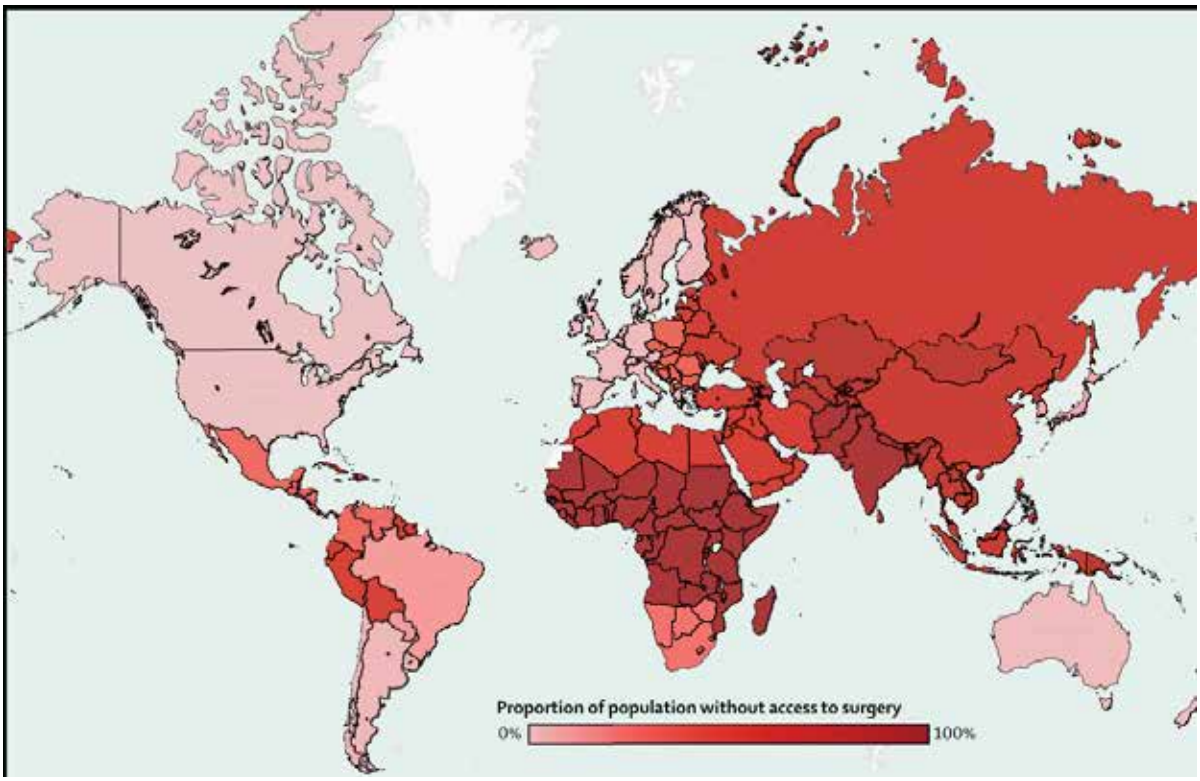
2.3.1 Key message: lack of global access to surgical and anaesthesia care

The first key message from the LCoGS is that an estimated 5 billion people lack access to safe, affordable surgical and anaesthesia care when needed. The probability of accessing surgical care (p) can be represented as a function of those four factors: timeliness (T); capacity (C); safety (S); and affordability (A).

$$p(\text{access}) = p(t \cap c \cap s \cap a)$$

Meara explained that patients must jump through a series of metaphorical hoops to access SOA care. They need to be able to access care within the appropriate time window (eg, within 48 hours). The setting in which they seek care must have sufficient capacity, such as reliable electricity and water services; the facility should also have a culture of safety. Affordability is the factor that impedes most people around the world from accessing SOA care, so addressing this factor has the greatest potential to increase access. Figure 2-1 is a heatmap that illustrates the areas of the world in which 97% to 99% of people lack access to surgical care (indicated in dark red).

Figure 2-1. Proportion of the population without access to surgery



Source: Meara presentation

2.3.1.1 The surgical system and the three delays

Meara explained that the LCoGS built upon the "three delays" model, first introduced in the context of obstetric care the 1990s[6]: delays in seeking care; delays in reaching care; and delays in receiving care. Figure 2-2 illustrates the surgical system and the points in the system in which the three delays are situated.

In the surgical system, the community level ideally comprises informal healthcare providers and a network of community health workers and traditional healers, which should be connected to the broader health system. Delay in seeking care typically occurs at this level, often due to a host of financial, geographic, cultural, and educational barriers. Lack of trust in the system among patients can also be a factor. Further, this level of the system may be disconnected from the broad health system. Strategies for addressing this first delay may include outreach to the community and strengthening the network of community health workers. At the next level of the system, primary health centers should be well connected to first-level (district) hospitals through efficient communications and reliable referrals. However, the second delay—reaching care—can arise due to excessive distances that patients must travel to the centers, by poor prehospital care, and by financial constraints. Strengthening existing modes of prehospital transportation (eg, through Good Samaritan laws or lay responder programs) is a strategy for addressing the second delay, as are potential strategies to take care to patients through mobile surgery units.

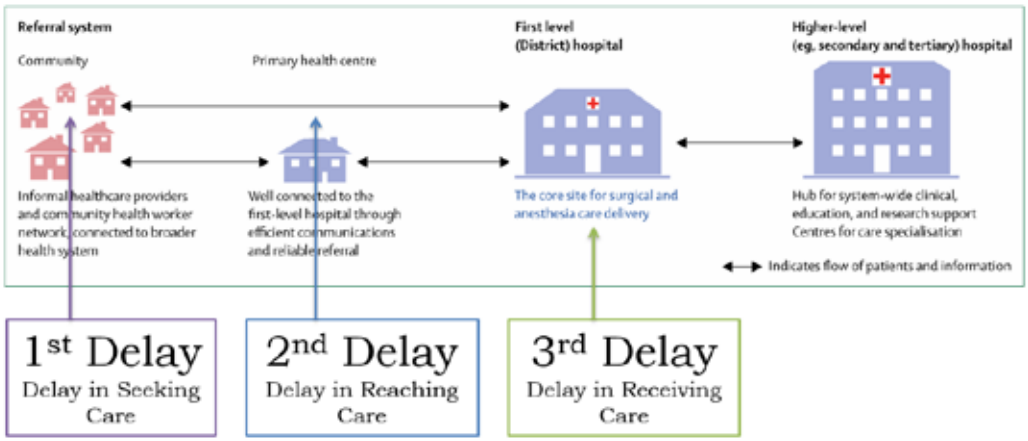
The delay in receiving care generally occurs when patients seek care at the first-level (district) hospital, which is the core site for surgical and anaesthesia care delivery according to the DCP-3. The third delay can be caused by a range of factors, such as poor infrastructure (eg, lack of electricity, water,

6 Thaddeus and Maine 1994

oxygen, emergency care, postoperative care, or anaesthesia machines), lack of essential medications and supplies, poor equipment maintenance, lack of radiology, inadequate blood banking, overcrowding, poor managerial support, or lack of care coordination. The third delay will shorten when first-level hospitals can efficiently deliver a broad range of surgical and anaesthesia services, thus investment should be prioritized at this level.

The LCoGS identified three Bellwether procedures that indicate the surgical functionality of a first-level hospital: Cesarean delivery, treatment of open fracture, and laparotomy. The premise is that first-level hospitals that can perform these three procedures will also have the capacity to perform a much broader range of surgical procedures. Economies of scope dictate that if a hospital has the staff, stuff, space and systems to do the three Bellwether procedures, then adding other procedures will not be prohibitively expensive.

Figure 2-2. The surgical system and the three delays

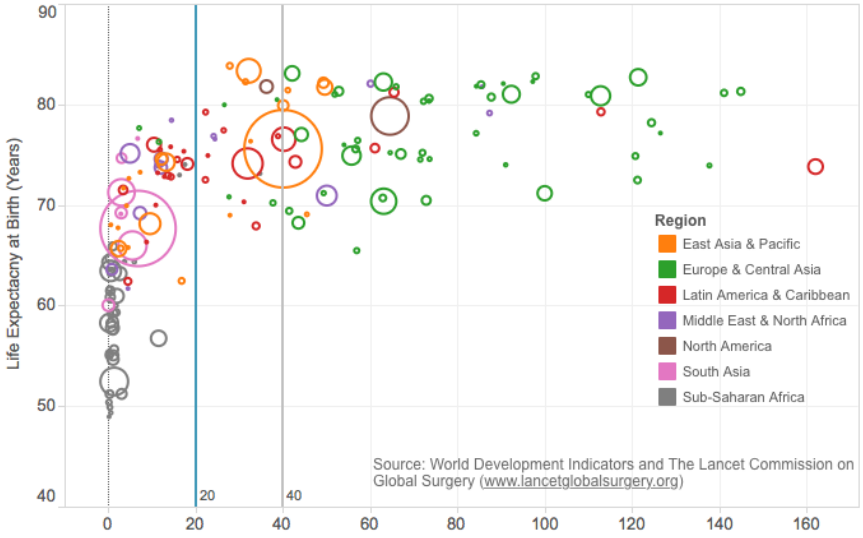


Source: Meara presentation

2.3.2 Key message: additional surgical procedures needed

The second key message from the LCoGS is that 143 million additional surgical procedures are needed in LMICs each year. Today, the poorest one-third of the world's population receives 6% of the total global number of surgical procedures. The LCoGS examined the global surgical workforce by assessing the density of SOA providers, then compared the SOA workforce density with World Bank life expectancy data (see Figure 2-3). Although this is not a causal relationship, they found that in countries with a SOA density of greater than 20 per 100,000 populations, the populations tend to reach life expectancy of greater than 80 years. Countries with SOA density below 20/100,000 tend to have systems that are not functioning very well. However, Meara said that a greater SOA density is not necessarily an indication that the system is functioning well. For example, the US has a very high SOA density, but its health outcomes are not optimal. He noted that the curve in the figure bends at a density of around 20/100,000, but more research is needed to determine the optimal SOA density.

Figure 2-3. Specialist surgical worker density versus life expectancy



Source: Meara presentation[7]

2.3.3 Key message: financial risk protection

The third key message focuses on financial risk protection. Each year, 81 million people face catastrophic expenditures paying for surgery and anaesthesia. 33 million people experience catastrophic expenditure accessing surgical care each year from the direct out-of-pocket costs alone, while an additional 48 million suffer catastrophic expenditure from non-medical costs of seeking care. To put these figures in perspective, Meara noted that half of the world's population lives on less than $2.50 per day. Furthermore, the estimate for catastrophic expenditures do not take into account the people that never access needed surgical care.

2.3.4 Key message: the case for investment in surgery

The fourth key message makes the financial case: investing in surgery is affordable, it saves lives, and it promotes economic growth. The LCoGS found that scaling up surgical care in 88 LMICs toward a minimum operative volume of 5000 procedures per 100,000 population between 2015 and 2030 will cost approximately 350 billion dollars. This could shift an estimated $12.3 trillion in total GDP losses during the same time period.

2.3.5 Key message: surgery, obstetrics and anaesthesia is an indivisible and indispensable part of health care

The fifth key message from the LCoGS is that surgery, obstetrics and anaesthesia is an indivisible and indispensable part of health care. Around one-third of the global burden of disease is related to surgical conditions. This is not to say that one-third of the world's population needs surgery, but that surgical knowledge and capacity are needed to address one-third of the burden of disease. For instance, if a person falls of a bike and has a closed head injury, determining whether a craniotomy is needed requires a person who understands neurosurgery.

2.3.6 Global surgery indicators

The LCoGS established a set of six core global surgery indicators:

- 2-hour access: access to timely essential surgery

7 Data source: World Development Indicators and the Lancet Commission on Global Surgery

- Surgical volume: procedures done in an operating room per 100,000
- Impoverishing expenditure: protection against impoverishing expenditure
- SOA/100,000: specialist surgical workforce density
- Perioperative mortality rate (POMR): all-cause death prior to patient discharge
- Catastrophic expenditure: protection against catastrophic expenditure

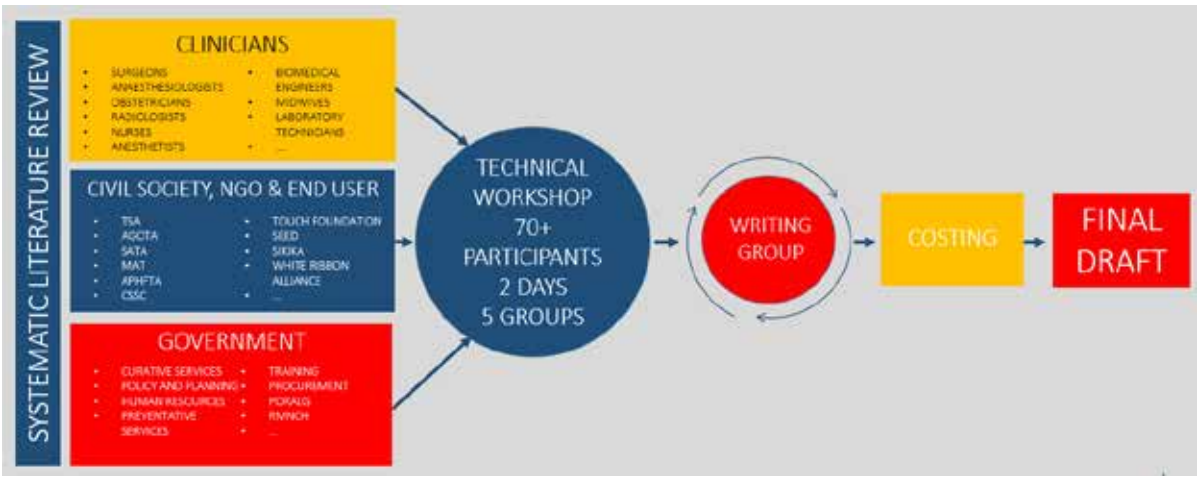
Meara noted that at the time of the LCoGS, the World Bank's World Development Indicators did not include any indicators related to surgery. With World Bank President Jim Kim's support for the LCoGS, the World Bank includes surgical indicators on its list, with the major caveat that the LCoGS could provide data for more than 50% of countries in a very short timeframe. Fortunately, enough data were collected to add the following indicators to the World Development Indicators (WDIs): surgical volume, catastrophic expenditure, impoverishing expenditure, and SOA density. The World Bank then helped to publicize the addition of these indicators (see Appendix 3).[8]

2.3.7 National surgical, obstetric, and anaesthesia plans

The work of the LCoGS provides critical support to countries in creating national SOA plans. The NSOAP process spans five stages. It begins with a preparatory phase, followed by a technical planning workshop. At that point the writing phase can begin, followed by costing the NSOAP and creating a final draft of the plan. Figure 2-4 provides an overview of the planning process. Key NSOAP planning domains include:

- Infrastructure: surgical facilities; facility readiness; blood supply; access and referral systems
- Workforce: SOA providers; allied health providers
- Service delivery: surgical volume; system coordination; quality and safety
- Financing: health financing and accounting; budget allocation
- Information management: information systems; research agenda
- Governance: leadership and management

Figure 2-4. National surgical, obstetric, and anaesthesia planning process



Source: Meara presentation

8 Raykar et al 2016; Suzuki et al 2018b

2.3.7.1 NSOAP progress and next steps

Meara reported that NSOAP drafting has been completed in Zambia, Tanzania, Rwanda, and Ethiopia. Workshops and other convenings help to support countries in the planning process. A National Surgical, Obstetric, and Anaesthesia Planning workshop was held at the Harvard Medical School Center for Global Health Delivery-Dubai in March 2018 and subsequently, a group of participants agreed to reconvene at the College of Surgeons of East, Central and Southern Africa (COSECSA) meeting to assess NSOAP progress. This type of commitment to reconvening is crucial, he noted. WHO holds regional workshops to provide tools, skills, and technical assistance to Member States to enable them to carry out their NSOAP work with a greater degree of autonomy. Tools for NSOAP planning and several countries' NSOAPs have also been collected by the Harvard Medical School Program in Global Surgery and Social Change.[9]

The next step is to scale NSOAPs, said Meara. This will require gathering more high-quality data about the surgical indicators worldwide. Regionalization will allow countries to work together as regions to develop NSOAPs, rather than doing so in isolation. Efforts will also need to be focused on garnering more funding by demonstrating the need to integrate NSOAPs into efforts to strengthen national health systems. Meara suggested that moving forward, the focus should be on aligning and integrating NSOAPs with the UHC and SDG3 agendas. To achieve this, the emphasis should be placed on equitable access to quality care, financial risk protection, measurement, and accountability for results.

2.3.8 Discussion

During the discussion, Walter Johnson, Head, Emergency and Essential Surgical Care Program, World Health Organization, remarked that the NSOAP process has evolved since its inception and asked about any further upcoming changes in the process. Meara replied that guidance and documentation about the NSOAP process are not intended to be rigid and prescriptive; each country has a unique context for which NSOAP processes and plans can be tailored. For example, Pakistan has adapted the NSOAP process substantially to suit its specific needs. Meara reiterated that regionalization will be critical moving forward. Developing a mechanism to channel data upstream to WHO and the World Bank will also be important in establishing accountability. Meara warned that without accountability and adequate funding, many NSOAP plans that are developed may never be fully implemented.

Hoonsang Lee, Adjunct Professor, Yonsei University School of Public Health, Korea, and Health Sector Advisory Committee, Korea International Cooperation Agency (KOICA), asked about the component of essential emergency care. Meara said that trauma and emergency care, as well as the trauma and burn community, must be a part of the NSOAP planning process as part of the stakeholder analysis.

Sk Nazmul Huda, Global Program Manager, Fistula Care Plus Project, Engender Health Inc. and Country Program Manager, Bangladesh Office, Engender Health Inc. suggested that given the shortage of resources, efforts might focus on optimizing the use of funds that are already available rather than seeking new funding sources. This could potentially help to close the equity gap in some settings, he noted. Meara agreed that it is important to determine the optimal use of existing funds, and that the equity gap underscores the need for better data to improve transparency around equity—for example, identifying the numbers of people who are receiving or not receiving needed surgical procedures.

Noor Hisham Abdullah, Director-General of Health, Malaysia, remarked that existing data demonstrate the urgent need to address the equity gap and highlight the need for a practical, high-impact plan with reasonable costs and desirable outcomes for policy makers. Meara commented that although

9 NSOAP tool and plans are available online at www.pgssc.org (accessed May 30, 2019).

there will not be a one-size-fits-all solution, because NSOAPs need to be country-specific and led by country- or regional-level actors, there are commonalities: high-level buy in and regional coordination are keys for successful NSOAPs in any context.

Salmaan Keshavjee, Professor of Global Health and Social Medicine and Director of the Harvard Medical School Center for Global Health Delivery–Dubai, suggested that the NSOAP community consider local- or city-focused strategies, which have been more effective for tuberculosis control than county-focused strategies. Lubna Samad, Pediatric Surgeon, Indus Hospital, Karachi, Pakistan, and Lecturer, Center for Global Health Delivery--Dubai, Harvard Medical School, noted that the contagiousness of tuberculosis was the driving force of the city-focused strategy, but the surgical situation may be different. For instance, urban settings in Pakistan have reasonable surgical access and delivery, while people in rural areas without access to urban settings suffer most from surgical inequity due in large part to the difficulty in getting to a hospital. She suggested addressing pockets of the population where the need is greatest, which is more likely to be in rural areas in the case of surgery than for infectious disease.

2.4 MACROECONOMICS OF SURGICAL CARE: THE COST OF DOING NOTHING

Blake Alkire, Faculty, Program in Global Surgery and Social Change, Harvard Medical School, made an economic case for NSOAPs with his presentation on the macroeconomics of surgical care and the cost of inaction. Economists have studied the connection between health and economic productivity for decades, creating a range of different models. Alkire provided a high-level overview by exploring several key points about how poor health can negatively impact an economy.

2.4.1 Economic welfare perspective

The economic burden of disease can mean very different things depending upon the economic perspective of a study. One perspective is based on 'welfare economics,' which is interested in individuals' standard of living or general prosperity. Economic welfare depends on people's ability to consume goods and services, people's ability to do what they want to do in their spare time, and people's health status. Each of the three factors contributes to increasing people's levels of utility.

Disease or injury decreases health status directly, but also impacts the ability to consume and have fun; it also decreases utility through other indirect pathways such as out-of-pocket health expenditures.

2.4.2 Economic output perspective

An entirely different economic perspective looks at the relationship between population health and the economic output of a country. At the macro level, the factors of economic output are the ability of households to consume goods, the resources that corporations and governments have to invest in human and physical capital, and the productivity of the labor supply. These three factors all show a strong correlation to GDP. Disease and injury can impact macroeconomic performance by determining how much governments have to spend on health at the expense of investments in infrastructure or education. Out-of-pocket health expenditure also impacts household consumption. Additionally, poor health and premature mortality negatively affect the supply and productivity of the labor force.

2.4.3 Estimating the macroeconomic burden of disease

Alkire explained that the LCoGS sought to estimate the macroeconomic burden of disease in LMICs based on both of those perspectives: the value of lost output and the value of lost welfare. The LCoGS conducted its analysis using both models.

For each approach, they modeled five disease categories that represent the vast majority of surgical disease: neoplasm, injury, maternal, neonatal, and digestive. Alkire presented the findings of the LCoGS analysis.[10]

2.4.3.1 Value of lost output model

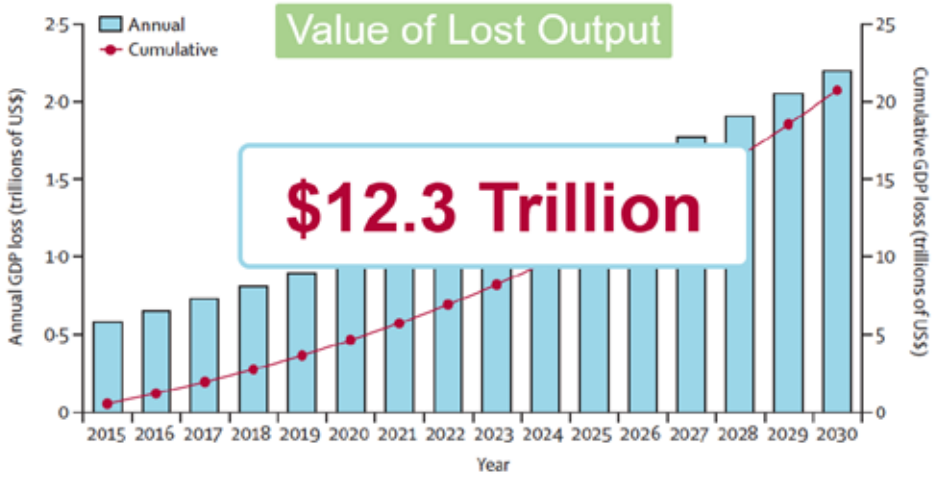
The value of lost output (VLO) approach attempts to measure the effect of disease on the market economy of a country by attempting to project forgone potential GDP secondary to a disease process. The VLO model is based on the Cobb-Douglas function, which relates a country's GDP to its capital stock, labor supply, and technological progress. Capital stock is the current value of fixed physical assets in a country, such as roads, and technological progress is economic productivity unaccounted for by capital or labor. WHO's EPIC model is based on the Cobb-Douglas function; it allows researchers to assess how a disease or group of diseases affects a country's labor supply and physical stock, as well as how those changes affect GDP.

Data were available for 128 countries for the VLO model, which projected GDP losses due to surgical disease over a 15-year period.

The analyses found that if nothing is done, an estimated $22 trillion will be lost globally over 15 years, with LMICs losing an estimated $12.3 trillion (see Figure 2-5). Low-income countries and LMICs stand to lose the most as a proportion of GDP—up to 2% (see Figure 2-6). He noted that a 2001 study[11] reported a 1.3% loss in GDP in countries with intensive malaria, thus a 2% loss is an impactful and important number. Results of the VLO model are available by country in the supplemental manuscript to the LCoGS report.

During the subsequent discussion, Elizabeth McLeod, Chair of the RACS Global Health Monitoring and Evaluation Committee, remarked that GDP loss does not account for unpaid work, especially work done by women. Alex Peters, Paul Farmer Global Surgery Research Fellow, Program in Global Surgery and Social Change, Harvard Medical School, explained that unpaid labor is not quantifiable. They often refer to the figures presented by Alkire as 'underestimates' due to such issues; there are other ways to measure impact and cost that may better capture different factors. However, the GDP approach has traction with policymakers.

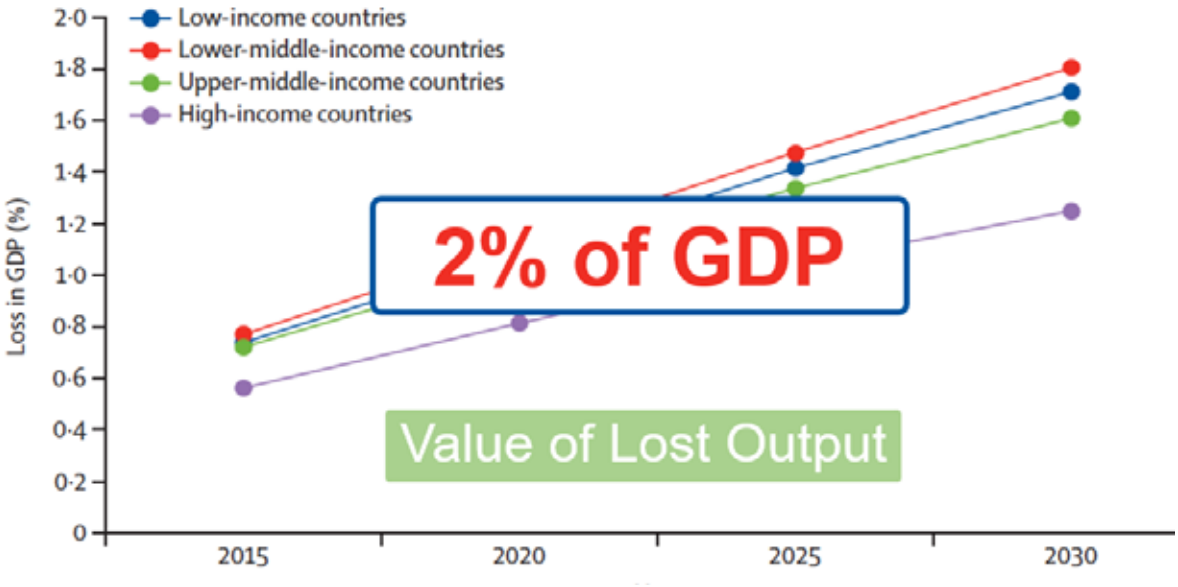
Figure 2-5. Total global GDP losses due to five surgical disease categories (2015-2030)



Note: Surgical disease categories modeled are neoplasm, injury, maternal, neonatal, and digestive.
Source: Alkire presentation

10 Alkire noted that since the LCoGS, two additional publications have used both the VLO and VLW models to look at the neurosurgical burden of disease and the burden of amenable mortality in LMICs.
11 Gallup and Sachs 2001

Figure 2-6. Value of lost output as a proportion of GDP by country development level



Source: Alkire presentation

2.4.4 Value of lost welfare model

The value of lost welfare (VLW) approach is an assessment of non-market welfare losses, such as the value placed on good health itself. This approach relies on a concept called the value of a statistical life (VSL). VSL is commonly used in environmental economics to perform benefit-cost analysis, but it is increasingly being used in health economics. The core of VSL is determining how much individuals are willing to pay to reduce their mortality by a small percentage, and then converting that figure to a VSL. For example, if a person is willing to pay $6 to reduce his or her chance of death this year by 1 in 1,000,000, then the person's VSL is approximately $6/1 in 1,000,000, or $6,000,000. VSL estimates are derived from two sources, wage data and survey data. Wage data assess differences in salaries of jobs with different risk profiles—that is, revealed preference. Survey data, in which participants are surveyed regarding their willingness to pay for mortality risk, are a measure of stated preference.

Data were available for 175 countries for the value of lost welfare model (VSL), which estimated welfare lost in just one year. The VLW model revealed that in terms of equivalent percentage of GDP, high-income countries stand to lose the most; this is a function of how VSL is derived. However, neoplasm currently has higher incidence in high-income countries. If that category is removed from the model, low-income countries are affected most. Given the ongoing epidemiological transition in LMICs, LMICS will likely be expected to bear the weight of this burden as well. LMICs are expected to lose $4 trillion in lost economic welfare due to surgical diseases in the next year (see Figure 2-7). These results are also available in the appendix of the LCoGS article.

Figure 2-7. Value of lost welfare as an equivalent percentage of GDP

Source: Alkire presentation

2.4.5 Discussion

It is important to collect data that will actually be useful, advised Khama Rogo, Lead Health Sector Specialist and Programme Head, Health In Africa Initiative, World Bank Group. If surgery becomes accessible for the first time in a rural area, for example, large numbers of people with life-threatening conditions will typically rush to seek care. The demand can become overwhelming and the results will suffer due to the limited resources. In such situations, it is impossible to judge the efficacy of the work being done without qualitative evaluation. Rogo highlighted the need for better communication between obstetricians and surgeons. Obstetricians have a long history of performing certain surgical procedures. Although this becomes more complex when dealing with the gamut of surgery in general, there are lessons to be gleaned from the use of qualitative data related to maternal mortality and C-section, for example. Tearikivao (Kiki) Maoate, Fellow of the Royal Australasian College of Surgeons, Surgical Examiner and Director of the College's Pacific Programs, added that qualitative data is needed to advocate with ministers of health. He also remarked that patient outcome data should not be overlooked during data analysis.

Emile Rwamasirabo highlighted the variability of different countries' contexts and needs in data collection. Some countries lack the most basic surgical services. People in these settings may suffer lifelong disability due to conditions such as a fractured femur or pelvis, which could be treated effectively by emergency surgery, for example. In such settings, an indicator such as access to surgery may be very different than in higher-resource settings.

Maoate noted that monitoring and evaluation is a massive undertaking that is beyond the purview of healthcare providers; it requires funding and support to implement. Rwamasirabo noted that Rwanda has an accreditation program for hospitals with quality standards and targets; data are entered into the national health and medical information system. He suggested that this type of information

system can be useful for national-level hospital monitoring and evaluation.

Faysal El-Kak, Vice President, Federation of International Gynecology, Obstetrics (FIGO), noted another factor to take into account. 'Near miss' is a measure of the efficiency of a system to improve maternal health. This is a complex indicator that someone was supposed to die, but did not due to a confluence of contributing factors in the entire system, such as access to surgery or numbers of surgeries being performed in a population.

John Meara, Director, Program in Global and Social Change and Plastic Surgeon-in-Chief, Department of Plastic & Oral Surgery, Boston Children's Hospital, agreed that these suggestions are all valid and should be collected. The key questions concern when these indicators can start being tracked, how soon the data can become available, and at what level the results should be reported. He warned that the World Bank will not continue to post its surgery indicators if years go by without more surgical data. No institutional process is currently in place to generate more of that data, so the World Bank surgery indicators are dependent upon data delivery from workshop participants and their organizations. Institutionalizing the data collection will also facilitate the flow of information from facilities to regional and national health bureaus, then on to ministries of health, the WHO,[12] and the World Bank. He added that the data set necessarily will be smaller at the national level, but the local and hospital levels should collect larger, more granular data sets that include qualitative data and other indicators suggested during the discussion. However, monitoring and evaluation and quality improvement should be performed at every level: local, regional, and national—but it has to be staged and will require strategic decisions about what data will be included in global reporting.

2.5 THE NSOAP PROCESS: THEORETICAL FRAMEWORK

Desmond Jumbam, Health Policy Analyst, Program in Global Surgery and Social Change, Harvard Medical School, outlined the core features of an NSOAP and how it can be used to improve surgical care through health system reform. The six domains[13] of an NSOAP are workforce, infrastructure, service delivery, information management, finance, and governance. The LCoGS proposed a process for developing an NSOAP that spans eight steps, each of which Jumbam explored in detail. The procedural steps are:

- Ministry of health (MoH) leadership
- Situation analysis and baseline assessment
- Stakeholder engagement and priority setting
- Drafting and validation
- Monitoring and evaluation
- Costing
- Governance framework
- Implementation

2.5.1 Ministry of health leadership

MoH leadership is a critical initial step in the NSOAP process, said Jumbam. MoH buy in represents high-level commitment, through which senior officials can establish the directive that the NSOAP needs to be accomplished. Ultimately, the NSOAP is a MoH policy, so the MoH is responsible for coordinating NSOAP development and implementation. The MoH can take a leadership role at each step of the NSOAP process. For instance, the MoH can use its convening power to bring stakeholders together and facilitate policy dialogue. MoH leadership can ensure that SOA care is integrated into the national health plan and government policies, which is a crucial

12 Emmanuel Makasa noted that in Southern Africa, they are collaborating with WHO to create a center for surgical data collection.

13 Although the LCoGS initially proposed five NSOAP domains, the first few countries involved in the planning process recommended the inclusion of governance as an additional domain.

step for funding. The MoH can also take the lead in mobilizing domestic and external resources for NSOAP implementation.

2.5.2 Situation analysis and baseline assessment

The next step is a situation analysis to assess the current surgical capacity in the country. Situation analysis is fundamental to establishing the baseline state of SOA capacity, setting goals and targets for what the country wants to achieve through the NSOAP process, and determining the activities that are needed to achieve those goals and targets. Situation analysis can be performed in different ways. If the MoH is already collecting relevant data, then this corpus can be reviewed. Literature reviews can help inform the effort and provider interviews can also be a useful mean of assessment. Hospital assessment tools and other tools to aid in situational analysis are available to NSOAP planners.[14] The NSOAP financing strategy should ensure fiscal space for health analysis, stakeholder analysis, and stakeholder engagement.

2.5.3 Stakeholder engagement and priority setting

Stakeholder engagement is a core component of the NSOAP process. Including providers on the front line delivering care—such as surgeons, obstetricians, and anesthesiologists, and community health workers—helps to ensure that the NSOAP reflects the reality of those front-line implementers. It is also important to engage with and gain buy in from a range of other stakeholders, including: professional societies, academic and research institutes, clinical providers, emergency providers, ancillary surgical staff, funders, nongovernmental organizations, patients, media, World Health Organization, private sector stakeholders, and the ministries of health, education, and finance.

Stakeholders can be engaged through focus groups, semi-structured interviews, workshops, and committees. Workshops can also provide the opportunity for stakeholders to collaborate in priority setting, writing workshops, costing, and validation. Harvard Medical School's Program in Global Surgery and Social Change (PGSSC) has developed tools to assist in stakeholder engagement activities, including a guide for semi-structured group interviews and an NSOAP Discussion Framework (see Figure 2-8).

14 For example, the NSOAP semi-structured hospital interview tool and the WHO-PGSSC Surgical Assessment Tool are available at https://www.pgssc.org/national-surgical-planning (accessed May 31, 2019).

Figure 2-8. Excerpt from NSOAP Discussion Framework

INFRASTRUCTURE

Number and Distribution of Surgical Facilities

I. Background

1. What are the different levels of health facilities that exist in the country?
    a. How many facilities are there of each level in the country?
2. Which of the facilities should be capable of providing the Bellwether procedures (C-section, laparotomy, and treatment of open fracture)?
    a. What is the geographic distribution of Bellwether-capable facilities?
        i. Is this distribution deliberate, and if so how?
    b. What percent of population do you estimate can reach a Bellwether-capable facility within 2 hours?
3. Is the current number and distribution of facilities adequate?

II. Challenges & Proposed Solutions

4. What are the major barriers to developing new facilities?
5. What are previous and current initiatives to improve distribution and number of facilities?

III. Targets

6. In 5 years, what changes need to be made in regards to the number and distribution of surgical facilities?

IV. Monitoring and Evaluation

7. Key Metrics
    a. How can 2-hour access to Bellwether procedures be measured accurately?
    b. What is the frequency that access to Bellwether procedures should be measured?
8. Which body of government or organization will lead this initiative and monitor progress?

Source: HMS PGSSC[15]

2.5.4 Drafting and validation

Jumbam explained that drafting is the technical process of integrating the themes and priority consensus that emerge from the stakeholder engagement and priority setting stage. This process involves organizing goals, strategic objectives, outputs, activities, indicators, and targets. The first step is to assemble a team to develop the draft plan—depending on the setting, this might involve the NSOAP core team, individual stakeholders, or an outside consulting group. After the plan is drafted, the validation process ensures that the draft reflects the consensus of the stakeholders, strikes the appropriate balance between views and evidence, and is aligned with the priorities of the government and MoH. The validation process can be carried out in person at a validation workshop or remotely through email or post.

2.5.5 Monitoring and evaluation

Developing an NSOAP monitoring and evaluation plan is the next step in the process. This allows for tracking the progress of NSOAP implementation and facilitates evidence-based policy decisions. This requires determining what data should be collected, setting indicators and targets, and deciding how to collect and report those indicators. Ideally, indicators selected should be relevant, feasible to collect, and amenable to change. Mechanisms for reporting data to the local, national, regional,

15 The full NSOAP Discussion Framework is available at https://www.pgssc.org/national-surgical-planning (accessed May 31, 2019).

and global levels should also be built into the monitoring and evaluation plan.

2.5.6 Costing

Costing the NSOAP is a critical tool for resource mobilization, because the MoH can use the costing plan to advocate for NSOAP funding with potential funders at the national or international levels. The costing process comprises four steps:

- Assemble costing information
- Define objects and quantities
- Determine cost base
- Attribute cost to cost objects

2.5.7 Governance framework

Jumbam explained that the next step in the process—establishing the governance framework—involves several important considerations. The roles and responsibilities of all actors should be explicitly established, with clear accountability structures in place. Reporting mechanisms must also be built into the governance framework. Issues related to data access and utilization should also be considered at this step in the NSOAP process.

2.5.8 Implementation

Implementing the NSOAP is the ultimate aim, said Jumbam, who noted that "NSOAPs are not meant to sit on the shelf." At this stage, the NSOAP should be disseminated to local-level implementers to operationalize the plan that has been developed. After the NSOAP has been implemented and is being executed, monitoring and evaluation should be used to review and revise the plan as needed. Implementation can be challenging, as illustrated by the experience in countries such as Zambia and Tanzania, who were among the first two initiate the NSOAP process and are still working to implement the plans.

2.5.9 Discussion

2.5.9.1 Task sharing

Inaam Haq, Program Leader for Human Development, Africa Region, World Bank, commented that it will be necessary to integrate task-sharing strategies and draw upon non-physician providers to achieve sufficient service delivery capacity in many low-resource settings. Meara added that task sharing may be a useful option; the LCoGS did address task sharing, but they did not make a firm recommendation because countries have such varying positions on the issue.

Emile Rwamasirabo, Chief Consultant Urological Surgeon, King Faisal Hospital/ OSHEN, Kigali, Rwanda, remarked that task-shifting has been a crucial strategy in Rwanda. At district hospitals, anaesthesia care is delivered by non-physician/non-specialists and general practitioners have been trained to perform certain basic surgeries. Task-shifting has been a necessity, not an option, but it has been working well. Quality has improved over time as a result of better training.

2.5.9.2 Leveraging the private sector

Haq noted that efforts to build surgical capacity are already ongoing in most countries, albeit mainly in urban settings and tertiary-level facilities. He suggested broadening the perspective to consider the package of service delivery that needs to be delivered to the population to serve the greatest need. He remarked that many people are seeking care in the private sector, so NSOAP planners should consider how the private sector can be leveraged to achieve NSOAP goals; for example, perhaps the plan could be supported by government financing while the services are delivered by the private sector.

3 Global-level NSOAP mandates and activities

3.1 NSOAPS AND WHO HQ: PROGRESS ON WHA 68.15 AND THE ROLE OF WHO

Walter Johnson, Head, Emergency and Essential Surgical Care Program, World Health Organization, delivered a presentation on NSOAPs and WHO Headquarters and described progress made since the unanimous passage of WHA 68.15 in 2015. Johnson explained that WHO is the health (technical) arm of the United Nations, through which Member States come together to decide upon agendas and funding. The WHA and the UN provide political commitments for Member States to achieve those agendas.

In the 2030 Agenda for Sustainable Development, the SDGs represent some of those political commitments to national SOA planning: every country has agreed to report surgical and anaesthesia data every two years until 2030. Because of this process and the accountability structure of the WHA, WHO can ask countries what they have done since 2015. Nine of the targets in SDG3 are related to surgical care (3.1, 3.2, 3.3, 3.4, 3.6, 3.7, 3.8, 3.b, 3.c); four of the targets will never be achieved without advancing surgical and anaesthesia care (reducing maternal mortality [3.1], reducing infant and under 5 mortality [3.2], reducing premature deaths from NCD [3.4], and reducing road traffic deaths by half [3.6]). Further, UHC (3.8) will never be achieved without inclusion of SOA care. He noted that the Thirteenth General Programme of Work, 2019-2023 (WHA71.1)[16] of the 71st World Health Assembly, which is the detailed program that guides WHO activities, includes a sentence addressing surgical need—"there is also a need to increase the availability of safe and effective surgery."

3.1.1 Essentials of WHA68.15

Johnson outlined the essentials of Resolution WHA68.15, *Strengthening Emergency and Essential Surgical Care and Anaesthesia as a Component of Universal Health Coverage*. The Resolution includes advocacy and resource development, as well as essential medicines. Service delivery elements cover access to surgery and systems integration, while information management includes data collection, analysis, and monitoring and evaluation. Workforce components include training, credentialing, competence, and oversight. Reporting is required every two years from both WHO and from Member States.

3.1.1.1 Global health financing

The proportionate need for surgery worldwide far outstrips the global funding available for building SOA capacity. To put this in context, there are an estimated 17 million deaths due to surgical conditions per year, yet the budget for surgery is virtually non-existent. There are around three million deaths per year from HIV/AIDS, tuberculosis and malaria, yet the annual funding for these diseases is about $5 billion. Similarly, noncommunicable diseases have a very small pool of global funding, but the demand for surgical care increases as noncommunicable diseases become more prevalent.

3.1.1.2 Service delivery: access and system integration

In the context of the service delivery system for SOA care, WHO focuses on the district hospital level and its ties to the community in order to work toward eliminating delays in seeking care. This becomes increasingly important with the increasing burden of noncommunicable diseases, Johnson noted. The district hospital is the focal point of

16 World Health Assembly 2018

surgical care; its purpose is to provide safe, affordable and timely basic surgical, obstetric and anaesthesia care. It is critical to remove barriers to access, to strengthen the health system by strengthening the building blocks at the first-level hospital, and to interconnect this facility to the community through the primary health care system as well as to higher-level health facilities through an efficient referral system. This directly links surgical care with primary health care and UHC.

WHO encourages ministries of health to use data to drive health policy. The list of WHO 100 Core Health Indicators[17] that came out in 2018 refers to surgery twice in the context of service delivery. These indicators also cover all six of the LCoGS indicators, with surgical volume, SOA density, catastrophic expenditure, and impoverishing expenditure included as WDIs.

3.1.1.3 Training and credentialing

In addition to countries' ministries of health and education, many professional societies and organizations are involved in training and credentialing the SOA workforce, said Johnson. These include:

- COSECSA
- West African College of Surgeons (WACS)
- American College of Surgeons
- World Federation of Societies of Anaesthesiologists
- American Association of Neurological Surgeons
- Royal College of Surgeons Ireland

3.1.1.4 NSOAPs

Through the process of identifying stakeholders, situation analysis and baselining, setting targets, and devising a plan to achieve those targets, NSOAPs can allow countries to achieve their national surgical goals.[18] Johnson emphasized that implementation is the lynchpin of the iterative NSOAP process—it is toothless if not implemented. Furthermore, funding is the key to NSOAP implementation. Zambia's NSOAP was distributed and discussed at a 2017 meeting to follow up on the 2015 WHA Resolution. Interest in Zambia's NSOAP at the meeting was overwhelming, which underscored the need for regionalized NSOAP workshops to support countries embarking upon the NSOAP process.

Impact should be the driving force of every NSOAP, said Johnson. Without funding and impact, an NSOAP will not accomplish a country's national surgical goals. Currently, 20% of LMICs have NSOAPs underway, which accounts for about one billion people. If Brazil and India join the process, then NSOAPs have the potential to impact 2.5 billion people, which amounts to half of the five billion people without access to surgical care worldwide.

In many settings, surgical care systems need to be strengthened in order to effectively deliver SOA care through implementation of NSOAPs. Resources and case reports are already available[19] and others are being developed to support countries in implementing their NSOAPs to the greatest possible impact.

3.1.2 WHO's current priority projects

Johnson outlined WHO's current priority projects:

- Mandates of Resolution WHA68.15, including facilitating NSOAP, convening NSOAP workshops, and collecting data and indicators
- Quality initiatives
- Norms and standards
- Children's surgery
- Obstetric surgery
- NCD surgical care in LMICs, including cancer, stroke, heart conditions, and diabetes mellitus

17 World Health Organization 2018a
18 Albutt K et al 2018
19 World Health Organization 2018b

- Injury, including traumatic brain injury
- Partnerships, such as WHO Collaborating Centres for Surgical Care and Anaesthesia

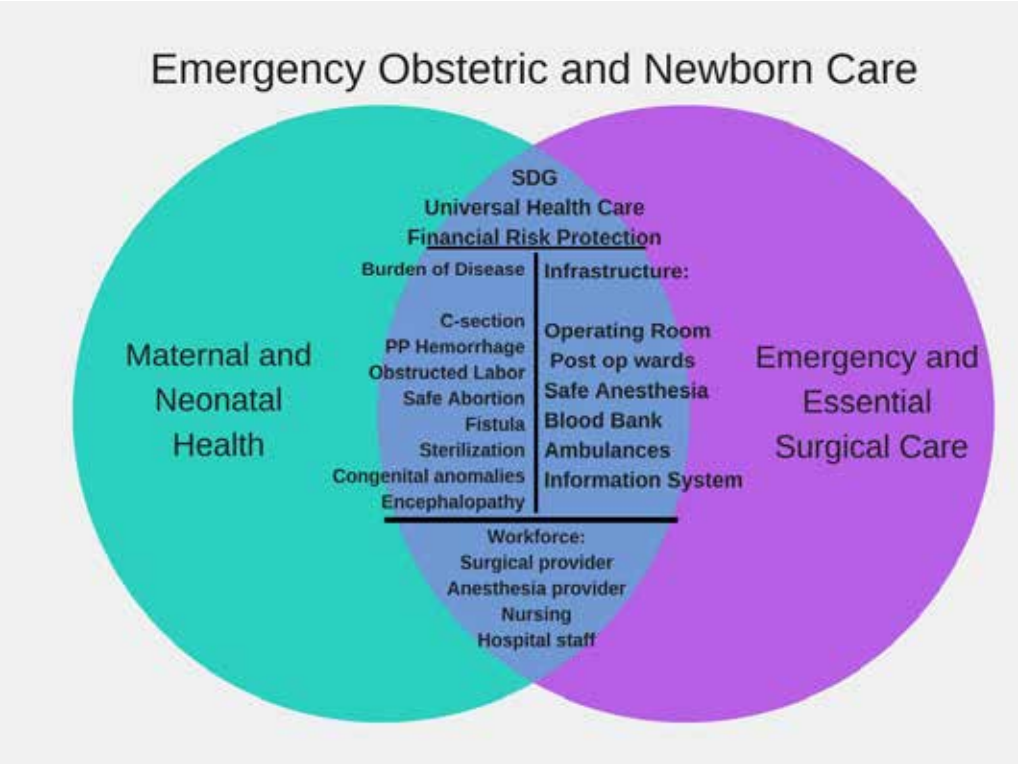
Johnson emphasized that surgery is a requisite component of UHC, but quality is also imperative. In 2018, the first-ever jointly issued report by WHO, OECD, and World Bank Group issued a call to improve global health care through a "focus on (the) quality of health services, which involves providing effective, safe, people-centered care that is timely, equitable, integrated, and efficient."[20]

Norms and standards available or under development include the World Health Organization-World Federation of Societies of Anaesthesiologists (WHO-WFSA) International Standards for a Safe Practice of Anesthesia[21]; Global Guidelines for the Prevention of Ebola or Marburg Virus Transmission During Surgery and Invasive Procedures (WHO); and surgical checklists, including WHO's Surgical Safety Checklist, the Trauma Care Checklist, and Safe Childbirth Checklist.

Johnson noted that strengthening pediatric services is critical because in some settings, such as sub-Saharan Africa, 43% of population is under the age of 15. Surgeons who operate on adults may not want to face the higher risk associated with operating on children. Further, pathology is different in children and they are unable to pay for their own services. The Global Initiative for Children's Surgery has published the Optimal Resources for Children's Surgery (OReCS),[22] covering all pediatric services. Emergency obstetric and newborn care lies at the intersection of maternal and neonatal health and emergency and essential surgical care (see Figure 3-1). Around 40 million unsafe abortions are performed each year, and the need for fistula surgery is vastly unmet in many settings. For instance, Ethiopia has about 9000 fistula cases each year, but only 1200 fistula surgeries are performed in the country annually. During the discussion, Lauri Romanzi, Project Director, Fistula Care Plus, Engender Health Inc, emphasized that morbidity matters: more important than quality of fistula surgery is using surgery to prevent fistula. Fistulas no longer occur in wealthy countries, she said, the rate of fistula at the district level can be seen as a sentinel indicator of gaps in surgical maternal care. She noted a trend in which C-sections have been scaled up without quality governance, resulting in an increase in iatrogenic fistula.

20 WHO et al 2018
21 Gelb et al 2018
22 Available at https://www.globalchildrenssurgery.org/optimal-resources/ (accessed June 1, 2019).

Figure 3-1. Emergency obstetric and newborn care



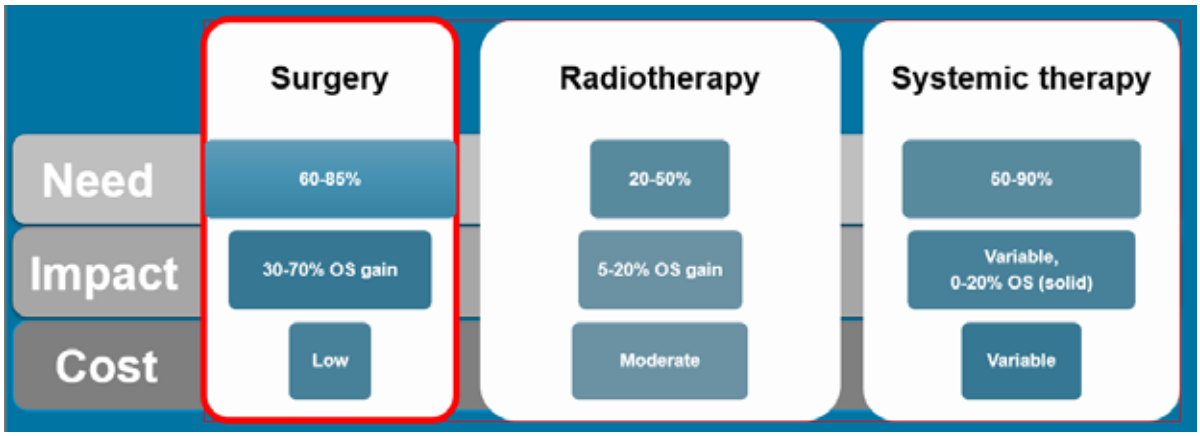
Source: Johnson presentation

The demand for injury and NCD-related surgical care is increasing worldwide, said Johnson. However, there are vast inequities in the incidence and impact of injuries. Poorer countries are the worst affected by injuries and violence, according to WHO Global Health Estimates for 2014.[23] According to DCP3, 68% of surgery-preventable deaths are from injuries. An estimated 90% of the world's fatalities on the roads occur in LMICs, even though these countries have approximately 54% of the world's vehicles. Traumatic brain injury is the leading lethal injury in every country, but there are no algorithms for treating traumatic brain injury for facilities without CT or MRI scanning capabilities.

According to GLOBOCAN estimates, there were 9.6 million cancer deaths in 2018 and by 2030, this number is predicted to triple, with three-quarters of those deaths in LMICs.[24] The incidence of cancer is being propelled by aging societies, commercial interests, and unhealthy lifestyles. Johnson emphasized the need to politically prioritize the importance of surgeons in cancer control, given that surgery addresses the greatest need with highest impact, but lowest cost (see Figure 3-2). The only hope against cancer for poor people in poor countries is early detection and surgical excision, because they have no access to radiotherapy or chemotherapy.

23 Available at https://www.who.int/healthinfo/global_burden_disease/en/ (accessed June 1, 2019).
24 The Lancet 2018

Figure 3-2. Importance of surgery in cancer control



Source: Atun et al 2015; Rossi et al 2015

3.1.3 Ways forward for global surgery efforts

Johnson reflected on how successful global efforts in the past can inform success in the future. The Millennium Development Goals set forth in 2000 produced the most successful anti-poverty movement in history. During the agenda, the was a decline in the global under-five mortality rate by more than half between 1990 and 2015; a similar decline of almost 50% was seen in the maternal mortality ratio during the same period.[25] Analysis of the global disease burden between 1990-2016 shows a substantial decline in the disability-adjusted life years rate from all causes, particularly in LMICs.[26] In 2015, the MDGs effectively transitioned into the SDGs of the 2030 Agenda for Sustainable Development.

Catalyzed by the efforts brought forth over the past decade by the LCoGS, the DCP-3, and the SDGs, "the tide has turned and the momentum in global surgery is tremendous," said Johnson. The paradigm for discussing global surgery has shifted from a vertical, siloed conversation to a horizontal, matrix-oriented conversation. There is now high-level buy in and greater awareness about the importance of expanding SOA care at all levels, from WHO's Director-General and other UN agencies as well as countries' ministries of health. Funding is on the imminent horizon and the workforce is expanding, with workforce specialty groups organizing globally. Centers for global surgery and training consortiums are being established worldwide and the Consortium of Academic Global Surgery is working to unify academic global surgery programs to discover solutions for safe, effective, and affordable surgical care worldwide. These developments are being fueled by the infusion of a new generation of leaders entering the field.

Partnerships are a pillar of WHO's responsibility—codified in SDG 17—and they are necessary to achieve surgery goals. WHO Collaborating Centres can forge strong partnerships around NSOAP efforts. Eight Surgery and Anaesthesia Collaborating Centres have already been established across WHO Regions and developing more Centres will strengthen this global network. Expanding and twinning partnerships will be an important strategy going forward.

The case for building global SOA capacity has now been irrefutably established, both economically by the DCP-3 and LCoGS and politically by the SDGs and Resolution WHA68.15. A great deal of work remains to

25 United Nations 2015
26 Roser and Ritchie 2016

be done at all levels, but it can be achieved by identifying and leveraging existing strengths and developing efficiencies. Surgery should be framed as a social justice issue that extends to health equity, gender equality, primary health care, and UHC—with health as a vehicle for peace.[27] Johnson concluded with a quote from Resolution WHA34.38: "The role of physicians and other health workers in the preservation and promotion of peace is the most significant factor for the attainment of health for all."[28]

3.1.4 Discussion

Khama Rogo, Lead Health Sector Specialist and Programme Head, Health In Africa Initiative, World Bank Group, underscored the role of nurses. In the three-delay model described by Meara, neither surgeons, obstetricians, nor anesthesiologists are present at delay 1 or 2. At delay 3, SOA providers have the least contact time with patients. Johnson agreed about the importance of nurses' roles. WHO is working with many associations of perioperative nursing and has a chief nursing officer partnered with the SOA effort. Meara concurred that the entire cadre of the surgical ecosystem is important and should be represented at any NSOAP stakeholder convening.

Emile Rwamasirabo, Chief Consultant Urological Surgeon, King Faisal Hospital/ OSHEN, Kigali, Rwanda, called upon WHO to do more advocacy for funding. In many countries, SOA care has to compete with other agendas for available funding from global organizations and funders. In the context of implementation, he recommended that WHO provide support in addressing accessibility issues related to consumables for surgery. For instance, orthopedic trauma is common but access to prosthetic implants is limited. He suggested that WHO could bring together countries, manufacturers, and suppliers in a global effort to deal with consumable cost and accessibility issues.

Emmanuel Makasa, Global Surgery Ambassador, Zambia, remarked that many countries are trying to move very quickly in the NSOAP process. While he applauds the WHO's work at the global level, he noted an absence of support from the WHO Regional Office as a platform or convener for collaboration. Countries would benefit from greater engagement and involvement by their Regional Offices to facilitate the types of regional and intergovernmental approaches that are being called for by the NSOAP community. Johnson replied that top-down leadership is helpful in this process but demands should also be placed on Regional Offices from the local and country levels. He added that country and regional actors may need to be convinced about the importance of surgical care, but a helpful strategy for doing so is to "connect the dots" between surgical care and rates of maternal, vehicle, and cancer deaths.

3.2 WHO REGIONAL OFFICES AND THE NSOAP PROCESS

Walter Johnson commented on the regional NSOAP efforts underway in the Southern African Development Community (SADC) and elsewhere. He noted that WHO Regional Offices and national-level country offices can offer technical and catalytically financed support for these efforts, albeit on a limited basis because WHO is a three-tiered organization. However, there is a process underway to transform WHO into a more efficient system. He remarked that although WHO has been undergoing a transformation over the past two years, WHO Regional Offices are still relatively autonomous. He asked whether WHO's Regional Office for the Eastern Mediterranean (EMRO) is undergoing any kind of similar transformation. Hamid Ravaghi, Regional Advisor, Hospital and Management, Department of Health System Development at EMRO, said that the region is on the precipice of regional-level

27 Arya and Santa Barbara 2008
28 Resolution WHA34.38 is available at https://apps.who.int/iris/bitstream/handle/10665/158786/WHA35_Inf.Doc-2_eng.pdf?sequence=1&isAllowed=y (accessed June 24, 2019).

transformation, with the momentum toward UHC offering great opportunity in this regard.

3.2.1 Overview of the WHO EMRO Region

Hamid Ravaghi, Regional Advisor, Hospital and Management, Department of Health System Development, WHO Regional Office for the Eastern Mediterranean (EMRO), described some of the work ongoing in the EMRO Region. The region consists of 22 countries,[29] six of which are high-income countries and nine of which are in emergency situations. Consequently, the needs in the region are diverse. Some countries need policy dialogue and advocacy, others need technical support (eg, Iran, Egypt, Jordan, and Lebanon), and some need consumables and hands on support in service delivery.

The push toward UHC is gaining momentum in the region, said Ravaghi, which should be leveraged to strengthen surgical systems and embed NSOAPs within UHC planning. NSOAP-specific activities are not yet underway, but other activities have the potential to indirectly impact surgery and trauma care. For example, Iran and Pakistan—two of the most populated countries in the region—are both piloting the DCP-3 project for universal health packages. He was hopeful that the essential health service package will be developed in the region, which would also strengthen surgical and trauma capacity at the primary, secondary, and tertiary levels.[30] WHO HQ is working with eight countries in the region to assess their emergency care systems and develop a roadmap for emergency care systems. They are also working to build capacity for hospital managers by establishing a course for hospital managers in five countries. Clinicians in charge of hospitals need to have a capacity-building approach, he added. They are emphasizing the importance of effective emergency unit management, because patients typically do not go straight into surgery—they typically go through emergency units. To that end, they have developed a patient-safety hospital initiative with 140 standards, with 20 of those standards related to the quality of surgical care and patient safety. More than 600 hospitals in the EMRO Region are taking part in the initiative.

3.2.2 NSOAPs in the EMRO Region

Implementing NSOAPs in the EMRO Region will require internal understanding and collaboration within WHO Regional Offices, said Ravaghi. Existing teams that are focused on regional-level maternal and child health, emergency and trauma care, and health systems, for example, all need to coordinate and work together to promote NSOAPs. He suggested that WHO should push to foster closer relationships and communication with regional-level leadership. To support NSOAP development in the region, countries should be provided with tools, assessments, frameworks, and practical approaches. He noted that the directors of hospital care for all 22 countries would be meeting in April 2019 to review the regional hospital framework; Ravaghi planned to introduce NSOAPs at this meeting to raise awareness. The EMRO Region also has a parliamentarian committee in which the parliament members of all 22 countries will be meeting to discuss UHC; discussion about NSOAPs in the context of UHC should also take place at this convening.

From a health system perspective, NSOAPs should not be construed as just another vertical program, but as a systematic approach that addresses governance, financing, information systems, and so forth. The WHO Regional Office for EMRO should support capacity building in country-level offices, where the limited staff who deal with health systems are already overburdened with a host of other responsibilities, such as maternal and child health, patient safety, and service quality. There is already

29 Afghanistan, Bahrain, Djibouti, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Occupied Palestinian territory, Oman, Pakistan, State of Palestine, Qatar, Saudi Arabia, Somalia, Sudan, Syrian Arab Republic, Tunisia, United Arab Emirates, and Yemen.

30 He suggested that first-level hospitals should be part of UHC and primary care, despite the preference in some countries to situate hospitals as part of the secondary care system.

cross-departmental work being carried out at WHO HQ; he suggested that this strategy should be applied at WHO Regional Offices as well. For example, multiple departments—such as noncommunicable diseases, health systems, and injury/violence—can contribute to assessment of emergency care systems in the region. However, the regional offices will need guidance to implement this type of cross-departmental work. It would also be helpful to create WHO Collaborating Centres in the EMRO Region (where there are none currently), as well as models for strengthening community engagement. Strong nongovernmental organization (NGO) programs for trauma and surgery care are already in place in the EMRO Region, which have benefited from WHO acting as a bridge to bring in donors and support. WHO should similarly act as a bridge for achieving NSOAP goals as well, he said.

3.2.3 WHO support in developing funding for NSOAPs

Walter Johnson remarked that WHO is frequently approached to provide funding for programs, but WHO itself is underfunded. He asked if there are more effective ways to collaborate with NGOs, or ways that WHO HQ and WHO Regional Offices can collaborate with non-state actors to develop funding. Hamid Ravaghi replied that a positive development is the mandate to mobilize resources, especially in the EMRO Region. In countries where funding is not an issue, such as Yemem, WHO could potentially play a role in fostering multisectoral and multiregional collaboration. The discussion will have greater clarity once district health services models—with SOA included as part of the service delivery component—are developed, with explicit details about funding, costing, and programming. He emphasized the benefit of a strong proposal when seeking funding from donors: "donors want to help, but they need a clear plan."

Tearikivao (Kiki) Maoate, Fellow of the Royal Australasian College of Surgeons, Surgical Examiner and Director of the College's Pacific Programs, characterized WHO as the "CEO" for the 194 Member States. Member States and WHO are mutually accountable, but he cautioned that lack of clarity and lack of accountability can give rise to misconceptions. WHO's mechanism entails that any Member State can seek help from WHO and, in fact, WHO should be the first port of call, given the commitments made by ministers of health to WHO. WHO is willing and able through its mechanism to help countries in need. However, countries should bear in mind that financial institutions, NGOs, and other entities are conduits, not controlling mechanisms.

3.2.4 NSOAPs and people-centered health services

Hoonsang Lee, Adjunct Professor, Yonsei University School of Public Health, Korea, and Health Sector Advisory Committee, KOICA, agreed about the increasing momentum in UHC. He asked how WHO plans to address the issue of strengthening primary health care while also strengthening surgical capacity at the secondary and tertiary levels. He also asked how NSOAPs fit into the integrated people-centered health services concept, the new framework endorsed by WHA in 2016. Hamid Ravaghi replied that all health services should be transformed to enrich UHC. The role of hospitals will need to be redefined within this framework, he added. Hospitals should not be reactive organizations, but proactive organizations working closely with primary care. Depending on the country, between 70% and 90% of services can be delivered at the primary care level. A hospital's role should be to support primary health care by providing expertise and high-level, technologically advanced care. Hospitals should not be providing services that can otherwise be provided at the lower levels of the system. In an integrated, people-centered surgical care framework, first-level hospitals should provide support for primary care and act as the first level of referral from primary care, providing the minimum surgical procedures as defined by each country. In 2019, WHO EMRO is working to

transform hospitals and to highlight the role of hospitals in supporting primary health care and providing acute care for patients, in keeping with the aims of the Declaration of Astana. Walter Johnson remarked that surgical care is part of primary health care. Integrated people-centered care is patient-oriented and community-oriented, thus SOA care is tied into community-oriented care.

3.3 GLOBAL SURGICAL INDICATOR TRACKING: PROGRESS, CHALLENGES AND OPPORTUNITIES

Suzuki (World Bank) // Tangi (Tonga) // Shoman (Pakistan)

Moderator: Alex Peters, Paul Farmer Global Surgery Research Fellow, Program in Global Surgery and Social Change, Harvard Medical School

3.3.1 World Bank's World Development Indicators

Emi Suzuki, World Bank Development Data Group explained that development projects are a major focus of the World Bank, with over 12,000 projects funded since 1947 through traditional loans, interest-free credits, and grants. They also work on knowledge and innovation, such as Open Data and the Open Knowledge Repository. The World Bank also offers products and services to support to developing countries through policy advice, research, and technical assistance.

The WDIs are a primary knowledge product of the World Bank. The World Bank covers 217 countries and economies, producing country-level data, global-level data, and data grouped by regions and income groups; they have now started to produce some subnational data as well. Health indicators represent a significant portion of the 1500+ WDI indicators, which have been collected since 1960. Other topics covered by WDIs include debt, health, population, national accounts, education, labor, and the environment. Criteria for inclusion of indicators in WDI include the indicator's relevance to development, good data coverage for the indicator across the world and over time (with trend data if possible), comparability across countries and across time (that is, consistent definitions and methodology), and good quality, reliable sources with regular updates. WDI indicators are updated quarterly in July, September, December and April. Producing WDI data involves more than 50 international organizations, more than 200 National Statistical Offices, and World Bank country economists from 150 countries; about two-thirds of the data come from external partners (including WHO, Harvard Medical School and Lund University). Sources include administrative data, academia, and household surveys. WDI products include the WDI database, WDI book/WDI online, online tables, Atlas of Sustainable Development Goals (SDGs), and SDG dashboards. WDI publishes data in various forms, including databases, books, online tables, bulk download, Data.worldbank.org, API data queries, and Google infobox.

3.3.1.1 WDI global surgery indicators

Suzuki described milestones in the development of the WDI global surgery indicators:

- Geographic accessibility of surgical facilities
- Density of specialist surgical providers (SOA density)
- Number of surgical procedures provided per 100,000 population
- Perioperative mortality rates
- Risk of impoverishing expenditure when surgery is required
- Risk of catastrophic expenditure when surgery is required

In early 2015, the WDI team was contacted by the LCoGS, which led to an agreement to work toward publishing the global surgery indicators as part of the WDI. The LCoGS shared global surgery data on the six indicators with the WDI team and the

next year, WDI 2016 published four of the surgery indicators. Indicators 1 and 4 were not published due to low data coverage. The indicators for SOA density and surgical volume data were updated in WDI 2017 and in 2018, more SOA density and surgical volume data were added from Pacific countries. Later that year, time-series financial risk protection data were added.

1.1.1.1.1 Data coverage of six global surgery indicators

Suzuki described progress in the coverage of global surgery data in WDI 2016, WDI 2017, and WDI 2018 (see Table 3-1). She noted that access to timely essential surgery has low coverage, so the data for this indicator have not been published in the WDI. SOA density has had very good coverage, with more data points added in WDI 2017 and WDI 2018. Surgical volume data were produced using a model first. The empirical, non-modeled data covered 33 countries in WDI 2016. In WDI 2017, more country data were collected and added, and they switched from modeled data to country data in WDI 2017. The coverage for this indicator is currently 69 countries. The perioperative mortality rate indicator only has data for 19 countries (9%). Due to low coverage, the data were not published in the WDI. The financial risk protection data were modeled estimates for 186 countries in 2014. Time-series data were produced in 2018 for years 2003-2017. Suzuki highlighted the World Bank's efforts to bring attention to surgery and surgery indicators. A global surgery indicator was included in the *Atlas of Sustainable Development Goals 2018*.[31] They also promote the global surgery indicators through blogs and Twitter when global surgery data are published.[32] The four global surgery indicators were viewed by users 20,000 times a year between 2017-2018, with surgical volume indicator the most commonly viewed, followed by the SOA density indicator.[33]

Table 3-1. Data coverage of six global surgery indicators

Indicator	WDI 2016	WDI 2017	WDI 2018
	Number of countries (%)	Number of countries (%)	Number of countries (%)
Geographic accessibilitya	14 (6%)	14 (6%)	14 (6%)
SOA provider density	173 (80%)	173 (80%)	174 (80%)
Number of surgical proceduresb	33 (15%)	58 (27%)	69 (32%)
Perioperative mortality ratesa	19 (9%)	19 (9%)	19 (9%)
Risk of impoverishing expenditure	186 (86%)	186 (86%)	149c (69%)
Risk of catastrophic expenditure	186 (86%)	186 (86%)	149[c] (69%)

[a] Not published in WDI; [b] Non-modeled; [c] Time-series data
Source: Suzuki presentation

1.1.1.1.2 Data quality for the six global surgery indicators

Suzuki provided an overview of the ideal data flow of global surgery indicators within a

31 World Bank 2018
32 Kluyts et al 2018; Marks et al 2018; Raykar et al 2016; Suzuki et al 2018a; Suzuki et al 2018b
33 Views on https://data.worldbank.org.

strong data collection and reporting system. Country-level data should be collected first at the health-facility level. Data are then acquired, curated, and disseminated by the MoH or national statistical office (NSO). Then the country-level data should be collected by or should be reported to international organizations, such as WHO. The data should be reviewed, cleared, and disseminated by the international organizations. Data that come from household surveys can also be compiled by international organizations, such as WHO and the World Bank.

She presented an evaluation of the data quality of the six global surgery indictors according to the following dimensions of data quality: completeness, accuracy, validity, reliability, timeliness, comprehensiveness, utility, and accessibility. Indicator data is complete if data are available for all required data elements. Accuracy is determined by the proximity of the data to the "truth"; this is affected by systematic biases, such as omission and misclassification. Validity means that the data measure what they intend to measure. Reliability indicates that data are measured and collected consistently; timeliness means that the data are available for use in a timely manner. Comprehensiveness describes data that have all the detail needed for the creation of useful indicators. Utility indicates that the data produced are useful and pertinent for policy and programmatic needs. Finally, data needs to be accessible by potential data users. She noted that data quality varies by indicator (see Table 3-2).

Table 3-2. Data quality by global surgery indicator

Quality	Indicator					
	Access	SOA density	Volume	POMR	FRP (modeled)	FRP (non-modeled)
Completeness	X			X		X
Accuracy	X	X	X	X	X	X
Validity	X			X	X	X
Reliability	X	X	X	X		X
Timeliness	X		X	X		X
Comprehensiveness	X			X		X
Utility						
Accessibility	X			X		X

SOA: surgical, anaestheisa, and obstetric; POMR: postoperative mortality rate; FRP: financial risk protection
Source: Suzuki presentation

3.3.1.2 Challenges and opportunities for data collection

Suzuki concluded by summarizing challenges and opportunities with respect to data collection going forward. Low capacity needs to be addressed by capacity building and training. Countries are not currently incentivized to collect data. They could be motivated by requests for country-level data from international organizations. She suggested that countries would likely be more motivated to do so if requests come from international organizations such as WHO; further, the global community should ensure that these country data are used, in order to provide additional motivation to countries. Lack of resources could be addressed by making data collection a higher priority. Lack of communication, trust, and understanding is a problem at all levels, underscoring the need for better partnerships. Countries are often unclear about what and how to measure, which could be addressed by establishing clear international standards that include definitions and methodology; guides or manuals would provide further support to countries. Centralized data management systems would also help, both within countries (by MoH and NSO) and within international agencies. Moving forward, the key principles for better collection of global surgery data are partnerships and capacity building. She cited UNAIDS' development of core partnerships as a good example of promoting countries to generate data: "Through the development of core partnerships with country teams, implementers, demographers, mathematicians, epidemiologists and international organizations, UNAIDS has developed the capacity of country teams to produce internationally comparable HIV estimates."[34]

3.3.2 Global surgical indicators in the Pacific Region

Lord Viliami Tangi, Chief Surgeon Specialist, Vaiola Hospital, Tonga, presented on global surgical indicators in the Pacific Region, which includes countries with populations ranging from 8-9 million to less than 20,000. Regardless of the population, the countries in the region face challenges in delivering access to safe SOA care. The surgeons in the region are a close network that receives support from Australia, New Zealand, and WHO. The regional surgeons' association

34 Mahy et al 2017

meets every two years and the Royal Australasian College of Surgeons (RACS) meets once every year; some surgeons in this region attend this meeting as fellows.

Tangi traced the timeline of surgical system strengthening efforts in the region. An initial surgical symposium was convened by RACS in 2012, followed by a POMR workshop the next year. In April 2013, the Pacific Head of Health endorsed work on POMR. A seminal paper on POMR was published in 2015,[35] the same year as the LCoGS report and Resolution WHA68.15. Momentum of the effort in the Pacific Region increased with support from RACS, the LCoGS, WHO, Strengthening Specialised Clinical Services in the Pacific (SSCSiP), Pacific Islands Surgeons Association (PISA), and others.

3.3.2.1 POMR indicator

The effort in Tonga began in 2013 with a focus on POMR, which had been endorsed by the Head of Health. Tangi had little guidance for this work—eg, no standard mechanism for collection—but he attended training in other countries on how to collect POMR data. With support from the national Head of Information, he pushed for a shift to electronic storage of records and for tracking of surgical procedures and mortality. In subsequent years, Tonga reduced its POMR rate from 0.466% in 2012 to 0.193% in 2016.

The effort that started with POMR data in the Pacific led to collection of data on more of the surgical indicators, as discussed in a recent publication on the Pacific Region's collaborative approach.[36] With support from RACS and PISA, 13 countries in the region have collected baseline data for the first four global indicators. Although challenging, this experience demonstrates that regional collaboration can be very effective.

3.3.2.2 Challenges, opportunities, and ways forward

Tangi outlined some of the challenges and opportunities faced in the Pacific Region with respect to indicator data collection. Countries in the region have widely variable profiles, and transportation problems within and between countries are common; workforce migration poses further challenges. It can be difficult to convey the fundamental concept of surgical indicators to policymakers in the region. Health information systems need to be strengthened and data collection is currently being driven by individuals, but the process needs to be made more sustainable.

The Region is still very early on in the NSOAP process, but hopes to leverage the global momentum around WHO's agendas as a key opportunity. Political and health leaders are becoming better informed about the need to strengthen surgical systems, and countries are taking ownership of their own NSOAPs.

The guiding principle for NSOAPs in the region is to provide universal access to, safe, affordable and timely surgical and anaesthetic care when needed. However, surgical patients dying before or without surgery is not captured by POMR or any other indicator; this is a key issue to address moving forward. He noted that in 2017, the surgical ward at Vaiola Hospital had seven cases of postoperative mortality and 38 cases of mortality in people who died without having surgery.

3.3.3 Assessment of the strength of Pakistan's surgical system: tracing the LCoGS indicators

Haitham Shoman (PGSSC) reported that in Pakistan, a country of around 205 million people across four provinces and two autonomous territories, they are embarking upon a provincial SOA planning (PSOAP) model. A full assessment of Pakistan's surgical system is underway and the data collected will be the backbone of Pakistan's investment in surgical systems. The rationale for this full assessment of the strength of the surgical system is to identify priority areas for improvement in Pakistan's ability to deliver safe, timely, and affordable SOA care.

35 Watters et al 2015
36 Guest et al 2017

Subsequent SOA planning will be aligned with Resolution WHA 68.15 and SDG 3.8

3.3.3.1 Core objectives

PSOAPs are focusing on four of the six LCoGS indicators: 2-hour access; SOA per 100,000; impoverishing expenditure; and catastrophic expenditure. The program will compile existing data sources, as well as a variety of survey-based tools to collect indicator data. Data will be analyzed by software and then the PSOAP team. Shoman provided an overview of the core objectives of the program for 2-hour access, SOA workforce map, and financial risk protection. The 2-hour access indicator will employ geospatial mapping, determine access to Bellwether procedures, assess the burden of surgical disease. SOA workforce map will be developed by mapping facilities and SOA in districts per 100,000 population, using resources from Pakistani Bureau of Statistics and Pakistani College of Surgeons (CPSP). Data collection about financial risk protection indicators (both catastrophic and impoverishing expenditure) will utilize the Financial Risk Protection Survey, Indus Health Network Welfare Assessment report, and the World Bank Poverty Assessment Tool.

3.3.3.2 Timeline and milestones

The Pakistan project has a 2-year timeline; they are currently in Q2 of Year 1. A NVSC stakeholders conference was held in November 2018 and provincial meetings have just been completed as part of the NVSC document drafting process. The full timeline is as follows:

- Y1/Q1: institutional review board; data collection instruments; field approvals and translations
- Y1/Q2: cluster and sites determination; delineation of sampled facilities; application for all data collection tools; NVSC2025 Stakeholders Conference
- Y1/Q3: on-site facility assessments; data collection workshops; training on use of application
- Y1/Q4: population-based cluster sampling; facility-based surveys; staff monitoring; routine quality control audits
- Y2/Q1: Report Year 1; modification tools
- Y2/Q2/Q3: routine quality control audits
- Y2/Q4: final report and publication

3.3.3.3 Challenges and opportunities

Data collection and storage presents some challenges, said Shoman. Data collection should be timely and carried out in accordance with guidelines. Data need to be stored and maintained on upgraded servers; in Pakistan, data are stored by the National Bureau of Statistics and district health information systems. For proper utilization, data have to be aggregated and reported promptly.

He outlined opportunities for data collection and utilization in the domains of regionalization, coordination, financing, and primary data collection. In terms of regionalization, Pakistani data could be collected into a regional data system, and then collected into WHO's Regional Office for the Eastern Mediterranean; these data could serve as a model for other countries pursuing a PSOAP model. Coordinating data collection among provinces will help the federal government coordinatet the PSOAPs. This coordination will also allow for identifying gaps that can be used to help estimate the cost and plan financing for PSOAPs.

Primary data collection is the most important aspect of data collection. They developed a set of questions to collect data on household expenditure, impoverishing and catastrophic expenditure, out-of-pocket payments, and peri-operative mortality. The survey was submitted to USAID's Demographic and Health Surveys Program User Forum.[37]

3.3.4 Discussion

3.3.4.1 Leveraging existing tools for data collection

37 https://userforum.dhsprogram.com/

Hamid Ravaghi, Regional Advisor, Hospital and Management, Department of Health System Development, WHO EMRO, asked if Pakistan has looked into existing data collection tools or reports that would provide indicator data. Tools are available to assess service availability for example, and there may be potential to merge surgical data from existing reports. Haitham Shoman replied that no single existing tool comprehensively addresses the LCoGS indicators, so it is important to have different tool kits available that are particularly helpful for certain indicators. In Pakistan, the most useful tools so far are Indus Health Network's own tool and WHO and PGSSC merged toolkits. He suggested looking into other WHO toolkits that may address unmet needs in surgical data collection.

Adrian Gelb, Secretary, World Federation of Societies of Anaesthesiology, said that his group has an Anesthesia Facility Assessment Tool that offers secure storage and data analysis at no charge. They are also re-working the WFSA workforce survey using an integrated workforce approach that convenes a grand consortium of surgeons, anesthesiologists, and others. They are aiming to compile the workforce data for all SOA providers into one resource, such that each subtype can be represented separately or as a combined workforce. The WFSA is also developing a standardized anaesthesia nomenclature, which is needed both in surgery and in anaesthesia for accurate data collection.

3.3.4.2 Qualitative data collection

Noor Hisham Abdullah, Director-General of Health, Malaysia noted that indicators are quantitative data and asked if any qualitative data will be collected. Emi Suzuki replied that in terms of development indicators, there are no qualitative data; however, there are metadata that relate to the quantitative data. Noor Hisham Abdullah noted that WHO's Regional Office for the Western Pacific (WPRO) is looking into integrating qualitative data into quantitative performance monitoring to determine if providers are delivering quality care. Before POMR data—at which point it is already too late for the patient—it is possible to collect data on operating times, blood transfusions, and hospitalization, for example.

Sonal Nagra, General and Endocrine Surgeon, Senior Lecturer in Rural Surgery, Deakin University, cautioned that clinicians in the Pacific are struggling enough just to collect the six LCoGS indicators, so would likely be overburdened if deeper qualitative performance monitoring was added to their workload. In terms of quality assessment, some people cannot even get to the hospital, so judging surgeons based on blood transfusions, for example, might be "going too far too fast" in many settings. He added that in the Pacific Region countries, small populations can make the use of data challenging.

3.3.4.3 Panelists' reflections on global surgery indicators

Khama Rogo, Lead Health Sector Specialist and Programme Head, Health In Africa Initiative, World Bank Group, asked the panelists to reflect on their experiences in collecting data on the global surgery indicators. Lord Viliami Tangi said that his focus is on POMR, which addresses the issues of surgical access and safety. In terms of SOA density, the LCoGS SOA density indicator is helping Tonga to inform its workforce planning (currently the SOA ranges between 10-14/100,000) to meet the target of 20-40/100,000. Emi Suzuki replied that the indicators have value in monitoring global and country-level progress; data and indicators are also very powerful tools for advocacy. Haitham Shoman commented that indicators inform countries' planning efforts through baseline assessment of needs to set the starting points and targets for planning. Lord Viliami Tangi said that global indicators require collaborative collection and progress assessment. He emphasized that the indicators should be used for strong advocacy efforts with politicians—ministers of health

around the world want their populations to be healthy, but they need to be educated about the importance of strengthening SOA care. Tonga and other countries in the region are in the early phases of NSOAP development, with support from the Secretariat of the Pacific Community and WPRO.

3.4 WORKING WITH THE WORLD BANK TO PROMOTE NSOAPS GLOBALLY

Khama Odera Rogo, Lead Health Sector Specialist and Programme Head, Health In Africa Initiative, World Bank Group, explored the role of the World Bank Group (WBG) in planning for national surgical services. Rogo opened his presentation by encouraging participants to "ask not what the World Bank can do for you, but what can you do with the opportunities that the World Bank offers you in your various countries." Housed within the United Nations, the mission of the WBG is to end extreme poverty by 2030 by reducing the share of the global population that lives in extreme poverty to 3% and to promote shared prosperity by increasing the incomes of the poorest 40% of people in every country. The World Bank lends money at various interest rates that are contingent on a country's income. It has at its disposal its own money—which is its most substantial asset—as well as money that countries and philanthropists put through the World Bank to be used as trust funds in agreed upon ways to advance the World Bank's mission and the countries' interests. In addition to acting in its capacity as a bank, the World Bank also disseminates knowledge and technical support to countries. The WBG is made up of five institutions that play different roles (see Box 3-1). The International Monetary Fund (IMF) is another institution that is part of the United Nations; its mandate is to promote international monetary cooperation and provide policy advice and capacity development support to help countries build and maintain strong economies.[38]

38 https://www.imf.org/en/About/Factsheets/Sheets/2016/07/27/15/31/IMF-World-Bank

Box 3-1. World Bank Group

The World Bank Group is one of the world's largest sources of funding and knowledge for developing countries. Its five institutions share a commitment to reducing poverty, increasing shared prosperity, and promoting sustainable development.[39]

The International Bank for Reconstruction and Development (IBRD) and the International Development Association (IDA) form the World Bank, which provides loans to countries for capital projects. The IDA focuses on the poorest countries and the IBRD focuses on middle-income and creditworthy poorer countries.

The International Finance Corporation (IFC) is the private arm of the WBG that offers investment, advisory and asset management services to encourage private sector development in developing countries.

The Multilateral Investment Guarantee Agency (MIGA) is the arm of the WBG that offers political risk insurance and credit enhancements guarantees to assist investors in protecting foreign direct investments against political and non-commercial risk in developing countries.

The International Centre for Settlement of Investment Disputes (ICSID) is the arm of the WBG that is mandated with the responsibility for legal dispute resolution and conciliation between international investors.

3.4.1 Engaging with the World Bank in SOA planning

Rogo explained that the global push toward UHC provides opportunities to embed SOA care within UHC agendas and spending. Front-line workers are making the case for building operating theaters and referral systems that will allow their communities to access surgical care. To engage with the WBG, it is important to situate SOA within the continuum of care, rather than directly asking for a new theater, for example. NSOAP strategies must be framed in context and for most countries, there is no better or accommodating entry point for NSOAP than UHC. Some surgeons feel left out of the UHC conversation because it does not mention surgery, but *universal* means that surgery is a part of UHC.

The IFC and IDA institutions of the WBG are the most relevant to NSOAP planners. The IDA engages with governments, so if an NSOAP involves government funding, then the government will interact with this institution of the WBG. The IFC deals with the private sector and provides loans to small and medium enterprises. Rogo noted that the private sector is important in the surgery space, because it is the locus of innovation and equipment. He cautioned against approaching the IMF for NSOAP financing, because they only become involved when a country has serious financial problems. He advised the workshop participants to explore what the World Bank and IFC are already doing in their respective countries, how they work, and who their representatives are. Professional organizations should strengthen their engagement with the WBG by bringing them to the table at convenings so they can begin to understand the work that needs to be done.

3.4.2 Human capital: the crisis

39 https://www.worldbank.org/en/who-we-are

A potential leverage point for NSOAPs is the WBG's interest in the human capital crisis, said Rogo. The demand for higher-order skills is increasing, but half of the world is trapped in low productivity. The human capital index represents the productivity of a future worker relative to the benchmark of complete education and full health. The index is a function of three factors: a) survival: children who do not survive do not grow up to become future workers; b) school: contribution of quality-adjusted years of school to productivity of future workers; and c) health: contribution of health (adult survival rate and stunting) to productivity of future workers. Unfortunely, countries still face an unfinished human development agenda, however. According to the World Development Report 2019,[40] the impact of digital transformation on the nature of work is contingent upon new opportunities emerging in job creation, upon increased productivity and public service delivery; upon the shift in skills in demand (ie, cognitive and socio-behavioral skills); and upon changes in how people work, with short-term work posing challenges. The governments' role in addressing this agenda is three-fold. The first is to invest in human capital as to develop these in-demand skills. The second is to enhance social protection coverage beyond access through formal sector jobs. The third is to increase revenue mobilization by upgrading taxation systems where it is needed to provide fiscal space.

Rogo emphasized the potential to direct the World Bank's interest toward the skilled human capital that is indispensable for surgery. Surgical skill needs to be cultivated around the world, but the issue not just about human capital: it is also about the ability to provide jobs. A major problem is that the labor laws have not evolved to accommodate growing skillsets. Many healthcare providers are still under public service commission and employed on a permanent basis, but many workers are no longer interested in permanency or pension plans (pensions are often meaningless because of economic instability). There is a movement underway toward different models of employment. In Kenya, for example, new health sector employees are being hired on results-based contracting, enabling them to work in several places and accomplish more. The underutilization of existing resources and infrastructure also needs to be examined. For example, in the developing world, a large proportion of operating rooms are idle and there is significant underutilization of existing infrastructure—there may be equipment and an operating room, but no surgeon, or a surgeon but no operating room, and so forth. Programs financed by the World Bank have recently opened eight new operating theaters (costing no more than US$5000 each) in county hospitals that already had space and equipment (some of which was still in the packaging). Rogo asked, "How does this happen? Where are the surgeons?"

Rogo provided an overview of the concentration of the global human capital crisis. The World Bank ranks countries each year according to the human capital index. The countries with the highest rankings are not the richest countries in the world, but the countries with the lowest index are among the poorest countries.[41] He explained that human capital is not a question of wealth, but it is a question of how the dialogue to develop human capital is managed in countries. There are opportunities to utilize this dialogue with the World Bank in the context of surgery by emphasizing that human capital is integral to the development of surgery (see Figure 2-1). He advised that NSOAP financing should not only be seen exclusively through the lens of UHC.[42] Planners should determine whether there is existing funding for other programs that can be directed toward NSOAPs. He reiterated that

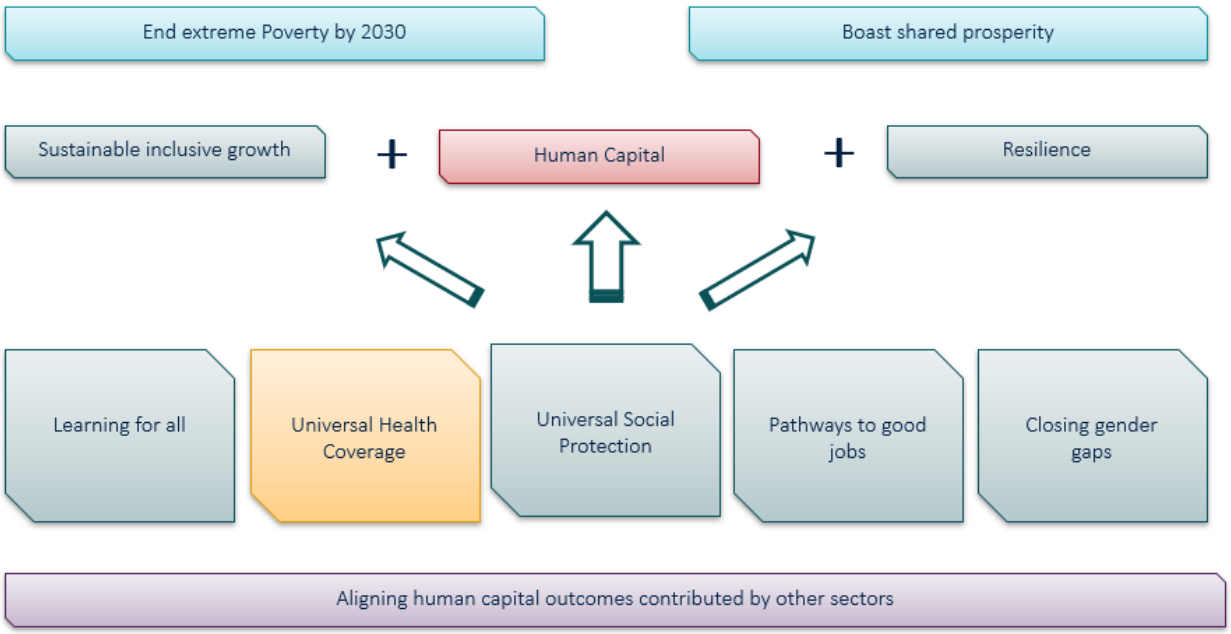
40 World Bank 2019

41 World Bank Human Capital Index 2018 ranking (top 5): Singapore, 0.88; South Korea, 0.84; Japan 0.84; Hong Kong, 0.82; Finland, 0.81. Among the bottom 30 countries World Bank Human Capital Index 2018 ranking, 25 are located in Sub-Saharan Africa, 18 are LICs, and 11 are LMICs; 24 have >30% stunting rate; 25 have >4 fertility rate and pre-demographic dividend; 16 have >400 maternal mortality rate.

42 UHC is primarily about access through insurance and social protection.

this is not about money *per se*; it is about knowing what opportunities are available.

Figure 3-3. Human capital is integral to development of surgery



Source: Rogo presentation

3.4.2.1 Critical action points for human capital development and surgery

Rogo suggested a set of critical action points for human capital development and surgery, spanning three categories: making social services work for all; engaging the private sector for human capital in all sectors; and innovating to close gender gaps (see Box 3-2). He focused on human skills development because it is the most difficult component to address. Infrastructure is less challenging because if skilled workers are not in the country, then existing infrastructure will not be utilized. Promoting gender empowerment is a key tenet because globally, countries are losing $160 trillion in wealth because of differences in lifetime earnings between women and men. Financing for service delivery must be improved, but the World Bank does not currently have designated funds for surgery. In fact, based on the lending history and knowledge production of the WBG, it is not doing anything substantial in the area of surgery. Surgery is seen as a part of health that is only addressed to the extent that people working in surgery speak up about it. This underscores the need for surgeons to be more engaged in strong advocacy work in this realm.

To frame the discussion, Rogo presented a simulation model for developing human capital for health and a diagram of the interrelationship between the health professional job market and health professional training opportunities (see Appendix 4 and Appendix 5). He reiterated that NSOAPs should be integrated within UHC plans and that training efforts need to account for training costs as well as where the trainees will be absorbed. A World Bank program is working on a labor/job market strategy for nursing because nurses are being

trained, but no one knows where they should go; nurses trained in Kenya were more likely to become cell phone vendors than to work in nursing. At any given time, half of the medical staff in Africa are on strike or pre/post-strike.

Box 3-2. Critical action points for human capital development and surgery

Making social services work for all:

- Strengthen financing for service delivery by addressing low capacity to generate revenue, poor allocation of budget for human capital development, and weak governance and accountability contributing to inefficient spending. Focus on finance outcomes, not inputs.
- Improve the quality of key social services by focusing on service provider skills and motivation, the operation of accountability mechanisms, and resource challenges at the front line.
- Link social services to good jobs.

Engaging the private sector for human capital in all sectors:

- Adopt different approaches to doing business (eg, public-private partnerships, social health insurance)
- Use disruptive technologies to address longstanding service delivery issues (eg, M-Tiba)
- Create an enabling environment for private sector participation through legal and regulatory reforms to facilitate impactful investment by private providers
- Innovating to close gender gaps:
- Improve access to quality services (especially for women and girls) and opportunities to enter the labor market. This is key to reaping a demographic dividend in many countries.
- Promote gender empowerment through better economic opportunities for women.

3.4.2.2 Case example: filling the surgical specialist gap in Eswatini

Rogo said that surgeons tend to specialize because many do not want to perform only Bellwether surgeries. He provided a case example of filling the surgical specialist gap in Eswatini, a country of 1.2 million people that has trained 600 doctors over the past decade, but only 40 specialists (most of which are foreigners) remain in the country. When people leave Eswatini to train in surgery, they generally never come back, creating an urgent need to expand surgical services. See Box 3-3 for the findings of an analysis of the nursing labor market study in East, Central and Southern Africa. The World Bank supported COSECSA/ECSACOG in local surgeon training projects. With local training supported by outside consultants, Eswatini will soon have 40 locally trained gynecologists and 40 locally trained surgeons. This is the kind of low-cost, highly effective work the World Bank can help countries to implement, said Rogo.

Box 3-3. Nursing labor market study in East, Central and Southern Africa

The study identified a set of key gaps in the nursing labor market in East, Central and Southern Africa:

- Absolute shortages (ie, not enough health workers), relative shortages (ie, skills imbalances), or both. Increasing trend toward specialization among nurses resulting in shortages of professionals at the primary health care level
- Limited financial resources to increase education accreditation activities in nursing pre-service training
- Barriers to the development of advanced nursing roles that are proving highly effective at expanding healthcare coverage

The study recommended the following paradigm shifts:

- Increase in investment strategies that engage both the private and public sector for the training and employment of the health workforce
- Create an enabling environment through regulatory reforms for private investment in the health workforce
- Implement innovative and cost-effective approaches in the education system that fully embrace the broad spectrum of competencies and cadres
- Strengthen nurses' roles in primary health care and surgery

3.4.3 Summary

Rogo summarized some of the key takeaways from his presentation. The World Bank is not an innovator, but they do support innovation; governments are not innovators, but they can be supported to innovate. In terms of the innovations to achieve the desired outcomes, Rogo highlighted opportunities to develop scaled human capital for surgery needs. The labor market has to be understood so that the trained surgeons and support staff are available to perform the services that a given country needs.[43] All existing resources need to be optimized, particularly those related to unused infrastructure. Ultimately, the money is available and opportunities exist through both public and private channels, but "it is not about the money," he said, "it's about countries positioning themselves to take advantage of opportunities."

During the subsequent discussion, Faysal El-Kak, Vice President, FIGO, commented that funders have a major role in shaping policy and contribute to the lack of attention paid to surgery. "If surgery has been hidden, it is because of the focus on primary health care and the lack of awareness that SOA is a part of primary care," he suggested. Rogo replied that in many cases, funders can have an undue or excessive influence on countries' decisions. Countries who are not clear on what they wish to do can be taken advantage of by funders, who deal primarily with government workers and not the skilled workforce who could provide much-needed expertise. In many cases, government workers may yield to the pressure of funders. Many donor-driven agendas are not based on sustainability and most global health projects are disease-based. In contrast, surgery is a cross-cutting intervention, so space will need to be made for

43 He noted that the World Bank tends to deal with countries rather than regional programs, due to accountability issues and other concerns, so it can be difficult for regional groups to come together to receive loans and distribute funds.

this type of program. Vertical programs should be assessed to determine where surgery is being implemented. For example, malaria is a cause of renal failure, so renal dialysis centers are being established all around the developing world. Surgery is also a part of tuberculosis and AIDS programs, but it is not seen as a 'surgery project.' Obstetricians have long been engaged in public health through midwives and family planning, but anesthesiologists have not traditionally been engaged in public health, so they need to chart a course to enter the public health space.

3.5 ROLE OF PROFESSIONAL SOCIETIES IN NSOAPS

Moderator: Lubna Samad
(Indus Health Network / GICS)

3.5.1 World Federation of Societies of Anaesthesiology

Adrian Gelb, Secretary, World Federation of Societies of Anaesthesiology, presented on the role of the WFSA. Established in 1955, the WFSA now comprises 135 national societies that represent 150 countries, with some smaller countries banding together into smaller societies. Guided by its vision of universal access to safe anaesthesia, the WFSA's mission is focused on uniting anesthesiologists around the world to improve patient care and broadening access to safe anaesthesia and perioperative medicine. This is done in coordination with other professional societies, NGOs, governments, and any other partners interested in safe anaesthesia through strengthening health systems and achieving UHC. WFSA advocacy has three guiding pillars: scaling up of the global anaesthesia workforce, achieving UHC through the WFSA UHC position statement and participation in NSOAPs, and ensuring safe anaesthesia for all by establishing international standards.[44]

Gelb underscored the critical component of anaesthesia in global surgery:

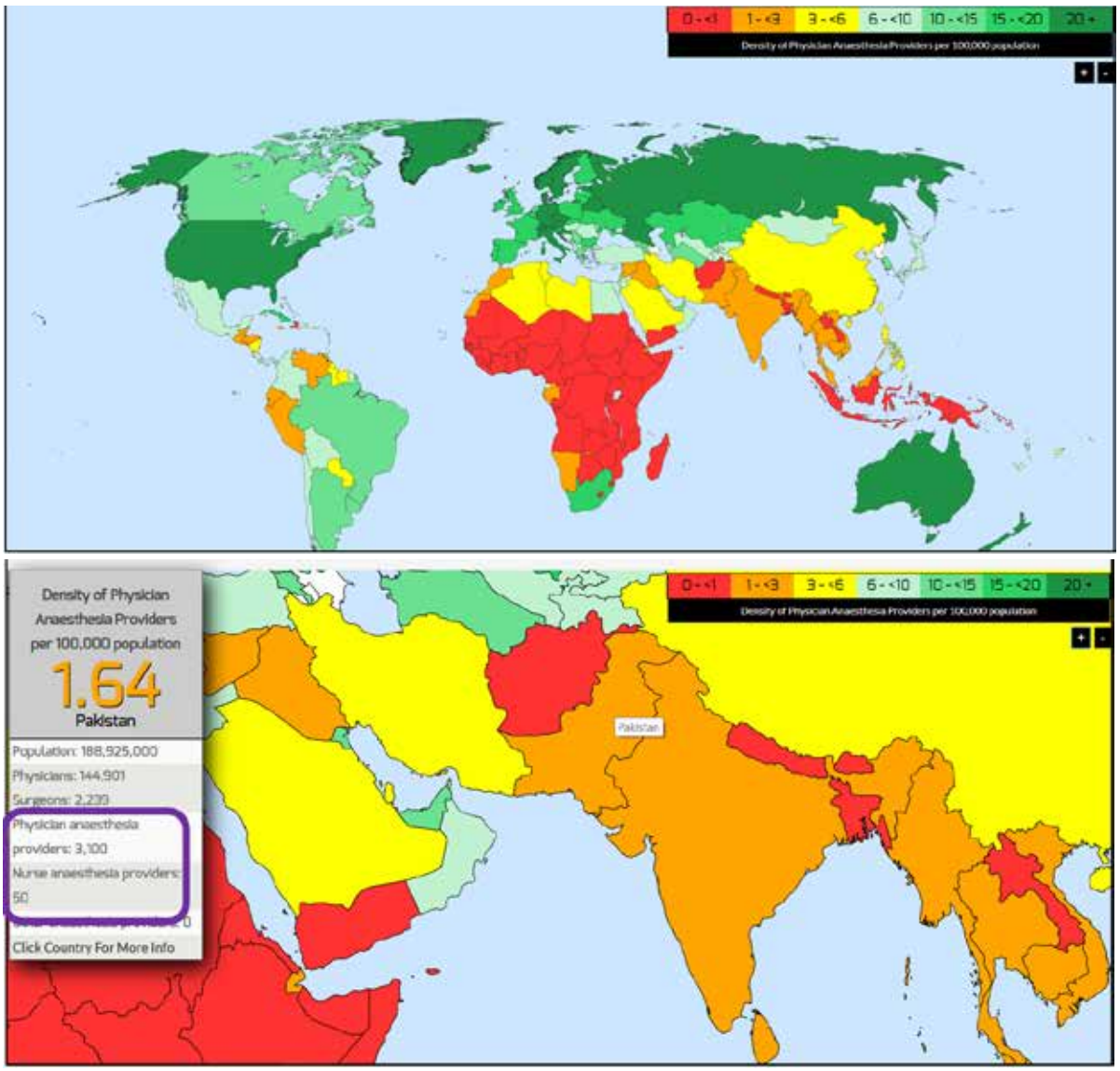
> Global surgery encompasses anaesthesia, all surgical specialties including trauma surgery, general surgery, obstetrics and gynecology, perioperative medicine, critical emergency medicine, pain management and palliative care, rehabilitation, nursing and other health professions involved in the care of the surgical patient.[45]

3.5.1.1 Mapping the global anaesthesia workforce

Gelb explained that the WFSA tracks the anaesthesia and surgery workforce at the global and national levels (see Figure 3-4). The format of reporting the number of providers per 100,000 population is aligned with the LCoGS format for reporting workforce density. After the LCoGS set its target of SOA provider density at a minimum 20 per 100,000, a study was conducted using maternal mortality as an index for safe anaesthesia. They investigated the relationship between the physician anaesthesia provider (PAP) density and the maternal mortality ratio (MMR) for 168 countries.[46] The inflection point is at roughly five providers per 100,000 for anaesthesia, in the range of about 2.5 and 7 per 100,000 (see Figure 3-5). Currently, many countries in Asia are far short of the anaesthesia provider density target of 20 per 100,000: Indonesia (0.70); Bangladesh (0.79); Vietnam (1.07); India (1.27); Pakistan (1.64); Thailand (2.45); Malaysia (2.87); Cambodia (2.89); and China (5.12).[47] The dearth of anaesthesia care in China recently became publicized worldwide when a pregnant woman jumped out of a 7th story window due to the pain she was experiencing. China's new Minister of Health recently issued a directive that by 2030, China will have an additional 160,000 anaesthesia providers; expanding the workforce to that extent so quickly will be a challenge, noted Gelb.

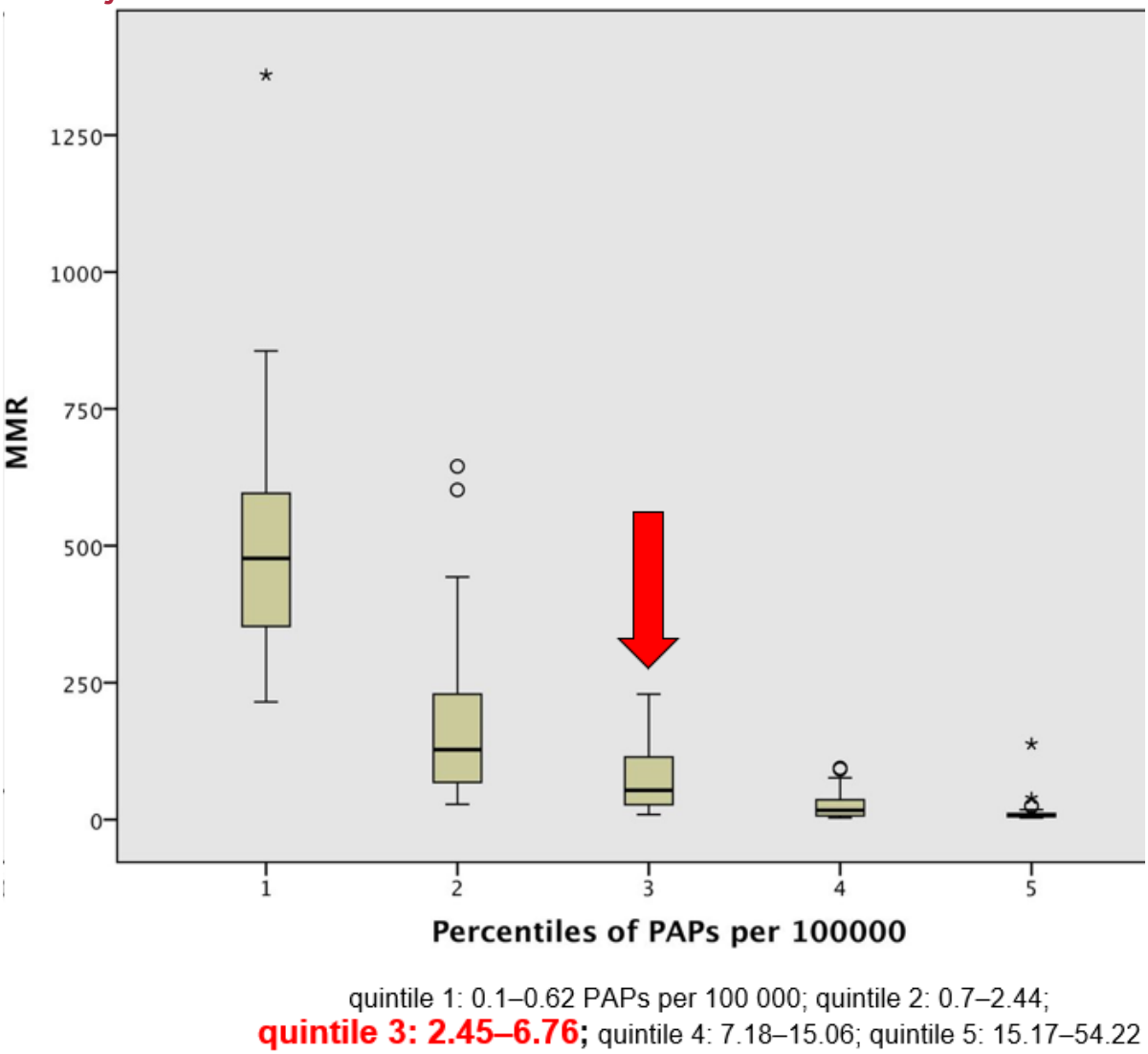
44 https://www.wfsahq.org/our-work/advocacy
45 Juran et al 2019
46 Davies et al 2018
47 Source: www.wfsahg.org/workforce-map

Figure 3-4. Density of physician anaesthesia providers per 100,000 population



Source: www.wfsahg.org/workforce-map

Figure 3-5. Relationship between physician anaesthesia provider density and maternal mortality ratio



MMR: maternal mortality ratio; PAP: physician anaesthesia provider
Source: Davies et al 2018

3.5.1.2 Workforce training and education

The workforce is not just about numbers, said Gelb: it is also about appropriate education and regulation. Mere availability of health workers is not sufficient to translate into effective service coverage.[48] The workforce needs to be equitably distributed and accessible by the population. Health workers must possess the required competency and be motivated and empowered to deliver quality care that is appropriate and acceptable to the sociocultural expectations of the population. Fundamentally, the workforce needs to be adequately supported by the health system. Gelb cautioned, "you will not get buy-in from physician anesthesiologists in any country for alternate models, unless the model is coupled with a regulatory framework that ensures job and income protection for those who already have jobs."

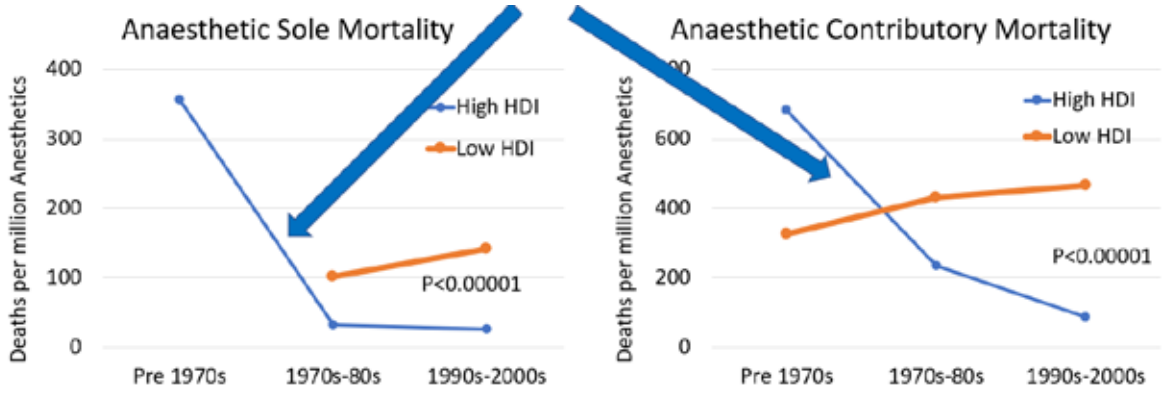
48 World Health Organization 2016

To support the workforce, WFSA runs various educational programs. For example, the Safer Anaesthesia from Education (SAFE) program is a 3-day intensive training program focused on obstetrics and pediatrics, with a fourth day for training trainers. Since its inception in 2011, the program has been delivered in more than 30 countries; 3,500 anaesthesia providers are expected to have been trained by the end of 2018. They have recently launched a one-day SAFE OR team integration training program. WFSA offers almost 400 online lessons and weekly tutorials in a range of languages, as well as publishing 33 volumes to date of the journal Update in Anaesthesia.[49]

3.5.1.3 International Standards for a Safe Practice of Anaesthesia and Anaesthesia Facility Assessment Tool

Perioperative mortality has fallen in both high- and low-income countries over the last 50 years, noted Gelb. An evaluation of avoidable perioperative mortality can provide valuable lessons to improve care, but there is relatively little recent data from the least developed countries in the world. A study of anaesthesia mortality by decade by countries' Human Development Index status[50] found that both anaesthetic sole mortality and anaesthetic contributory mortality have reduced substantially in high-income countries, but the rates have increased in low-income countries (see Figure 3-6). The investigators posit that the decrease in mortality in high-income countries represents investment in the implementation of safety standards, training, and equipment upgrading.

Figure 3-6. Anaesthesia mortality by decade and country Human Development Index status



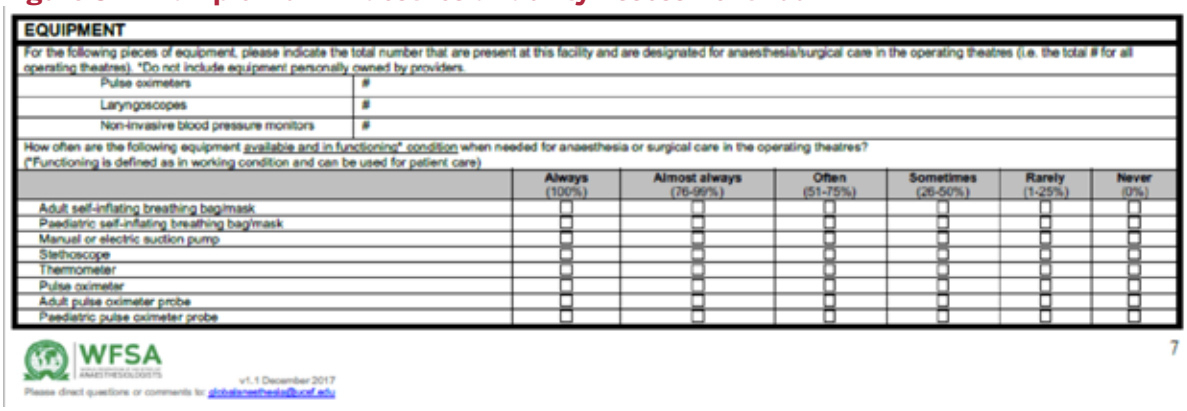
HDI: Human Development Index
Source: Bainbridge et al 2012

These findings spurred a WFSA partnership with WHO to create International Standards for a Safe Practice of Anesthesia.[51] These standards are structured in accordance with the WHO classification of hospital types and are additive, in that they go from a freestanding health clinic to a district hospital to a tertiary care facility. See Figure 3-7 for an example of the standards for monitoring. To help improve perioperative outcomes in low-resource countries,[52] the standards have been converted into an Anaesthesia Facility Assessment Tool (AFAT).[53] This checklist can be uploaded free of charge for analysis by WFSA. Figure 3-7 is a sample from the AFAT. As part of the NSOAP process, the tool can

49 https://www.wfsahq.org/resources/update-in-anaesthesia
50 Bainbridge et al 2012
51 Gelb et al 2018
52 Weiser et al 2015
53 www.wfsahq.org/afat

be used as part of the situational analysis and baseline assessment as well as for monitoring and evaluation.[54] It is currently being used by MoH in Guatemala, Uganda, and an anaesthesia partnership in India.

Figure 3-7. Example from Anaesthesia Facility Assessment Tool



EQUIPMENT

For the following pieces of equipment, please indicate the total number that are present at this facility and are designated for anaesthesia/surgical care in the operating theatres (i.e. the total # for all operating theatres). *Do not include equipment personally owned by providers.

Pulse oximeters	#
Laryngoscopes	#
Non-invasive blood pressure monitors	#

How often are the following equipment available and in functioning* condition when needed for anaesthesia or surgical care in the operating theatres?
(*Functioning is defined as in working condition and can be used for patient care)

	Always (100%)	Almost always (76-99%)	Often (51-75%)	Sometimes (26-50%)	Rarely (1-25%)	Never (0%)
Adult self-inflating breathing bag/mask	☐	☐	☐	☐	☐	☐
Paediatric self-inflating breathing bag/mask	☐	☐	☐	☐	☐	☐
Manual or electric suction pump	☐	☐	☐	☐	☐	☐
Stethoscope	☐	☐	☐	☐	☐	☐
Thermometer	☐	☐	☐	☐	☐	☐
Pulse oximeter	☐	☐	☐	☐	☐	☐
Adult pulse oximeter probe	☐	☐	☐	☐	☐	☐
Paediatric pulse oximeter probe	☐	☐	☐	☐	☐	☐

WFSA

v1.1 December 2017

Please direct questions or comments to: globalanesthesia@ucsf.edu

7

Source: www.wfsahq.org/afat

3.5.1.4 Ways forward in improving global anaesthesia care

Gelb concluded by offering the anesthesiologists' perspective about what they need from surgeons and ministries of health. He described four key tenets. The first is to acknowledge that for safe surgery a trained, competent and dedicated surgeon (whether physician or not) must be accompanied by an appropriately trained, competent and dedicated anaesthesia provider (whether physician or not). Accepting anything less devalues the patients they care for together. The second is to encourage, facilitate, and support appropriate training of providers even when this results in short-term provider shortages while training takes place. The third is to adhere to, promote, and advocate for the International Standards for a Safe Practice of Anaesthesia. These should be endorsed and adopted at every level of the healthcare system.[55] The fourth tenet is to regard anaesthesia as an equal partner with surgery in promoting safe surgery, not just a stakeholder to consult occasionally. Anesthesiology is currently surgery's "invisible friend," but it should be a full partner in global, national, and local dialogues.

An adequate and well-trained workforce is crucial for patient safety, Gelb reiterated. Anaesthesia fits into multiple areas of the NSOAP development process.[56] The WHO-WFSA International Standards link standards to type of facility and type of cases and form the basis of the AFAT, which is a free and useful tool for obtaining much-needed data about anaesthesia care in order to understand how it can be improved worldwide.

3.5.2 International Federation of Gynecology and Obstetrics

Faysal El-Kak, Vice President, FIGO provided an overview of his organization's work to expand care for surgically amenable obstetric complications. He explained that pregnancy-related complications represent about 6% of the 11% of the global disease burden that can be treated with surgery. Pregnancy-related complications include fistula, C-sections, and cesarean hysterectomy.

FIGO is a federation of 133 national societies comprising 1.7 million gynecologists. They are

54 Albutt et al 2019

55 Gelb noted that Mongolia and Pakistan are endorsing these international standards and the MOH in Romania is considering making them a national standard.

56 Citron et al 2019

partnered with the International Congress of Midwives (ICM) which has at least 500,000 members. FIGO can implement guidelines through their member societies in China, India, Pakistan, Indonesia, The Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZOG), The American College of Obstetricians and Gynecologists (ACOG), Society of Obstetricians and Gynaecologists of Canada (SOGC), and Royal College of Obstetricians and Gynaecologists (RCOG). FIGO can contribute to NSOAP efforts through teaching, improving access and reducing the surgical burden at the policy level, by working with governments and professional associations. FIGO's committees and technical arm can also contribute through skill improvement and capacity building.

3.5.2.1 FIGO Fistula Surgery Training Initiative

Fistula is a significant part of the surgically amenable burden of disease, but many women cannot access care for fistula, particularly in low-resource settings. Only one in 50 women worldwide has access to fistula treatment. An estimated 2-3.5 million women live with obstetric fistula in developing countries, with between 50,000 and 100,000 new cases each year. Multiple factors contribute to this significant gap, including:

- Poor access to public health services
- Lack of health services for safe delivery and emergency obstetric care
- Severe shortage of trained and skilled fistula surgeons
- Unavailability of holistic treatment units
- Unavailability of family planning, antenatal care, and SAB
- Poor education, inequality, and low empowerment of women

To ameliorate this gap in fistula treatment, FIGO developed its Fistula Surgery Training Initiative, an ambitious multi-year fistula training program for surgeons and multidisciplinary teams. FIGO's Fistula Fellows have collectively performed more than 8,000 repair operations in 19 countries across the globe, helping thousands of women recover and regain their lives from this devastating condition. FIGO is committed to expanding this initiative, to reach significantly more women in the future. Trainings take place in established training centers as well as through coaching visits by FIGO trainers to fellows' home facilities. Along with partners, FIGO has created the first standardized, evidence-based Global-Competency-Based Fistula Surgery Training Manual. FIGO and Medical Aid International supply much-needed fistula equipment to fellows, including a FIGO Specification Fistula Instrument Set, to make quality fistula equipment accessible to all partners and ensure that women receive the best-quality care. The End Fistula campaign is currently targeting countries in Africa and central and southeast Asia. According to Gillian Slinger, Senior Project Manager, FIGO Fistula Surgery Training Initiative, "obstetric fistula is finally 'out of the shadows,' and will not go back under any circumstances."

3.5.2.2 Postpartum hemorrhage

Hemorrhage is the leading direct cause of maternal mortality, accounting for 27.1% of maternal deaths worldwide. Interventions that can reduce maternal mortality from hemorrhage include:

- Institutional delivery and skilled care before, during, and after childbirth
- Use of active management of the third stage of labor
- Accurate estimation of blood loss and use of shock index to trigger action
- Use of uterotonics, including oxytocin and misoprostol
- Use of manual methods to manage or provide temporizing measures
- Functional referral system providing access to comprehensive emergency obstetric care when needed

To strengthen care for postpartum hemorrhage, FIGO has worked with partners to develop international guidelines on prevention and treatment of postpartum hemorrhage with misoprostol in low-resource settings. They have also produced international guidelines and advocated for the inclusion of misoprostol for postpartum hemorrhage treatment to be included on WHO's 2015 Essential Medicines List. FIGO's misoprostol recommended dosage chart was created in 2012 and updated in 2017. They have also conducted more than 40 expert panel sessions to disseminate the latest clinical information on postpartum hemorrhage management and have launched a survey with 130 member societies to find out about the current status of country-level guidelines on postpartum hemorrhage management. FIGO also guides advocacy initiation for better postpartum hemorrhage management.

Effective strategies are available for postpartum hemorrhage prevention. FIGO has found postpartum hemorrhage simulation training to be effective in resolving problems including delay in diagnosis, poor communication, insufficient teamwork, and lack of adequate education and skills.

3.5.2.3 Cesarean hysterectomy

When medical interventions fail, postpartum hemorrhage can require cesarean hysterectomy. El-Kak highlighted the problem of increasing C-sections worldwide: every second there is a C-section somewhere in the world. By 2030, an estimated 30 million C-sections will be performed worldwide. However, as C-sections increase, so do rates of abnormal placentation, a condition that ultimately ends in cesarean hysterectomy.[57] Because more C-sections will require more hysterectomies, FIGO is committed to working toward lowering C-section rates. FIGO has convened a consensus group, a working group, and a committee working on FIGO guidelines for placenta accreta spectrum disorder.

3.5.3 Broadening access to care for women with limited social rights

57 Silver et al 2006

Syed Shershah, consultant obstetrician and gynecologist, Koohi Goth Hospital, and President, Pakistan National Forum on Women's Health, emphasized that understanding women's surgical needs requires taking into account women's social and community status. Women who do not even have access to a reasonable quality of life have little chance of accessing quality obstetric or gynecological care. Shershah remarked, "People living in caves and in the streets have such a low standard of living… how can they have access to surgery?" In Pakistan, for example, women are subjugated and have very limited social rights. Many women are subject to horrible abuse or even honor killings; young girls can be married off to much older men. Having a hysterectomy can justify a woman's husband leaving her. Maternal deaths are very common in Pakistan and C-sections are often performed in women's homes by non-physicians. Many women live with severe uterine prolapse with no treatment at all.

3.5.3.1 Poor prioritization by NGOs, civil society, and autonomous agencies

Shershah considered the role of NGOs, civil society, and autonomous agencies in addressing the unmet burden of women's surgical care in Pakistan. He maintained that these groups often have the wrong priorities and are not focused primarily on patients' needs. For example, the lack of midwife training and a midwife workforce is a huge gap in Pakistan. Competent midwives are needed in Pakistan to reduce the C-section rate, but midwives are not being supported by the government or by NGOs. Funding entities are spending money on fistula care but not midwives, said Shershah; he emphasized that the burden of fistula would be substantially reduced if better midwife care were accessible to women. A further benefit of a midwife workforce is that they are trained in family planning, while OB/GYNs typically do not have time to talk to patients about this. However, the NGOs such as the Pakistan Medical

Association may be resistant to training midwives on safe delivery practices, because they view midwives as competition. Similarly, autonomous donor agencies' priorities tend to be aligned with government-driven priorities rather than patient-focused priorities. As a result, NGOs such as War Against Rape bring young girls to private gynecologists for care, because they cannot receive care at government hospitals. Shershah works with groups that set up outreach surgical camps regularly across the country, with more than 4,000 surgeries carried out so far. He reiterated that the priorities of government and donor agencies urgently need to be re-focused on providing access to health care and surgical facilities to women and other highly vulnerable populations.

3.5.3.2 World Federation of Neurological Societies

Kee B. Park, Lecturer, Program in Global Surgery and Social Change, Harvard Medical School, described the role of the World Federation of Neurological Societies (WFNS) at the forefront of efforts to strengthen global neurosurgery. Founded in 1955 and based in Switzerland, the WFNS now includes 130 neurosurgical societies representing 49,000 surgeons. The WFNS has an official relationship with WHO through the Emergency Essential Surgical Care Programme.

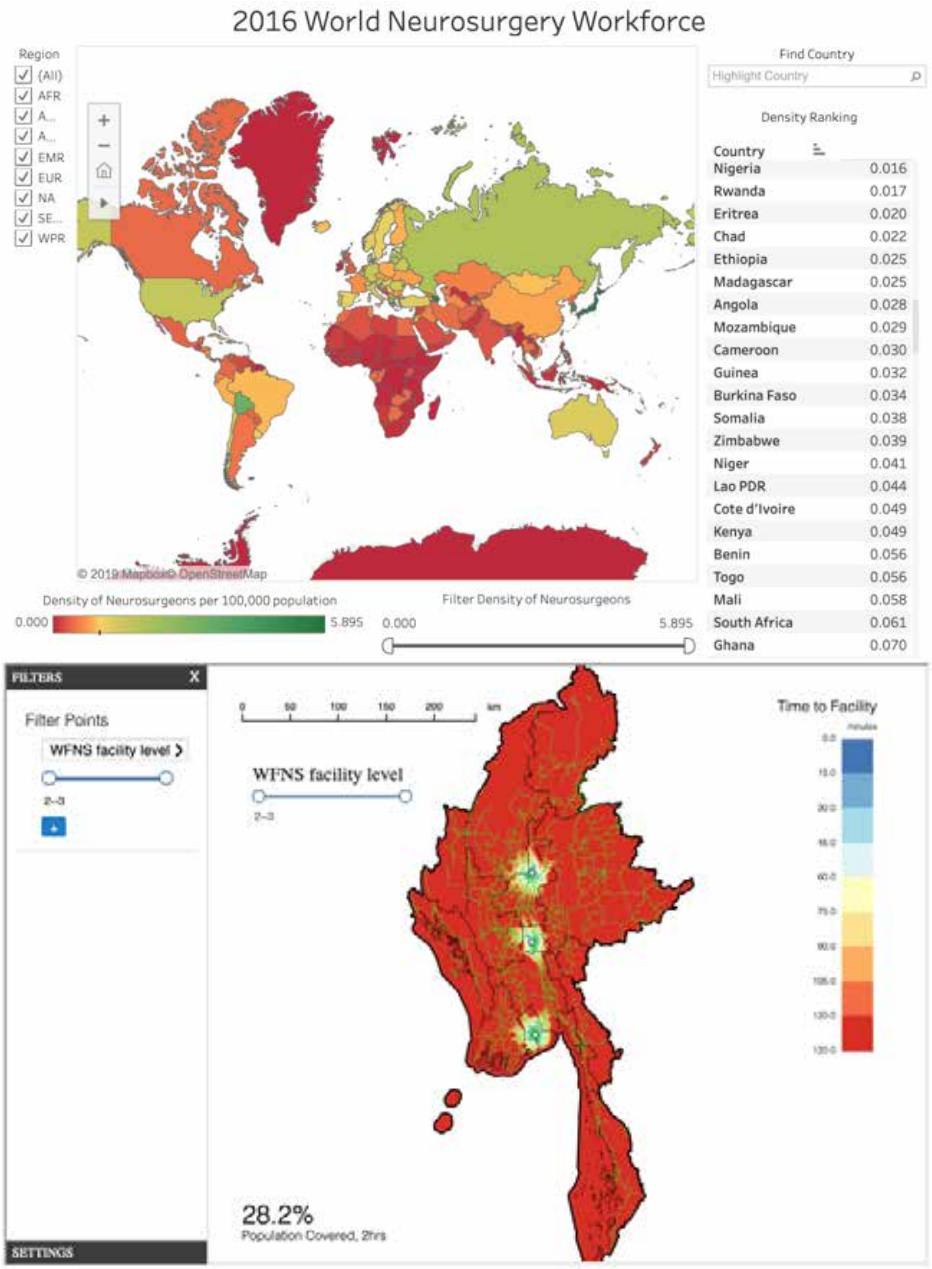
Neurosurgeons entered the public health arena in 2015, with the WFNS issuing the Bogota Declaration in 2016 which called upon neurosurgeons around the world to address the unmet neurosurgical need: "We call on the neurosurgeons as well as their professional societies of the world and related stakeholders to take urgent coordinated action to lead and address the unmet global neurosurgical need." Since the Bogota Declaration, the field of global neurosurgery has taken hold, catalyzing a profusion of publications in global neurosurgery.

3.5.3.3 Global Neurosurgical Workforce and Capacity Mapping Project

Neurosurgery represents a large proportion of the unmet global surgical need, so the WFNS is focused on how to deliver neurosurgical care to those who need it. A first step has been establishing the gaps in care. The PGSSC has estimated that there is an unmet burden of 5 million neurosurgical operations, primarily in developing nations. WFNS has projected that to meet that demand, an additional 20,000 neurosurgeons will be needed. Park noted that more than half of untreated neurosurgical conditions are head injuries, facilitating an entry point for global neurosurgery into the UHC dialogue. SDG 3.6 calls for a reduction of death and disability from road traffic accidents by half, so neurosurgeons will be key players in achieving this goal.

WFNS supports a world neurosurgical workforce map, similar to the map developed by the WFSA. It provides workforce density per 100,000 for each country. WFNS has analyzed the distribution of neurosurgeons in each country to estimate the proportion of the population that can access neurosurgical services (see Figure 3-8).

Figure 3-8. Global Neurosurgical Workforce and Capacity Mapping Project



Source: World Federation of Neurological Societies

3.5.3.4 WFNS policy-facing activities

Park explained that neurosurgeons have not traditionally been brought to the table in developing head injury policy and recommendations. To address this, WFNS brought together specialists to create *Comprehensive Policy Recommendation for Head and Spine Injury Care in LMICs*,[58] guided by the vision that no person experiences undue disability or death due to head and spine injury regardless of where they live. Using a paradigm with the same six domains as the NSOAP framework,

58 https://docs.wixstatic.com/ugd/d9a674_1ba60c38a07341a7bbbe8b1e3f0ff507.pdf

they looked at the full spectrum, including surveillance at the national level, prevention policies, prehospital care (ie, getting injured patients into the hospital), the surgical system, and rehabilitation. They published recommendations for each domain based on research and the best evidence available and driven by the needs of patients (see Appendix 6). Park said that WFNS is fully committed to Resolution WHA68.15 and is open to collaborating with any interested groups.

3.5.4 Discussion

Lubna Samad, Indus Health Network / GICS, asked for discussion about the role of professional societies in NSOAPs and how to ensure the inclusion of other healthcare professions in the process. Khama Rogo, Lead Health Sector Specialist and Programme Head, Health In Africa Initiative, WBG, said that the stark contrast between conditions in Pakistan and conditions in countries with access to high quality surgical care should be used to spur action by professional societies. Sk Nazmul Huda, Global Program Manager, Fistula Care Plus Project, Engender Health Inc. and Country Program Manager, Bangladesh Office, Engender Health Inc., remarked that midwifery is a critical concern in countries such as Bangladesh. The midwife workforce needs to be better enabled to carry out their work by creating space for midwife practice in hospital settings and by facilitating enhanced communication and understanding between OB/GYN and midwife societies; fistula programs could also benefit from this type of improved cooperation and communication. Faysal El-Kak agreed about the need for better communication and collaboration between OB/GYNs and midwives in many settings. FIGO is committed to strengthening this partnership. He added that there is some ongoing collaboration between surgeons and anaesthetists around fistula.

In the context of WFSA's standards for anaesthesia, Rogo cautioned that excessively strict controls over anaesthesia care may have negative impacts on C-section rates; this may warrant further consideration by WFSA and other professional societies. El-Kak agreed that this point about C-section rates is important and controversial. C-section will be an epidemic in coming years and dealing with the related accretas and hysterectomies will be prevalent problems for surgeons, gynecologists, and anesthetists. He remarked that surgeons have not traditionally been involved in primary health care due to their surgery-focused training which focuses on technical components rather than clinics—"the more training provided to specialist surgeons, the more they want to do surgery." He suggested that training needs to be adapted for surgeons to participate in the global agendas of UHC and primary care. He noted that FIGO has an MOU with WHO, recommending guidelines for C-section and safe motherhood, but this is a volatile political issue that has to be negotiated in each country's health system environment.

Gelb replied that it is a challenge for surgeons to develop standards and have MoHs embrace those standards; it is also a challenge to grant non-surgeon caregivers of surgical patients, such as anesthesiologists, as much authority in deciding to operate—"Income is not an indication to operate," he warned. The fragmentation that has taken place in the US because of income needs to be avoided globally. Gelb sees the WFSA's role as working with MoHs through partnerships with national societies of anaesthesia—if the MoH is engaged with a national society, they can choose to include the WFSA in the process. To build an allied workforce, WFSA is willing to work with any legitimate, certified anaesthesia provider. They already work closely with the International Federation of Nurse Anesthetists and have begun writing policy documentation.

4 NSOAP financing and resource mobilization

4.1 DEVELOPING AN NSOAP FINANCIAL STRATEGY

Developing an NSOAP gives rise to two major challenges: how to obtain financing to develop and fund a plan and how to implement and execute the plan. A presentation by Che-Len Reddy, Paul Farmer Global Surgery Research Fellow, Program in Global Surgery and Social Change, Harvard Medical School, focused on how to develop an NSOAP financial strategy. He described a systematic approach to financing NSOAPs and why it is necessary, as well as policy recommendations for a practical approach going forward.

Reddy began with the rationale for developing an NSOAP financial strategy. The bottom line is that an NSOAP will not be implemented without financing. To put the discussion in perspective, the costs of implementing an NSOAP is estimated to be US$600 million overall (US$85 million per year) in Tanzania and US$260 million overall (US$51 million per year) in Zambia. It is clear that financing NSOAP implementation requires a strategic approach or plan that is developed from the outset of the NSOAP process.

4.1.1 NSOAP financing and the NSOAP process

A NSOAP financial strategy provides an MoH that is embarking on an NSOAP with a structured approach to assess fiscal space for health. Then the MoH can develop a strategy to mobilize a pool of resources for NSOAP implementation. The NSOAP financial strategy is housed primarily within the NSOAP finance domain. However, financial planning should begin at the outset of the NSOAP planning process and continually modified and refined throughout the process by the NSOAP task force. For example, identifying financial gaps in the plan and the cost of inaction should be part of the situational analysis phase and financial considerations should be part of the consensus building process among stakeholders.

4.1.2 Components of an NSOAP financial strategy

An NSOAP financial strategy consists of three components: sources, actors, and engagement. The fiscal space for NSOAP analysis is the 'where'; stakeholder analysis is the 'who'; and stakeholder engagement planning is the 'how.'

4.1.2.1 Fiscal space analysis

Fiscal space analysis maximizes the 'headroom' for health financing—that is, where, from whom, and how to get financing. The analysis can be used to determine the potential sources for NSOAP financing and the viability of each of those sources. Fiscal space analysis can also be used to expand the health sector fiscal space more broadly. A guiding principle of fiscal space analysis is fiscal sustainability: "the capacity to increase public spending but doing so in a fiscally sustainable manner that does not threaten government solvency."[59]

Six key sources of financing to consider in a fiscal space analysis include:

- Macroeconomic conditions
- Reprioritization of government budget
- Increase health sector-specific resources
- Efficiency of existing resources
- External sources
- Innovative financing sources

Reddy explained that fiscal space analysis can help to mobilize funding through reprioritization of government budgets. In Turkey, for example, UHC could not have been

59 Burnside 2005

implemented without the decade of sustained growth. Increasing health sector resources might include implementing an excise tax on cigarettes to fund cardiovascular programs, as an example. In Rwanda, they used external sources of financing very effectively to train a large workforce of providers. He noted that the Global Surgery Fund is an example of an innovative financing source to be considered.

4.1.2.2 Stakeholder analysis

Stakeholder analysis outlines key actors who can influence the fiscal space for health and NSOAP. This involves identifying and mapping the major funding stakeholders and then gauging each stakeholder's interest in surgical and health system performance. Additional considerations include the power and influence of each stakeholder, the quality of the existing relationship and the nature of potential engagement with them in the NSOAP process, and the relative likelihood that the stakeholder will mobilize resources. Figure 4-1 provides a sample matrix for analyzing stakeholders along the dimensions of influence and power, interest in NSOAP, trust, and potential.

Figure 4-1. Stakeholder analysis matrix

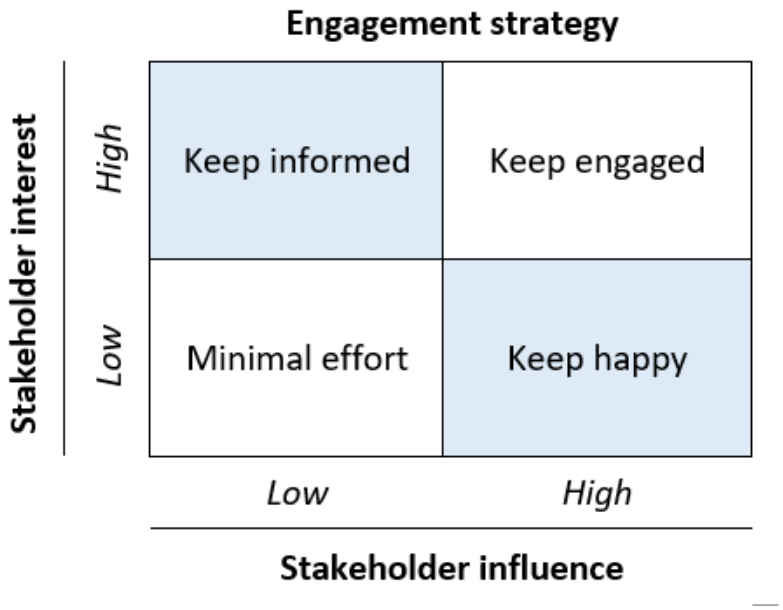
Stakeholder	High / Medium / Low	Influence	Interest	Trust	Potential
Ministry of Finance					
Bilateral funder					
Private provider/insurer					
Surgical device manufacturer					
Academic institution					

Source: Reddy presentation

4.1.2.3 Stakeholder engagement plan

The next step is to develop a stakeholder engagement plan, which serves to build relationships and secure funding from key partners. A useful strategy is to plot the stakeholders and actors to determine the best way to engage with them based on their relative degrees of influence and interest (see Figure 4-2). The aim is to determine the most effective way to engage with a given stakeholder—for example, framing the NSOAP as an infrastructural matter versus a health matter—to increase the likelihood of obtaining financing.

Figure 4-2. Plotting stakeholder engagement



Source: adapted from Mendelow 1991

4.1.3 Policy options for NSOAP financial strategy

NSOAP financial strategies are setting-dependent, noted Reddy, and not all countries are equally economically positioned. Thus, the financial strategy and policy options available will differ depending on the resources available and the country's level of economic development. However, all countries should emphasize efficient spending and pursuing innovative financing strategies, with opportunities for innovation considered in domestic and external financing, as well as regional strategies. Table 4-1 illustrates the types of funding and policy options that may be appropriate for countries at different levels.

Table 4-1. Funding and policy options by level of economic development

	Country's level of economic development		
	Upper-middle-income (eg, South Africa)	Lower-middle-income (eg, Pakistan)	Low income (eg, Liberia)
External			√
Innovative, macroeconomic, efficiency	√	√	√

Source: Reddy presentation

4.1.4 Discussion

4.1.4.1 Aligning NSOAPs with other national plans to ensure financing

Inaam Haq, Program Leader for Human Development, Africa Region, World Bank, remarked that it would be very difficult for NSOAPs that do not fit within other national plans, such as those to address maternal mortality. He recommended regional- and country-level strategies to target ministries of finance to mobilize domestic resources that will be needed to implement the NSOAP. Meara agreed that financing an NSOAP is contingent upon its compatibility and alignment with existing national health plans. Emmanuel Makasa, Global Surgery Ambassador, concurred that a standalone NSOAP has little chance of being implemented—this was a critical issue for NSOAP development in Zambia. Fortunately, the NSOAP in Zambia was developed at an opportune time with high-level government buy in. They were able to integrate the NSOAP into Zambia's health sector strategic plan. The health sector strategic plan is also part of the country's broader national development plan, which yields further benefits in terms of integration and coordination of national efforts and availability of funding. He noted that local resources are the foundation of NSOAP implementation.

4.1.4.2 Prioritization of funding

Given the dearth of funding, Haq suggested that prioritization should be built into planning to ensure that priority services are funded first. Makasa remarked that in hindsight, Zambia's NSOAP planners should have included prioritization because "you can't approach financiers with a request for $260 million." He added that merely integrating the NSOAP into larger existing plans is not sufficient—an operational plan also needs to be in place to actualize the plan through specific actionable steps. This operational planning can also help planners prioritize the different steps involved in implementation when funding becomes available.

4.1.4.3 Regionalization and spending efficiency

Benetus Nangombe, Executive Director of the Ministry of Health and Social Services, Namibia, emphasized the need for regionalization, noting that improving the efficiency of how existing funds are spent should be an important factor when considering regionalization. As the African region moves toward regionalization, efficiency within each country will become increasingly important. Nangombe suggested that all countries should investigate the efficiency of their public expenditures. Namibia is currently doing so, because although it is approaching

the 15% mark[60] for health allocations in the budget, the country is not achieving the same health outcomes as Botswana, which allocates less of its budget to health. It can be difficult for countries to evaluate their own spending and efficiency, so he suggested that international institutions such as the World Bank could conduct broader, more regional exercises to evaluate and inform countries about where they stand in terms of efficiency. He is currently engaged with the World Bank to conduct a public expenditure review for health spending to examine how to pursue efficiency at the regional and continental levels in Africa.

4.2 MOBILIZING GLOBAL RESOURCES FOR NSOAPS

4.2.1 Spanish Agency for International Development Cooperation

Maria Cruz De Ciria Mantilla, Head of Health Sector Division, Spanish Agency for International Development Cooperation (AECID), described how international development agencies such as her organization can contribute to NSOAP process through resource mobilization, advocacy and influencing policy (to the extent that financing allows), and innovation.

4.2.1.1 Advocacy for global health policy

As a development agency, AECID works primarily to support governments in implementing policies for national health sector plans and health system strengthening, although AECID firmly believes that those policies should be set by the countries themselves. AECID advocates and promotes an integrated and comprehensive health system model that provides UHC and health services at all levels of care for everyone, from the first level of primary health care to the secondary and tertiary levels of hospital specialized services and care, coordinated and integrated with an adequate referral system. Primary health care is essential but insufficient to address the full range of health challenges, so UHC also requires that all people be able to access specialized services; this is a key factor in closing the equity gap for populations who do not currently benefit from scientific and technical health knowledge. She noted that Spain contributed to the Declaration of Astana and its focus on providing access for all people to the right care at the most appropriate level of care, with a referral system between primary and other levels of care.

4.2.1.2 Resource mobilization

AECID also supports resource mobilization for Member States. This work is primarily focused on primary health care and community health programs that are aligned with the partner country's health policies and national plan. They also support social protection and contribute to a joint financing mechanism focused on primary health care programs and complementing domestic resources, as well as providing financing to NGOs engaged in health system strengthening work. Additional financial and technical resources are available based on the partner country's needs. For instance, AECID offers a technical program that supports the institutional capacity of specialized training (mainly surgical) and service delivery in second- and third-level hospitals.

4.2.1.3 National capacity building for specialist training

Mantilla explained that AECID also supports national capacity building for specialist training. They offer specialized training support and service development programs to strengthen local capacity for specialized medical training and the provision of high-quality specialized services in secondary and tertiary decentralized hospitals. Based on the partner country's needs, this may involve surgery, gynecology, anaesthesia, traumatology and orthopedics, pediatrics, and internal medicine. In recent years, AECID has provided this support to partner countries including Mozambique, Ethiopia,

60 Nangombe noted that a budget declaration commits the governments of countries in Africa to allocate at least 15% of their total budgets to the health sector.

Bolivia, Niger, Malí, and Mauritania. This work is carried out in collaboration among the partner country's MoH and universities, AECID, Spanish institutions, university hospitals, scientific societies and colleges of surgeons, orthopedics, anesthesiologists, pediatricians, and so forth.

4.2.1.4 Supporting NSOAP process

International development agencies such as AECID can also support countries in navigating the NSOAP process. AECID is committed to supporting Resolution WHA68.15 by helping countries to embed their NSOAPs within national health sector plans, which makes it easier to obtain infrastructure investment. They are working to increase synergies in supporting specialized services with NSOAPs. In Ethiopia, for example, they are working to increase synergies for the Saving Lives through Safe Surgery initiative, and AECID is willing to work with other partner countries. She emphasized that the regional approach to SOA planning will be critical moving forward, as will efforts to promote access to surgical materials and devices.

4.2.2 Korea International Cooperation Agency and NSOAP partnership

Hoonsang Lee, Adjunct Professor, Yonsei University School of Public Health, Korea and member of the Health Sector Advisory Committee at KOICA explained that the organization has developed an extensive network of international partnerships over the past two decades, with a particular focus on forging partnerships in Asia, Africa, and Latin America. Korea is an emerging player in overseas development assistance, increasing its volume of overseas development assistance (ODA) funding by more than 40-fold between 2005 and 2015. The essential components of Korea's health ODA are to support evidence-based, population-based, public health, and health systems approaches as well as strengthening monitoring and evaluation; these are aligned with the key tenets of NSOAPs, he noted.

4.2.2.1 Sample of KOICA projects

Lee provided an overview of an ongoing KOICA project to improve community-based primary health care by strengthening community-based health planning and services (CHPS) in the Upper East Region of Ghana. This $9 million project encompasses 120 CHPS compounds, 48 health centers, and six district hospitals. They are working in communities and facilities to strengthen health system components of management, leadership, and referral systems. Lee highlighted the importance of a strong, integrated referral system by describing the Ghana Essential Health Interventions Program (GEHIP). GEHIP was introduced as a coordinated response for addressing challenges and facilitating the scale up of CHPS in response to a MoH evaluation report. As part of GEHIP, they piloted an "Sustainable Emergency Referral Care" intervention that placed motorbike ambulances in communities to transport patients to the district hospital. Evidence suggests a significant decline in facility-based maternal mortality during the intervention period that was more pronounced in communities with "Sustainable Emergency Referral Care"; they are continuing to evaluate the impact to determine if there is evidence to support nationwide scale up. KOICA is also partnering with the United Nations Population Fund on projects to prevent and provide surgical support for women with fistula, as well as support for social reintegration and readjusting to the community.

4.2.2.2 Mobilizing resources for NSOAPs

Lee emphasized that financing and sustainability are core components of NSOAPs. Beyond introducing a $600 million project, for example, there will be further recurring costs that governments will have to cover. He added that certain system strengthening measures will add to recurring costs for governments. Surgical care capacity building is critical, but governments need to be prepared for a likely increase in long-term costs. NSOAPs also need to be presented as

an integrated program that harmonizes with existing programs and coordinates with other top global priorities, such as reproductive health. This can be an effective strategy for obtaining funding. For example, Korea's loan agency recently provided almost $100 million for a hospital project in Tanzania, which is about 1/6 of the estimated overall NSOAP cost for Tanzania. Instead, this was spent on just one hospital because it was requested by the government of Tanzania. "The money is flowing, but the spaces for NSOAP have to be identified and taken advantage of," suggested Lee. He suggested three key principles for a new way forward with NSOAPs: innovation and technology; private and public partnerships; and impact investment and social venture models.

4.2.3 USAID surgical programming

Monique Wubbenhorst, Senior Advisor, Family Planning and Reproductive Health, USAID, delivered a presentation on how her organization has incorporated surgery and obstetrics into their approach to strengthening health systems. She noted that they are considering incorporating anesthesiology going forward. USAID wants to create optimal health systems that deliver people the care they need in ways they trust (see Box 4-1 for an overview of USAID's mission). She explained how USAID works with partners to create optimal health systems as a development-focused agency. USAID is focused on primary health care and on reframing UHC in terms of access. Governments cannot guarantee healthcare for every person in the country, so public, private, faith-based, and civil society groups all need to contribute. She noted that Christian health associations provide a tremendous amount of care in sub-Saharan Africa. USAID's emphasis is on building resilience and sustainability by aligning with a wide variety of partners and stakeholders. They also consider market dynamics for new products, such as insurance schemes targeted to the poor.

Box 4-1. USAID's principles for optimizing health systems

USAID believes that the goal of universal access must be achieved in a way that supports the most vulnerable members of society. Communities are key actors in the implementation of universal access. In addition to beginning with primary health care, USAID believes that priority should be placed on services that help address the major diseases and conditions affecting vulnerable populations such as women and children and other marginalized or stigmatized groups. Approaches and interventions should be designed to be sustainable and achieve scale over time. Doing so requires measuring what works and finding ways to replicate it, while also having mechanisms in place to pause and adapt approaches that do not work as expected. USAID works with partners to create optimal health systems by:

- Focusing on primary health care
- Supporting patient ecosystems
- Letting countries lead
- Helping build resilience
- Emphasizing sustainability
- Engaging and aligning efforts with a wide variety of partners and stakeholders
- Designing new approaches for scale
- Scaling proven approaches
- Considering market dynamics for new products, especially those targeted to the poor

4.2.3.1 Overview of USAID funding

Wubbenhorst provided a brief overview of how USAID funding works. Because the aid is based on the wishes of the American people—which is development—three-quarters of USAID finances are in the field at USAID Regional Offices and missions. The aim is to support countries on a journey to self-reliance. As countries move along their trajectory, the funding changes from capacity building and improving health resources toward more innovative funding, such as development impact bonds. Most funding comes from grants, cooperative agreements, and contracts, with awards made on the basis of a competitive process. Funding is channeled through a variety of mechanisms; some are bilateral (government to government), but the majority are to NGOs and academic institutions. There has been a recent push to move funding to more local and indigenous partners, as well. USAID focuses on private sector engagement and technical assistance, as well as building essential data capacity in countries. She advised that moving forward, data and performance will be tied to funding, so countries need to own their data, build databases, and be accountable for their own data

4.2.3.2 Country health workforce development

Wubbenhorst underscored the need for better alignment of country health workforce development with country population needs and fiscal space for health. She noted that as gross GDP and total health expenditure per capita increases, the density of health workers changes toward more specialization. Over the past decade, countries and donors have made significant investments in health

worker education. However, due to fiscal constraints and other challenges, many new trainees have not been able to be hired or absorbed into country systems. Further, strategies have not been based on health labor market analysis nor available fiscal space for health. This has had a negative impact on the sustainability of investments, including the ability to hire and retain new graduates.

USAID is building models that incorporate economic, demographic and epidemiologic data to think more holistically about strategies and investments to advance education and reform training to develop comprehensive health human resources with the appropriate skill mix. This might involve, for example, addressing population health needs more directly through investments in community health workers and more mid-level cadres instead of more highly specialized doctors.

4.2.3.3 USAID programming for surgery

As part of USAID's work to optimize health systems and support patient ecosystems, they have existing programs that involve surgical services for cesarean delivery, fistula, and neglected tropical diseases. Wubbenhorst explained role of obstetrics and gynecology in the global surgery model, which needs to be founded on a strong primary health care system and supported by community health workers. Cesarean delivery is one of the three Bellwether procedures at the foundational level of the system. Anaesthesia providers should be available for obstetric care at the primary care level. Fistula and other complex reconstructive surgeries are performed at higher levels of surgical facilities.

4.2.3.3.1 USAID Maternal and Child Survival Program

USAID's Maternal and Child Survival Program is a surgical capacity-building program to strengthen Comprehensive Emergency Obstetric and Newborn Care (CEmONC) services, including safe blood transfusion and surgical care to manage obstetric complications in Tanzania, Haiti, Madagascar, Guinea, and Rwanda. In Madagascar, the project collaborated with the MoH and partners to support the development of a National Strategic and Operational Plan for essential surgery services, including safe cesarean. This complemented other support provided through Harvard and Mercy Ships. USAID supported training of 200 hospital staff in safe surgery as well as a core group of national trainers. USAID plans to support established hospital quality improvement teams to promote safe cesarean and support regular mentoring of surgical teams and surgical site infection surveillance.

1.1.1.1.3 USAID Fistula Program

Wubbenhorst also provided an update on the USAID-funded Fistula Program. USAID principles for fistula programming are to focus on the prevention, treatment and reintegration of women with obstetric fistula and to leverage public/private partnerships to reach innovative solutions for further success and advancement. The Fistula Care Plus Project has five objectives: to strengthen the enabling environment; to enhance community understanding and practices; to reduce barriers to care (eg, transport, communications, and finance); to strengthen clinical capacity; and to strengthen the evidence base. Recent accomplishments include surgical repair of more than 5,000 fistulas, which has demonstrated the potential for shorter postoperative care for fistula patients. The program has also introduced non-surgical fistula repair treatment, reduced the duration of time women live with fistula, and implemented shorter postoperative length of stay. They have identified the importance of iatrogenic fistula, which is most frequently associated with cesarean sections, cesarean-hysterectomies and repair of ruptured uterus. They have also identified the male role in fistula treatment, engaging men and husbands in community engagement programs. The effort also utilizes community-based programs to focus on engaging community and religious leaders to disseminate information about fistula and treatment options. For example, a community-based

program in Niger has reduced early marriage, which is correlated with fistula.

4.2.3.4 Neglected tropical diseases

Wubbenhorst described USAID's work on the neglected tropical diseases trachoma and lymphatic filariasis. USAID's Neglected Tropical Disease Morbidity Management & Disability Prevention Project worked in Ethiopia, Burkina Faso and Cameroon to provide over 13,000 trachomatous trichiasis (TT) surgeries and 23 lymphatic filariasis hydrocoele surgeries in 2016. These efforts have built capacity through supporting training, including curricula development and work with surgical simulators; this is accompanied by tools to strengthen case finding, improve patient access, infection control, and a monitoring and evaluation system to evaluate long-term surgical outcomes. For both trichiasis and lymphatic filariasis, USAID focuses on strengthening the capacity of national health services through different strands of investments. Investment in strengthening of national surgical systems has been fostered by USAID's development of procurement calculators for TT surgery and hydrocele surgery to ensure availability of essential medicines, consumables, and durable goods required for each type of surgery. Investments are also channeled into strengthening of capacity of local surgeons through the refinement of national surgical curricula to reflect global norms, introducing surgical simulators to safely bridge the gap between theoretical learning and surgery on live patients, and reinforcing training and refresher training opportunities. Supporting countries in addressing the morbidity associated with trachoma and lymphatic filariasis (e.g., identifying cases and providing quality services) is part of the long-term goal to eliminate these diseases as public health problems.

Quality assurance is implemented at both the facility level and patient level, with reinforcement of requisite infection control and waste management practices, supportive supervision of surgeons performing surgery, and postoperative patient follow-up (facility-based and home-based).

4.2.3.5 Future directions for USAID

Wubbenhorst noted that cervical cancer and blood transfusions are potential areas of future focus for USAID. Cervical cancer lesions are amenable to surgery and USAID has funded programs in Malawi and Mozambique looking at early treatment and visualization of these legions. Transfusions and blood services are an essential part of surgical services as well as for the treatment of pediatric malaria cases. A study has demonstrated that pediatric blood transfusions fluctuate over time and as malaria control funding dissipates, the need for transfusions increased.[61] Because most transfusions are done for malaria, changes in transfusion rates parallel rates of malaria transmissions. As malaria control is successful, transfusions go down.

4.2.4 Making the investment case for NSOAPs

Kanako Yamashita-Allen, Senior Specialist in Health, Nutrition, and Population, World Bank, discussed strategies for making an investment case for financing NSOAPs. To increase the availability and quality of SOA care, interventions need to be based on solid theory of change and improvements must be based on good, measurable indicators. She underscored the importance of operational research to gather the data and evidence needed to understand what works, learn lessons, and make course adjustments. The project preparation process must be demand driven—that is, at the request of the MoH or Ministry of Finance (MoF). The World Bank can sometimes help to create the demand at the country or regional level through policy dialogue and country-specific advisory services and analytics. The next principle is to identify needs and demonstrate why investment in SOA care makes sense, by describing regional and country context and strategies for bringing in global best practices. The next step is to propose the specific

61 Comfort et al 2014

interventions and budget coupled with prioritization of the plan. Coverage of the plan needs to be defined—for example, targeting geographically or demographically. She noted that rather than funding inputs, World Bank funding is based on results. In Africa, for example, there are many performance-based financing projects and it is very important at the facility level that the payments are based on quantitative or qualitative indicators. Once the indicators are achieved, disbursement-linked indicators go into the government's budget. She emphasized that although it can be challenging, it is very important to have measurable indicators that are verified by third parties

The key pillars of NSOAPs can be translated to the investment process by generating demand and awareness, coordinating with other programs to create synergy, and ensuring sustainability. The typical World Bank project lasts five years and it is important that the projects do not dissolve after that point. To that end, the World Bank encourages projects to be funded through government budgets, with the World Bank supplementing those costs through disbursements to the government.

4.2.5 Discussion

John Meara opened the discussion by remarking that he has never been to an NSOAP meeting with so many bilateral/multilateral attendees.

4.2.5.1 Working with subnational governments

Faysal El-Kak asked panelists about the extent to which their organizations support subnational-level governments in formulating and implementing plans. He also asked about mechanisms for guaranteeing sustainability and measuring impact.

Monique Wubbenhorst replied that from USAID's perspective, this depends on the structure of the government. In Kenya, where they have a devolved health system, it is possible to provide funding at a subnational level. However, USAID funding generally goes toward national governments or NGOs because it is more difficult to fund a local government without the MoH being involved.

Kanako Yamashita-Allen said that the World Bank has a health system strengthening project in Sri Lanka that is working both with MoH and local government. This project is using indicator-linked disbursement: when indicators are achieved, some funds go to the MoH, while the majority goes to the local governments that are the primary implementors. In Pakistan, they work at the provincial level and thus direct all the funding there.

Hoonsang Lee responded that from KOICA's perspective, it is critical to work with national governments. Their funding is demand driven, so they typically work with national governments when formulating a project. However, the KOICA experience in Ghana is somewhat different. Ghana has a decentralized health system and the regional health directorate office bears much responsibility and provides strong regional government leadership. In the current project, they made initial arrangements with the national MoH, but the regional director was a strong advocate and led the project.

Maria Cruz De Ciria Mantilla said that Spain typically works with national governments to enable them to guarantee the sustainability of their own plans. The expectation is that for sustainability, governments will transition into funding their own programs as external funding ramps down. She noted that supporting comprehensive health systems at the secondary and tertiary levels is not always on the global agenda, so it can be difficult for countries to include these elements in their plans. She suggested that primary care should be the focus, but secondary and tertiary care should be part of the vision as well.

4.2.5.2 Integrating NSOAPs into UHC

Lauri Romanzi, Project Director, Fistula Care Plus, Engender Health Inc, remarked

that the safe surgery community is learning how to manage and engage global public health; funding is crucial to this effort. She asked the panel to reflect on strategies for embedding NSOAPs into UHC policy

Hoonsang Lee replied that one strategy for embedding NSOAPs into UHC plans is to use WHO's framework for people-centered, integrated care, which can apply to all types and levels of care and referrals; this integrated framework can be introduced into UHC. Discussions around financing and health service should be brought together as part of the NSOAP process, he added. It will be important to engage people working on UHC financing, who will determine what is ultimately included in national health service packages.

Kanako Yamashita-Allen suggested that linking NSOAPs with UHC is about creating a "hook." NSOAP planners need to connect indicators to the UHC goals relating to financial protection in order to integrate NSOAP into UHC. Identifying and highlighting the SOA interventions that are needed to improve financial protection, for example, will make it easier to garner investment for NSOAPs because the intervention becomes linked with UHC as a way to provide access to quality care.

Monique Wubbenhorst replied that USAID prioritizes a country's journey to self-reliance and away from reliance on foreign aid. Part of the process of becoming self-reliant are the system strengthening and capacity-building components of UHC. USAID sees NSOAPs as a framework for understanding how countries can develop health systems and integrate SOA into their health systems at all levels.

In the context of sustainability and human capital, Emile Rwamasirabo said that in Rwanda they try to ensure that health facilities generate enough revenue to pay for the human resources that are needed. This is an innovative strategy that goes beyond performance-based payment to try to ensure that people employed in the hospitals feel that they have a future there. These types of innovative ideas need to be supported and given more structure so they can be implemented in other areas.

Hoonsang Lee commented on the need for strengthening leadership and coordinating capacities. Donors often have different agendas that require the country to coordinate. He noted that a MoH may also have competing divisions within it, but regional-level health governance tends to be smaller and thus have clearer leadership structures.

4.2.5.3 Balancing vertical and horizontal funding

Given the history of siloed funding, Romanzi asked about strategies to achieve greater economies of scale and scope through integrative projects. She noted that this has been seen in the integration of fistula care into maternal health projects. Maria Cruz De Ciria Mantilla replied that from the point of view of a development agency, it is difficult to avoid silos. Her organization wants to support the health system at all levels, but it is difficult because certain important programs must be financed even if they are siloed. They try to balance their funding with system strengthening in mind, however. Yamashita-Allen suggested that disbursement-linked indicators can help de-silo funding by allowing MoHs to work across the entirety of the health system and receive funding based on the outcomes. This can help MoHs to think clearly about their priorities and how a project should replenish the budget.

Wubbenhorst agreed that siloed funding is a struggle. Historically, USAID has worked with vertical programs—primarily tropical diseases—because over time, funding became tied to specific diseases/health categories. This has crystalized into structures, with specific funding schemes going to those silos. For example, there are counterproductive silos between maternal and child health services and OB/GYN surgery. USAID is actively trying to break down these structures because an integrated approach to funding is mandatory in the move toward health system strengthening. Economies of scale are very

important, she added, and looking for ways to integrate surgery into massive programs like the US President's Malaria Initiative (PMI) and the US President's Emergency Plan for AIDS Relief (PEPFAR) could provide a wealth of platforms and opportunities. Siloed funding can work in the short term but cannot be the long-term strategy. One problem with siloed funding is that it cannibalizes the aid budget. Most siloed programs are driven by advocacy for the limited amount of funding and vertical programs tend to grow at 1-3% per year, so the long-term strategy must be integration. USAID wants to empower countries to self-fund their health systems, so as part of the roadmap to self-reliance, they are encouraging programs to focus on integration and map their programs to broader country-specific strategies.

Shiva Murugasampillay, Health System and Disease Control and Elimination Specialist, noted the importance of bringing representatives from governments and NGOs to the table to instill accountability for aid. The performance of aid is poor, with too much money spent to achieve poor results, which is a reason why many aid organizations must work with WHO in the health sector. A balance is needed between vertical and horizontal funding, he suggested. Integrated health systems can become very administrative, which is a barrier to producing results. For example, maternal mortality rates are still huge in Zimbabwe, Kenya, and Namibia, where much money has been spent on reproductive health and family planning. Hoonsang Lee agreed about the need to balance vertical and horizontal approaches or, as Jim Kim has been suggesting, 'diagonal approaches.' Even though silos are a problem, some vertical programs can be effective and deliver results. It is important to consider how vertical programs can benefit horizontal programs. In Ghana, the Global Fund is setting aside a percentage of funding for health system strengthening, for example. System-wide horizontal programs can effectively link together existing vertical programs, he added.

4.2.5.4 Creating demand for NSOAPs

Maria Cruz De Ciria Mantilla noted that much aid is funded by taxpayer money, which demands results. The population may consider certain issues to be priorities, such as malaria, but surgery is rarely on the table. She suggested better advocacy and marketing to establish the demand for surgical services so it can be put on the development agenda.

Emile Rwamasirabo noted that the message at the workshop is very different than the message he hears from representatives of organizations in Rwanda, who do not know about NSOAPs and have a limited understanding of system strengthening that does not include surgery. The evolving understanding of healthcare writ large—and specifically, of surgery as part of UHC—needs to trickle down to these organizations at the local level, so they can advocate for NSOAPs with the MoH.

Murugasampillay maintained that the success of an NSOAP relies on surgeons understanding health systems and on health systems experts understanding surgery, obstetrics and anaesthesia. Syed Shershah, Consultant Obstetrician & Gynecologist, Koohi Goth Hospital, President, Pakistan National Forum on Women's Health, agreed that surgeons need to better understand the health system. Donor agencies will tend to fund the interventions that governments ask for, even if the investment they request is not the best use of that funding. Wubbenhorst reflected on how to manage dyssynchronous expectations between what health care professionals know is needed and what the government thinks is the priority. The reality is that politicians are in office to get re-elected. The extent to which an issue is prioritized is the extent to which politicians can understand that issue and or the extent to which voters are made aware of the issue. Political actors have to be educated and made aware of priorities for health system improvements, so that they can negotiate effectively.

Emmanuel Makasa, Global Surgery Ambassador, remarked that surgery is not a new intervention, but it is a new aspect of global health. In the past, surgical care has been fragmented because of vertical programs, creating a weak surgical system with limited capacity and leading to inefficient use of health care system funds. Surgery is a crosscutting intervention that—albeit challenging—offers the opportunity to close the gap in reaching desired outcomes. Makasa asks the attendees' organizations to give NSOAPs a chance to work through funding systems to move beyond the policy development stage and be implemented, providing an opportunity to demonstrate whether or not NSOAPs can actually deliver results. Regarding Makasa's plea to give NSOAPs a chance, Wubbenhorst added that growth is painful and organizational change is difficult, thus incorporating new ideas about surgery and building national capacity will take time. USAID wants to increase transparency and accountability through open dialogue to discuss these types of issues.

4.2.5.5 Integrating NSOAPs into existing programs

Viet Phuong Nguyen, Regional Vice President for Development and Asia Pacific Country Representative Vietnam, Operation Smile, commented that when designing an NSOAP to integrate with an existing vertical program, it is important to avoid gaps and areas of overlap with existing vertical health programs. Teri Reynolds, Programme Lead, Emergency and Trauma Care, Department for Management of Noncommunicable Diseases, Disability, Violence and Injury Prevention, WHO, remarked that it is actually quite difficult to link vertical and horizontal programs to existing programs. Because people are increasingly trying to shoehorn their work into primary care, given its prominence on the global agenda today, they are trying to assert the importance of their own work and their own impact, but the price of this 'bandwagoning' is intellectual clarity. Operative care delivered in theater is definitionally secondary care—this is important for several reasons. It is clear that surgery is essential for UHC. People have a strong idea of what primary care is, and they are invested in this idea, but there is a cost to aligning everything with primary care. Reynolds recently completed a new essential package of health services for Afghanistan with involvement from USAID and the World Bank. Afghanistan has a defined package of essential services and the funders are interacting with government via that technical document. For the first time, a core set of surgical services were explicitly defined in this document. Defining services through national technical documentation is a powerful mechanism for engaging with funders who already have an existing relationship with countries. Another strategy is to leverage national assessments of country-set priorities to communicate with funders. She asked the group to consider other ways that countries can effectively express their needs to funders and NGOs, for instance, through a structured WHO process or list of essential services.

4.3 WHO RESOURCES FOR EMERGENCY AND TRAUMA CARE IMPLEMENTATION

An overview of WHO resources for emergency and trauma care implementation was provided by Teri Reynolds (WHO), Programme Lead, Emergency and Trauma Care, Department for Management of Noncommunicable Diseases, Disability, Violence and Injury Prevention, WHO. Reynolds explored the concepts of emergency care and acute care to consider whether they include surgery. She explained that the burden of surgery-preventable deaths caused by injury is immense and considered how injury can coalesce advocacy to find funders and underscored the importance of strengthening emergency care.

4.3.1 Global burden of injury-caused mortality

Every 6 seconds someone dies of injury: about one-third of those are due to traffic crashes[62]; 16% due to suicide; 14% due to

62 She noted that WHO avoids the word "accident" because crashes are predictable and preventable.

falls; 10% due to homicide; and 7% due to drowning. The number of injury-caused deaths each year is equivalent to the death toll of the worst plane crash in history occurring every day or if half the population of Bangkok or New York City died every year. She emphasized that the bulk of those deaths could be prevented by surgical care.

Citing large numbers can make it very difficult to appreciate the individuals who are injured and their personal experiences of care. To adopt a more person-centered perspective and better apprehend the magnitude of these deaths, Reynolds framed the discussion using smaller numbers relating to individuals who are considered too young to die. She noted that framing data on injury-related deaths in this way positions surgery as a major part of the solution to childhood health issues.

- Road crash is the #1 cause of death among people aged 5-29 years
- Suicide is the #2 cause of death among people aged 15-29 years
- Homicide is the #3 cause of death among people aged 15-29 years
- Drowning is the #4 cause of death among people aged 5-14 years

Despite representing a large proportion of the overall global burden of disease—almost twice the burden as HIV, tuberculosis, and malaria combined—injury receives a disproportionately small fraction of funding. HIV, tuberculosis, and malaria receive 36% of development assistance for health, while injury receives just 1%. Reynolds reframed the problem by looking at development assistance for health in dollars per disability-adjusted life year (DALY) burden: HIV ($4); malaria ($10); tuberculosis ($25); and maternal and child health ($45).[63] Trauma care receives just $0.04 per DALY burden, which is about 1000 times less than spending on maternal and child health, which does not even address injuries affecting children. Reynolds remarked that relative to a problem of this magnitude, all actions may seem small, but our understanding of the problem and global connections have increased enormously over the past two decades. Millions of lives could be saved by coordinating efforts around known effective actions. Although injury is severely underfunded, progress has been made in creating networking and reporting systems.

4.3.2 Need for low-resource, high-impact interventions

To illustrate how progress can be made without an influx of new resources, she described a low-cost, attention-shifting program at a hospital in Uganda that has had a significant impact on mortality through basic training and simple tools to direct providers' attention. The program is part of the implementation of the WHO basic emergency care course. It is premised on the idea that a person cannot die without experiencing at least one of four conditions: injury, difficulty breathing, shock, or altered mental status. People who seek care at a hospital for one of those conditions will not be aware of whether they have a surgically treatable condition or which program or provider should provide them with care. Front-line providers do not need have to get a diagnosis to respond to the sickest people. The program is based on process guidance, including a trauma care checklist, a triage tool, and guidance on how to organize the resuscitation area. For the latter, no new materials were needed; nurses created emergency corners in each ward and basic cardboard flags were used to indicate the location of the sickest patients. These processes direct attention to where it is most needed, at a cost of only around US$3000. Indicators used to assess the intervention were 24-hour, 48-hour, and in-hospital mortality rates. Mortality from road traffic crash decreased by more than half and—depending on the condition and timeframe—pediatric pneumonia, pediatric diarrhea, and postpartum hemorrhage mortality decreased even more sharply. Reynolds noted that this intervention can be construed in various

63 Flows of Global Health Financing Seattle, USA: Institute of Health Metrics and Evaluation; 2018 [cited 2018 8/12/18]. Available from: https://vizhub.healthdata.org/fgh/.

ways: as a pre-surgery intervention (ie, reducing the time to surgery), as a child health intervention, or as a quality intervention.

4.3.3 Aligning emergency and surgical care with global mandates

Emergency care and surgical care are often associated with SDG 3.6, which calls for road traffic deaths and injuries to be reduced by half by 2030. Given that around 1.25 million deaths per year are caused by road traffic crashes, this goal will not be achieved with prevention alone—quick action to improve injury care is required to reduce those deaths. If severe injury outcomes in LMICs were equivalent to those in high-income countries, then more than 600,000 road traffic injury deaths could be avoided.[64] Huge numbers of lives could potentially be saved every year in LMICs by improvements in trauma care, which indicates that SDG 3.6 could nearly be achieved by simply doing what high-income countries already have the capacity to do. Coordinated post-crash care will also be critical in achieving SDG 3.6. Because a typical MoH is already overburdened with problems, Reynolds suggested framing emergency care and surgery as a means to achieve ten relevant SDG targets (see Box 4-2). This can offer a MoH a solution instead of a problem: by using surgery and emergency care as an intervention to target other health outcomes, they will reap many other benefits for "free."

An everyday emergency care system is the substrate needed for disaster care, Reynolds emphasized. This has driven a new focus on the operating theater and surgery-specific skills, equipment, and policies that are situated within the expanded notion of surgical care. This is reflected in recent WHA Resolutions[65] that focus on the district hospital, which is crucial for delivering surgical services to a population. Reynolds noted that the Resolution's call to "strategize around the early recognition, resuscitation and referral" is not captured in the NSOAP documentation. She suggested that including this component could improve the indicators and the effectiveness of interventions, because surgical interventions need associated support outside the operating room. There will soon be a new mandate regarding emergency and trauma care, she added. Emergency care systems for UHC ensuring timely care for the acutely ill and injured has been proposed[66] as a draft resolution for the Seventy-second WHA in 2019.

64 Mock et al 2012
65 Resolution WHA60.22 Health systems: emergency-care systems (2007); Resolution WHA64.10 Strengthening national health emergency and disaster management capacities and resilience of health systems (2011).
66 Proposed by Argentina, Ecuador, Eswatini, Ethiopia, Israel, the European Union and its Member States and the United States of America).

Box 4-2. Emergency care for ten SDG targets

SDG 3.1 Maternal mortality: treat obstetric emergencies

SDG 3.2 Under-five mortality: treat acute pediatric diarrhea and pneumonia

SDG 3.3 Deaths from malaria and other diseases: treat acute infections and sepsis

SDG 3.4 Reduce premature mortality from NCDs: treat acute exacerbations of NCDs

SDG 3.5 Strengthen treatment of substance abuse: emergency care and harm reduction

SDG 3.6 Halve road traffic deaths and injuries by 2020: post-crash care

SDG 3.8 Achieve UHC: emergency care for timely access to care

SDG 3.9 Deaths and illnesses from hazardous chemicals: treat acute exposures

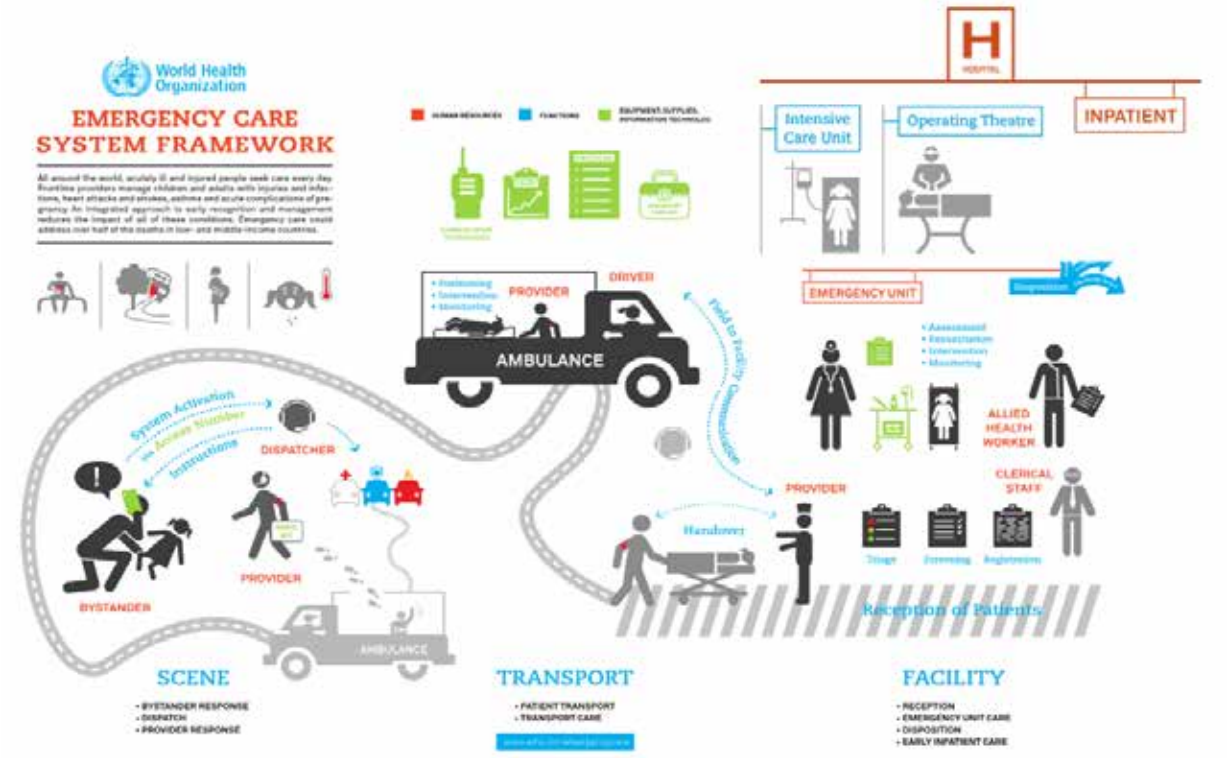
SDG 11.5 Deaths caused by disasters: preparedness and response for resilience

SDG 16.1 Violence-related deaths: treatment for victims of violence

4.3.4 Emergency care system framework

Emergency care is a critical component of UHC; it is about getting people safely from the outside world to a place where they can get care. Reynolds explained that although the effectiveness of surgical care is very high, its effectiveness decreases with delay. In fact, most WHO-recommended interventions become less effective with delay, but this is rarely considered explicitly; this may also apply to NSOAP design, she added. It is imperative to have a strategy in place to minimize the interval between a patient's first presentation of symptoms and the diagnosis. There needs to be a clear pathway for the patient from the initial complaint to the understanding that surgery is needed. She presented Figure 43 to exemplify how the system is experienced in a very different way by people accessing care than by providers delivering care. The steps in the emergency care system have a core architecture of functions that every country has the capacity to achieve within their resources.

Figure 4-3. Emergency care system framework



Source: Reynolds presentation

4.3.5 WHO Emergency and Trauma Care System Assessment

Together with professional societies, WHO can support a MoH in conducting the WHO Emergency and Trauma Care System Assessment to identify gaps and set national priority actions for system development. Identifying gaps that undermine the effectiveness of surgical care can amplify the potential impact of strengthened surgical capacity, because each gap is an opportunity to gain life-saving capacity through surgery.

Reynolds outlined a set of gaps that are often identified by emergency and trauma care system assessments in LMICs. She noted that the assessment looks at the explicit inclusion of surgical care into national health programs, which is not part of many similar assessments. Gaps common at the scene of an incident include lack of bystander protection, lack of universal access number with total country coverage, and lack of system-wide or centrally coordinated dispatch of prehospital providers. In the context of transport, there are often gaps in clinical documentation, equipment regulation, system-wide protocols, and training and certification for ambulance providers. The number of ambulances is often grossly inadequate for the needs of the population. At the point a patient arrives at a facility, there may be no standardized protocols for management of key emergency conditions, lack of protocols for handover to facilities, and substantial gaps in formal triage at all levels. In the domain of facility-based care, most countries report that only 25% of the population would have access to a staffed operating theater within two hours or less. Further gaps include limited care delivery at first-level hospital emergency units and gaps in resuscitation equipment and protocols at first-level facilities.

Thus far, WHO Emergency and Trauma Care System Assessments have been

conducted in around 30 countries. WHO priorities are driven by the high-frequency issues challenges identified in low-income countries (LIC) and LMICs during the assessment process. Based on these shared challenges, five areas have been targeted for priority action (see Table 4-2).

Table 4-2. Areas targeted for priority action to strengthen emergency and trauma care systems

Area targeted	Priority action
Developing prehospital systems	WHO standards and protocols
Establishing standards for data and quality improvement	WHO charts, dataset, and registry
Emergency and surgical care training	WHO/ICRC/IFEM basic emergency care
Formal triage and other protocols	WHO/ICRC triage tools, WHO checklists
Policies to improve access to emergency care	WHO legislative toolkit

ICRC: International Committee of the Red Cross; IFEM; International Federation for Emergency Medicine; WHO: World Health Organization
Source: Reynolds presentation

4.3.6 WHO International Registry for Trauma and Emergency Care

WHO has an open-access International Registry for Trauma and Emergency Care[67] that can be used at the facility level for quality improvement. At the MoH level, it can serve as a platform for epidemiological data collection to underpin advocacy and prevention efforts. The Registry is designed to characterize the system around the facility itself. It creates a common language for aggregation of data, with a standardized clinical form available for settings without the resources to fund ongoing data collection.

The standardized clinical form facilitates systematic care delivery for every injured patient. This improves care by having clinicians approach each patient in a systemized way, while also covering the needed data points. The form also facilitates the sustainable collection of standardized data to guide both quality improvement and system planning. A facility can implement the data registry with just a single data clerk gathering the data from the clinical forms. Capture rates with an extra form tend to be low, but the capture rate is very high when data are included in the clinical form.

4.3.7 Discussion

4.3.7.1 Emergency transportation

Hoonsang Lee asked for recommendations for emergency transportation in resource-limited settings, such as motorbikes. Reynolds explained that WHO formulated the Emergency Care Systems Framework in functional terms. The system has to be activated, which can be done through a computerized, centralized dispatch, through a cell phone protocol, or even through written protocols in a binder. In terms of transport, there are two distinct functions: transfer (ie, moving the patient) and transport care. Transfer can be achieved with a motor bike, but transport care cannot. An entire set of standards is available for countries developing prehospital systems that includes equipment recommendations at the basic and advanced levels

4.3.7.2 Training in emergency care

67 WHO's International Registry for Trauma and Emergency Care is available at www.who.int/emergencycare (accessed June 5, 2019).

Emile Rwamasirabo asked about the ideal strategy for training in emergency care. Teri Reynolds replied that there are several levels of training that are needed. WHO knows how to do the training, but the problem is that it is not being coordinated as an explicit strategy. Community-based first aid is needed, which can be implemented through opportunistic training at schools, mosques, or other congregate settings. Special skills training for non-physicians is also needed. First-level clinical providers need training in basic emergency care so they can identify conditions and presentations that lead to surgical care. This is where recognition, initial resuscitation, and timely referral are achieved, she noted. Specialist nurse training should include nursing leadership and the capacity to disseminate training. Specialized skills for physicians include high-level emergency medicine skills and high-level surgical skills. Non-specialist providers also need to be trained to achieve sufficient capacity as has been the case in anaesthesia. She noted that many general surgeons feel undertrained dealing with trauma, so targeted modules will be needed to upskill general surgeons. She added that surgical officers can be a significant boon to a health system. Rwamasirabo followed up by asking who should be trained to put in a chest tube at the community level. Reynolds said that there is no precedent to train lay people to put in a chest drain, but perhaps advanced nurses could do so. Clinical officers or some other non-surgeons must be trained to put in a chest drain, because it is a non-operating theater procedure that can have dramatic impact.

4.3.7.3 Framing emergency care within the health system

Khama Rogo remarked that the key to emergency care is a continuum of care, rather than older models oriented toward primary, secondary, and tertiary care models. Reynolds pointed out that there are four critical platforms that represent the continuum for addressing injury: emergency, surgical, critical, and rehabilitative. Not every patient will need all four platforms, but it slices the system in terms of mechanisms of care delivery that are needed to address injury. The system needs to have all four of those platforms at each level of the traditional system. Primary/secondary represents levels of the system; whereas this view focuses on mechanisms. Components of all four mechanisms are needed at each level, with strong presence at the secondary level. Reynolds is not invested in the question of whether emergency care is part of primary care. To many people, primary care is exclusively about preventive, longitudinal care—not surgery. However, surgical care is undeniably a part of UHC, which makes it a stronger rhetorical position. The focus should be on the emergency care services at each level of the health system. In Afghanistan, for example, the national health plan explicitly describes which surgical services need to be available at each level of the healthcare system; this is the package that the USAID is utilizing.

5 NSOAP progress in regions and countries

5.1 REGIONAL APPROACH TO NSOAP DEVELOPMENT: THE SADC RESOLUTION

This section summarizes the workshop's presentation on SOA care in the Southern African Development Community (SADC), which comprises 16 member states: Angola, Botswana, Comoros, Democratic Republic of Congo, Eswatini, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Tanzania, Zambia, and Zimbabwe. The SADC vision is to build a region in which there will be a high degree of harmonization and rationalization, to enable the pooling of resources to achieve collective self-reliance in order to improve the living standards of the people of the region. The vision of SADC is one of a common future, a future within a regional community that will ensure economic well-being, improvement of the standards of living and quality of life, freedom and social justice and peace and security for the people of Southern Africa. The SADC Mission Statement is to promote sustainable and equitable economic growth and socio-economic development through efficient, productive systems, deeper co-operation and integration, good governance, and durable peace and security; so that the region emerges as a competitive and effective player in international relations and the world economy.

Shiva Murugasampillay opened by quoting the President of Zimbabwe, Emmerson Mnangagwa: "Zimbabwe is open for business." He explained that the previous president was primarily focused on strengthening education and did not foster a relationship with the World Bank. However, the previous president did chair a meeting of the Organization of African Unity which led to the investment in infectious disease in Africa. The investment in infectious disease started in southern Africa, he said, so the investment into SOA can start in southern Africa as well.

Emmanuel Makasa explained that the SADC did not want Resolution WHA 68.15 to sit on the shelf—they wanted it to catalyze action. This global agenda was brought to the SADC meeting of health ministers in late 2018, leading to decisions for action that would re-affirm the countries' commitments to resolution WHA68.15. Box 5-1 provides an overview of the specific actions to be taken. The idea of a regional approach was attractive because it is difficult to move the agenda forward on a country-by-country basis. The region has a type of 'peer review' mechanism such that once one country takes action, the other countries in the region tend to come on board. Interest in a regional effort was already percolating because two countries in the region, Tanzania and Zambia, had already begun the NSOAP process.

Box 5-1. SADC Health Ministers SOA Decision for Action

- Advocate and prioritize scaling up of SOA as part of implementation of the SADC Health Protocol.
- Mobilize domestic funds and realign existing resources while seeking new resources for scaling up sustainable universal access to and coverage for SOA services for all.
- Put in place NSOAPs that are well integrated into their respective health sector strategic plans by end of 2019.
- Strengthen district surgical services through national and regional outreach and training programs of general medical doctors and other health professionals.
- Improve on SOA health informatics as part of broader health management information systems including telemedicine with a special focus on reducing maternal mortality.
- Establish a SADC Task Force and Expert Working Group to support and spearhead the attainment of commitments to the Resolution WHA 68.15 in line with the work of the SADC Committee on Human Resources for Health and report progress in 2019.

5.1.1 Timeline of regional SOA planning for SADC

Makasa outlined the history of the regional SOAP development process for SADC. He explained that they created a SADC SOA focal point network to move the process forward. These technical representatives were identified by MOHs as representatives of SOA overall or, in some cases, representatives specifically from surgery, obstetrics or anaesthesia. These focal points represent the interests of surgery, obstetrics, and/or anaesthesia in each country during the process of developing the regional SOAP. Once consensus was reached among the network of focal points, they presented the plan to a high-level meeting of permanent secretaries of Southern Africa and to the southern Africa ministers conference. It was at this point that the SOA Decision for Action was reached, detailing the strategy for establishing NSOAPs throughout the region (see Box 5-1). Fortunately, ministers have taken the view that the NSOAP process is the first step towards attaining the SDGs. The Decision for Action advocates for scaling up SOA as part of SADC health protocol, mobilizing domestic funding and realigning existing resources that may be overlapping (eg, maternal and child health or male circumcision) while also seeking new external resources. Mentorship and support will be needed to strengthen district surgical services. They plan to improve NSOAP health and medical information systems by using telemedicine to focus on reducing maternal mortality and by gathering data at all levels to improve service quality. A task force led by Namibia's MoH will champion these efforts, but they are also seeking outside advisors to help guide the process. The aim is to establish NSOAPs in the region before the end of 2019. Makasa emphasized that SADC representatives attended the present workshop not just to share and participate in the talks, but to call on the other attendees to join SADC's efforts.

The next step is to present the NSOAP resolution at the next meeting of the SADC health ministers in November 2019. The outgoing chair (South Africa), incoming chair (Namibia), and next chair (Tanzania) provided strong leadership in proposing the resolution at the SADC meeting; these three countries are aligned on the importance of surgical capacity building. He noted that once an issue is proposed on the SADC agenda, technocrats have to craft a document and consensus must be reached. The phases

of the strategic NSOAP planning process for SADC are detailed in Appendix 7.

5.1.2 SADC Health Protocol

Shiva Murugasampillay explained that the goal of SADC regional NSOAP planners is to support SADC collective efforts, regional integration, and all Member States scaling up to equitable access and coverage to quality and safe SOA services in supporting Primary Health Care and Strengthening Health Systems towards Universal Health Coverage (UHC) and Health for All in line with SDG2030 and Africa agenda 2063.

The SADC Health Protocol has five strategic objectives; Murugasampillay pinned a deliverable SOA-related outcome to each of the objectives. The first objective is to support SADC senior officials and ministers to prioritize SOA at the country and regional level within SADC health protocol. The deliverable outcome for the SADC SOA resolution is an annotated agenda. The second objective is to agree on terms of reference for the SADC SOA taskforce and network of country focal points, with a deliverable outcome of agreed upon terms of reference and a database of SOA focal points. The third objective is to orient SADC SOA country focal points on NSOAP development as part of national health sector plans, with the deliverable outcome of NSOAP development planning and tracking. The fourth objective is to develop a SADC- SOA regional strategy strategic plan concept note (ie, the deliverable) for supporting regional SOA annual operational plan and proposal development and resource mobilization. The fifth objective is to develop annual SOA country profiles and SOA annual reporting tools and consensus on strategic SOA research agenda; the deliverable outcomes are a template for country profile and annual reporting as well as defined research priorities. To achieve these objectives, all SADC countries representatives (focal points) have been asked to prepare a presentation for the next meeting in late 2019 on their respective countries' current SOA disease burden and trends, service delivery, access, equity, coverage, safety, and quality, as well as progress, gaps, challenges, and proposed next steps.

5.1.3 Progress, challenges, and next steps in the SADC region

Murugasampillay reported on progress made, challenges faced, and next steps in Namibia, Zimbabwe, ad Malawi. There has been powerful support for the regional SOAP cause amongst professional organizations, policymakers, NGOs, regional partners, and other engaged stakeholders. In fact, it was professional organizations that moved first, with MoHs following their lead. However, challenges remain to be addressed. SOA has not yet been adequately institutionalized within health ministries—for example, there are no dedicated SOA units or departments. SOA professionals tend to be very busy clinicians that have limited time to become trained in population and public health methods. International partners tend to focus more on training, research, and publications than on service delivery. Global surgery and global health more broadly are dependent upon multiple fragmented individual initiatives, which does not contribute to sustained population level outcomes and impact. WHO country offices and WHO regional offices can only provide limited technical support and catalytic financing support for SOA initiatives, because their efforts are spread thinly over many domains. SOA activities are also dependent upon professional volunteers who are subject to burn out. Finally, seed or catalytic funding is not yet available for these efforts.

Murugasampillay provided an overview of next steps to take place in 2019. Namibia, Zimbabwe, and Malawi are expected to complete their NSOAPs during 2019; Botswana and Madagascar have started the process. A regional SOAP needs to be developed next. The SADC meeting resulted in a concept note and the development of a Wits University hub collaboration. A focal points and partners' meeting will take place in July 2019 and the SADC SOA strategic

and investment plan and proposal will be presented at the SADC health ministers' meeting in November 2019. Namibia, as the chair of SADC, wrote to partners such as the World Bank and the European Investment Bank and the replies have been positive so far. Potential partners, such as the banks, are aware that it is very difficult to move NSOAPs forward on a country-by-country basis and have suggested that the regional platform be created.

5.1.4 Discussion

Benetus Nangombe commented that SADC is committed to advancing NSOAPs as part of the larger goal of UHC. Emmanuel Makasa said that SADC is moving towards a template for each country to use for data collection, so that all the countries are generating useful comparable data. The WHO calls for biannual reporting and SADC wants to approach this reporting from the regional level, so that each country has comparable data. The template developed should also capture data that will be useful for the World Development indicators data.

Makasa was asked to elaborate on the communications between SADC, the World Bank, and the EU. He explained that Namibia made requests for development partners and received positive but conditional responses from banks, who wanted to work on a country level. However, SADC is working on a regional level for very specific reasons that will need to be communicated clearly to potential partners moving forward. He noted that the European Investment Bank has been advocating for investment in surgery, so SADC has chosen them as a partner. Follow up will be needed to secure the partnerships, but they have at least two willing partners.

Lauri Romanzi asked if the SADC process is interacting or collaborating with the East, Central, and Southern Africa (ECSA) health community. Murugasampillay replied that after the SADC resolution, the plan was presented at a meeting of the ECSA, which is the biggest, strongest health workforce platform in Africa.

Khama Rogo remarked that the World Bank response was a polite one, but most of its major funding comes through bilateral arrangements in countries with a bilateral health program focusing on UHC. If NSOAPs are framed as part of the UHC package, the key determinants of World Bank's willingness to contribute are the extent to which these countries are going to use the World Bank loan to cover surgery and the extent to which they see regional coordination as being important. For instance, SADC is currently involved with a new World Bank project in Eswatini; if it is documented that part of their NSOAP technical support will come from SADC, then that can be part of the expenditure. Alex Peters followed up on Rogo's comment that it is up to countries to spend World Bank funding on surgical strengthening. Since surgical strengthening is an essential part of UHC, he asked about the extent to which World Bank will hold countries accountable for spending some portion of their funds on surgery.

Rogo clarified that ECSA comprises all the former British commonwealth countries plus Mozambique, Rwanda, and Burundi and, on the health side, Ethiopia, South Sudan, and (soon) Somalia. SADC is made up of two economic blocs: the East African community (Kenya, Uganda, Tanzania, Rwanda, Burundi, and South Sudan) and the Southern African community. Tanzania is in both ECSA and SADC. EGAD is Ethiopia, Somalia and (soon) Djibouti. In terms of health activities under ECSA, they are on board, but in terms of WHO designation, Somalia and Djibouti are a part of the Middle East Region—this can create confusion.

5.2 MILESTONES IN NSOAP DEVELOPMENT AND IMPLEMENTATION IN AFRICA

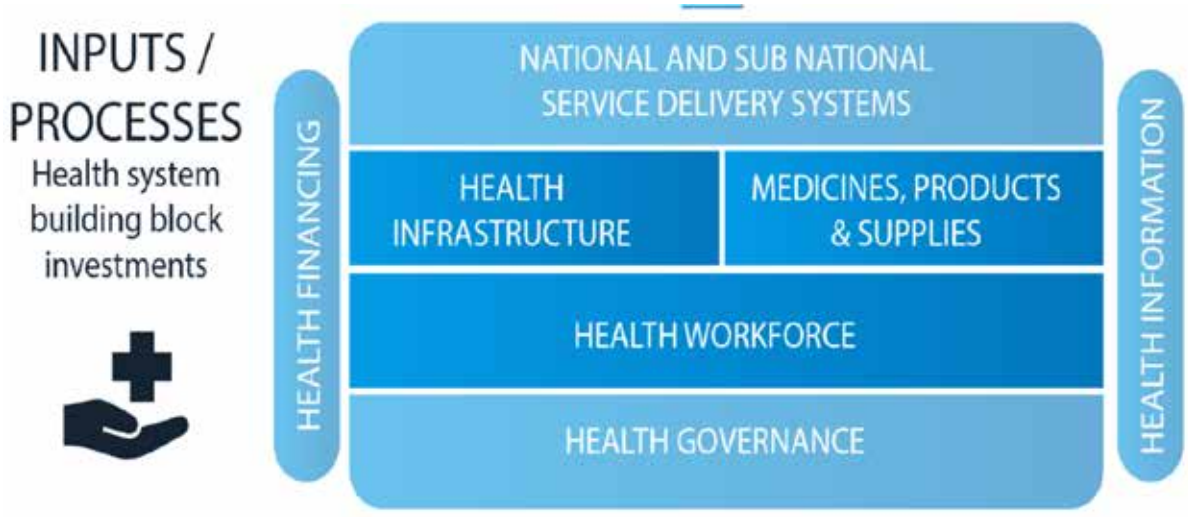
Moderator Shiva Murugasampillay, Public Health Physician and Health System, Disease Control, and Elimination Specialist, opened the panel by underscoring the need to activate

progress in global SOA planning, because WHO is not moving fast enough. Maternal mortality remains unacceptably high, for example. He urged the group to turn the tide in research and delivery of surgical services at the national, regional, and global levels. He provided an overview of regional structures that can support SOA planning in Africa. Africa's Regional Economic Communities (REC) include eight sub-regional bodies that are the building blocks of the African Economic Community, which was established by the 1991 Abuja Treaty to provide the overarching framework for continental economic integration. These eight RECs are:

- Arab Maghreb Union (UMA)
- Common Market for Eastern and Southern Africa (COMESA)
- Community of Sahel-Saharan States (CEN-SAD)
- East African Community (EAC)
- Economic Community of Central African States (ECCAS)
- Economic Community of West African States (ECOWAS)
- Intergovernmental Authority on Development (IGAD)
- Southern African Development Community (SADC)

He explained that the WHO Building Blocks of National Health Systems Strengthening can provide a theoretical framework for NSOAPs (see Figure 5-1). Key strategies moving forward will be to foster professional and political commitment for NSOAPs, to implement effective policy, and to mobilize human resources.

Figure 5-1. Building blocks of national health systems strengthening



Source: Murugasampillay presentation

5.2.1 Building blocks of NSOAPs

Murugasampillay provided an overview of the specific structural building blocks of NSOAPs related to public health systems and programs. The national SOA program structure should include SOA focal points at the national, provincial, and district levels.

Professional leadership, management and governance for SOA planning should comprise a national surgical task force, expert committees, working groups, and collaborative partnerships that convene on a regular basis. To ensure that SOA service delivery is people-centered, core essential and

emergency SOA services need to be defined at the levels of the community, primary care, and district, provincial, and central hospitals. Surgical patient records and registers should include definitions and classifications, indicators, surveillance, information, reporting, and monitoring and evaluation; assessment of the surgical country profile and annual surgical reporting should also be in place. National SOA advocacy can be used to mobilize and establish accountability among professionals, policymakers, politicians, and the community. National SOA policy and regulations may include a constitution, public health acts, and regulation on standards of service delivery and professional practice. To support SOA health planning, a unified strategy should be developed that is supported by strategic national SOA five-year plans and annual national SOA operational plans. Considerations in SOA financing include costing, budgeting, proposals, and resource mobilization (both domestic and international). The SOA health infrastructure will require operating theatres, wards, and A&E units. The SOA health workforce should be supported by appropriate training, accreditation, and continuing education, as well as efforts to promote motivation and retention. Requisite SOA surgical and medical technology and commodities include an essential list of SOA equipment, drugs, supplies specifications, estimates, financing, procurement, and stock control. SOA transport and logistics requirements include ambulances and vehicles for mobile outreach, computers, and telemedicine.

5.2.2 Namibia

An overview of Namibia's NSOAP process was provided by Benetus Nangombe, Executive Director of the Ministry of Health and Social Services of the country. The unmet surgical need is great across Africa, with most countries failing to attain the MDGs. He maintained that NSOAPs have great potential to help countries in Africa to attain the SDGs by 2030, buoyed by the momentum gathering for Resolution WHA68.15. Namibia is the current chair of the Southern African Development Community (SADC). At meeting of SADC health ministers in late 2018, SOA Clinicians presented an NSOAP resolution which was adopted by SADC and a SADC regional SOA task force was formed. The goal is to have all SADC Nations develop NSOAP documents by the end of 2019. Progress is already being made across Africa in the NSOAP process. NSOAP documents have already been produced in Zambia, Tanzania, Ethiopia, Rwanda, and Senegal; Malawi, Namibia, and South Africa are in the pipeline.

Nangombe explained that Namibia is a vast country with a scattered population of 2.4 million. As a result, the health system is heavily dependent on referral systems for emergency care. Patients are often referred to the two main hospitals in Windhoek from as far as 800-900 km away. They have developed a national medical outreach service through which physicians, specialists, and international volunteers are distributed around the country to deliver care. It was through this service that the unmet surgical need in Namibia was identified.

After attending the 2018 NSOAP meeting in Dubai, the representatives from Namibia engaged with the MoH to develop an NSOAP taskforce and working groups to push the NSOAP program forward. The first step, situational analysis, was conducted in 2018 using the WHO Situation Analysis Tool to assess the state of safe surgery and anaesthesia service delivery in the country. A number of health facilities were involved, including 4 intermediate hospitals and 27 district hospitals (comprising 3 mission hospitals and 28 public hospitals). The results were shocking, he said. The LCoGS target for SOA provider density is between 20-40/100,000 population, but the density in Namibia is just 1.61/100,000. There are no nurses or clinical officers providing anaesthesia and no clinical officers, paramedics, or midwives providing surgery (including obstetrics). He suggested that developing those currently nonexistent cadres in Namibia is a potential avenue to be

explored for task shifting and task sharing. Most facilities are capable of providing the Bellwether procedures (C-section: 77%; laparotomy: 52%; treatment of open fractures: 35%); however, lack of human resources is causing the lag in the latter two procedures. About 84% of facilities are providing ketamine intravenous anaesthesia, 77% can provide resuscitation with advanced life support measures, 74% can provide chest tube insertion, and 74% can provide spinal anaesthesia (likely related to C-sections).

Namibia is currently at phase 3 of the NSOAP process, working on broader stakeholder analysis and engagement. Stakeholders were invited to participate in situational analysis. At a stakeholder meeting in early 2019, situational analysis results were shared and working groups were formed to develop terms of reference and the NSOAP document. Both the country's five-year health sector strategic plan and the UHC document are being reworked to integrate NSOAP. The Ministerial Management Development Forum passed an NSOAP resolution in February 2019 that situates NSOAP as an overall component of health planning going forward and urges NSOAP task force to accelerate the development of the NSOAP for formal adoption. Next steps include the formation of working groups to start the drafting process based on the terms of reference and guidance from the present workshop. This will involve engaging private SOA providers and other partners to develop an NSOAP implementation plan, with the target for implementation of January 2020. The document will be part and parcel of the national agenda and the MoH budget will be apportioned to NSOAP activities. However, given the current national economic challenges and outlook, it may be necessary to outsource funding for initial phases of implementation. He noted that the World Bank is currently conducting a health expenditure review for Namibia.

5.2.3 Rwanda

Emile Rwamasirabo, Chief Consultant Urological Surgeon, King Faisal Hospital/ OSHEN, Kigali, Rwanda, provided an overview of NSOAP progress in his country. He represents Rwanda in COSECSA and works to promote NSOAP development in Rwanda and the region. Rwanda officially launched its NSOAP in 2018 at the COSECSA meeting with a plan that extends through 2024. He noted that by the time of the official launch, strategic planning and validation had already been completed and implementation had already begun. The MoH has been involved since the outset and the NSOAP is part of the government's national health plan. Methodology support has been provided by the Harvard Medical School PGSSC program; he strongly recommended that any country starting the NSOAP process utilize this support.

Rwanda's NSOAP has indicators addressing all of the domains and the indicators have been integrated into the national health indicators. Indicators are reported quarterly to enable accurate and timely monitoring. The Rwanda Surgical Society has partnered with the MoH and has signed a MoU to support the implementation of the NSOAP by continuing to train non-surgeon physicians to perform certain procedures at district hospitals. They will also help district hospitals set up surgical and emergency services and advise hospitals on practical issues, such as safety, sterilization, and task shifting (eg, the deployment of nurses to surgery).

Rwamasirabo outlined a set of potential challenges and considerations. Rwanda has thus far used domestic resources to support the NSOAPs, but mobilization of outside resources will be needed to rapidly upgrade infrastructure, purchase equipment, and train providers. They are conducting a survey to assess the availability of consumables for dealing with trauma care, which accounts for 60% of patients in surgical beds. He noted that the issue of consumables needs to be addressed at a global level and that lower-cost, higher-quality implants are urgently needed. Social protection and insurance for the poorest people are not adequate in many countries. Although Rwanda has a system to address coverage for the poorest people, increased coverage has led to increased volume that puts more pressure on the system. Social protection also needs to be addressed on regional and global levels. The competition for external resources is significant, he noted. Rwanda has been able to mobilize internal resources to some extent, but they face competition from other programs for external resources. Further, when the MoH convenes meetings with partners and programs involved in health care, few people or organizations are even aware of NSOAPs. More efforts are needed to promote greater global awareness and visibility for NSOAPs in order to galvanize support.

5.2.4 Zambia

Emmanuel Makasa, global surgery ambassador, provided an update on Zambia's NSOAP process. The process began in 2010 after an assessment of maternal mortality rates demonstrated that targets were not being reached and that the biggest obstacle was a condition related to childbirth that requires surgical intervention. A subsequent comprehensive assessment of every surgical facility in Zambia revealed gaps in every domain of assessment. It was clear that these gaps in surgical care were affecting health delivery outcomes throughout the country, but at the time, there was no existing solution nationally, regionally, or globally. In 2012, Makasa worked with the UN on the negotiations that led to Resolution WHA68.15 and with this global commitment, Zambia set out to implement its NSOAP. They worked with various regional actors (eg, the Pan African Association of Surgeons, the ECSA health community, and CDC Africa) and obtained strong buy in from high-level decision makers. Zambia's NSOAP planners built upon the LCoGS framework by adding the domain of governance, and Zambia's NSOAP was launched at the WHA

in 2017. In 2019 they will be conducting a midterm review of the Zambian NSOAP.

Makasa described some of the challenges faced in developing Zambia's NSOAP. They were the first country to embark on the NSOAP process and did not have the experience of other countries to learn from, he noted. The development process itself requires resources for administrative costs, event organization, and allowances for the stakeholders to convene. The MoH helped cover much of these costs for Zambia's NSOAP process. Patients are an important stakeholder group that were not brought to the table in Zambia's planning process; he suggested that other countries should ensure that they are included. In terms of the timeline for Zambian NSOAP implementation, they wanted the NSOAP to be synchronized with other national plans. The plan spans from 2017-2021, with the option to extend it, but the implementation has been challenging because they did not prepare an operational plan. He recommended the use of pilot programs to gather evidence that the interventions proposed in the NSOAP will actually deliver the desired outcomes. In terms of dissemination, the NSOAP document has been widely distributed, but it has not necessarily been read by enough stakeholders, including healthcare providers and partners. He noted that NSOAPs are often a top-down effort, but engaging partners in the process is critical. The plan also needs to be disseminated to the population so that people know about the commitments Zambia has made and they can hold politicians accountable. Many infrastructural needs remain, but equipment and instrument costs are very high. More training is needed to ensure a safe and skilled surgical workforce to ensure the quality and safety of each surgical procedure. The structure of the medical system (ie, district and provincial hospitals) has been regulated by the government, but surgeons need to be allowed to deliver care in district hospitals.

Financing Zambia's NSOAP has been a significant challenge, said Makasa, as it has been difficult to mobilize internal and external resources. The NSOAP was integrated into the national health sector strategy so that it could benefit from local resources, which has been somewhat successful in directing some funds toward surgical care. A recent law established a national health insurance authority, in the hope that health insurance will help alleviate the cost burden on patients. Further public-private partnerships are needed to ensure a supply of pharmaceuticals and obtain equipment leases. For instance, a model used in Kenya involves the government delegating the task of equipping theaters to the biomedical industry. The government pays the industry for time in use and the biomedical industry covers the maintenance, service and equipment training. He suggested that external funding should be channeled through neutral, accountable third parties, such as WHO or non-state actors such as academic institutions and NGOs.

5.3 DISCUSSION

Shiva Murugasampillay observed that information systems, education, and communication are building blocks of NSOAP programs. He also highlighted key issues of patient engagement, building public awareness, and the value of regional support and remarked that all three panelists emphasized the importance of integrating NSOAPs into national health sector strategic plans and the need to sensitize partners and governments to the NSOAP effort.

5.3.1 Opportunities for regional coordination

Inaam Haq, Program Leader for Human Development, Africa Region, World Bank, said that the regional structures and blocks created in Africa have been used to strengthen the NSOAP planning process, particularly in the realm of human resource development, because there is not enough academic capacity to train surgical care delivery workers. African countries also work on a regional level to finance human resource development and to carry out regional disease surveillance.

Emile Rwamasirabo commented on regional development of SOA human resources. The ECSA health community has developed a framework for supporting health education that includes COSECSA, and trains surgeons for the region. Some countries, such as Zambia, have also instituted their own colleges to build SOA training capacity. Absorption of SOA trainees is an issue with respect to human resources development, said Makasa. Despite great efforts to train locally and regionally, much more work is needed with respect to how those people will be absorbed into the system. Government constraints limit the number of new hires and systems cannot employ all of these newly trained specialists at once. During the NSOAP planning process, local and regional training needs must be balanced with consideration of how many people can actually be hired.

5.3.2 Avoiding duplication and overlap

Khama Rogo, Lead Health Sector Specialist and Programme Head, Health In Africa Initiative, World Bank Group, remarked that domains of NSOAPs are really the building blocks of all health systems. Programs are being developed in cities around the world using similar frameworks for tuberculosis, malaria, and so forth, but these efforts are not coordinated. He suggested identifying areas of overlap of these various efforts and programs. For instance, an operating theater that can deliver a baby through C-section should be able to do all the Bellwether procedures. Surgery is a component of other disease programs such as HIV/AIDS and male circumcision; although the programs include surgical equipment and instruments, they typically do not pinpoint surgeons. NSOAP efforts are not starting from scratch; these capacities are already being developed through existing disease programs and interventions that should be coordinated to achieve incremental progress.

Overlap and duplication was an issue for Zambia during the finance and resource mobilization process, said Makasa. They knew that surgery capacity and investment programs already existed and they were aware that the resources to be devoted to surgery would not all be new. They considered where there was already money going into surgery, such as maternal and child health, but it is important to assess how much of that money was actually addressing surgical needs.

To avoid duplication, Rwamasirabo suggested exploring synergies with maternal and child health, given the large unmet need for surgical care and safe anaesthesia among children in rural areas particularly. Male circumcision is a component of the Bellwether procedures but there are more critical areas that are not currently being addressed by any other programs or partners, such as trauma. Trauma represents the bulk of unmet surgical needs and there is no overlap with other programs dealing with trauma. More data are needed to establish the cost of *not* managing trauma. Between 60% and 70% of surgical beds are filled with trauma patients waiting for referrals, which needs to be addressed by national surgical planning.

In the context of duplication of capacities and NSOAP overlap with other programs, Ben Nangombe replied that costing programs should take into account the budgets of other programs. Namibia's situational assessment involved health facilities to understand the capacity already available, with the view to equipping facilities as needed up to the capacity required for the Bellwether procedures. Decisions must be based on sufficient evidence and reliable data. This process requires sufficient data and decisions must be based on reliable evidence. Avoiding the duplication of efforts is a valuable lesson for countries setting out on the NSOAP process.

5.3.3 Return on investment

To quantify the return on investment for surgery, Lauri Romanzi asked Rwamasirabo to unpack the Rwandan financial indicators and health management information system and to describe how they are used in annual

budgeting processes. Rwamasirabo replied that health and medical information systems need to be developed to better assess NSOAP outcomes and to ensure that district hospitals are reporting accurately. The organization of surgical services and record keeping is a fundamental of NSOAP implementation. Makasa agreed that accounting for the return on investment is an important consideration that should be part of operational planning from the outset, so that costs and outcomes can be measured from the beginning.

5.3.4 Galvanizing public support for NSOAPs

Adrian Gelb, Secretary, World Federation of Societies of Anaesthesiologists, remarked that safe SOA care is not just about the skills of specific healthcare specialists; it is about trust in the safety provided by the system. He asked about strategies to reach out to the public and garner the same public attention that HIV/AIDS receives, for example. Makasa urged the global surgery community to ramp up its public engagement by leveraging the media and learning how to advocate more effectively. He suggested seeking support from NGOs and channeling NSOAP communications through existing outreach arms, such as health promotion, that the MoH may already have in place.

5.4 ADAPTING THE NSOAP FRAMEWORK TO THE LOCAL CONTEXT: EXPERIENCE IN PAKISTAN

Pakistan's national vision for surgical care was presented by Lubna Samad, Pediatric Surgeon, Indus Hospital, Karachi, Pakistan and Lecturer, Harvard Medical School Center for Global Health Delivery-Dubai. She explained that Pakistan's vision for surgical care is being implemented through a joint effort by Indus Health Network and Harvard Medical School's PGSSC.

5.4.1 Surgical care delivery: the Indus experience

Samad became involved in the NSOAP movement when she was a pediatric surgeon at the Indus hospital in Karachi; she had experience in the government sector and was aware of the issues of delivering surgical care in the developing world. Once they began delivering care outside the facility through clinics and interventions, they realized that facilities are just the tip of the iceberg. For example, the Indus Early Infant Safe Circumcision Program—a health-worker-led program providing safe circumcision to male babies within 90 days of birth—demonstrated that there were no government policies to facilitate task sharing. Community-based midwifes were already providing obstetric care in communities; because male circumcision is far safer and more controlled than child delivery, they decided that the midwives would be able to carry out components of the circumcision program. However, they continued to face questions about task shifting throughout the process. Pehla Qada is a program that has expanded throughout the country to deliver four-year programmatic treatment of clubfoot using the Ponseti method. They realized that they could delegate components of care to different people. She emphasized that task sharing is not the complete handover of care, but the delegation to the appropriate persons of sub-tasks such as enrolment and follow-up.

These experiences set the stage for working toward the NSOAP process, said Samad. The Indus Health Network began to expand across Pakistan to 12 district and tertiary facilities, plus regional blood centers, tuberculosis and malaria centers, and the network of primary health care centers. Indus Health Network is free of cost, privately owned, and acts as a supplement to the government health sector. Although it was assumed that financing would be the limiting factor, human resources have actually proven to be the greatest barrier. Overall, the health infrastructure is very poor and they are working on models to develop both facility-level and national-level surgical infrastructure.

5.4.2 State of health care in Pakistan

Pakistan has a population of more than 200 million people and significant income disparity (GINI index[68] of 30.7). The maternal mortality is high (178/100,000 live births) and it has several population groups at risk of surgical inequity, the highest being the rural population group (64% of the total population). Almost half of the urban population lives in unplanned slums and about one-third of the total population lives in poverty.[69] Increasingly, the marginalized population is coming to the health system to seek care and health systems are now experiencing double the planned burden of care.

Compared to African nations engaged in the NSOAP process, Pakistan faces unique challenges (see Table 5-1). Pakistan has a much larger population and greater physician density. Although the specialist surgical workforce density is below the 20/100,000 population LCoGS target, it is significantly higher than other NSOAP countries. Crucially, Pakistan has a decentralized health system.

To initiate the NSOAP process, they had to approach the federal government as well as four provincial governments—essentially, five times the negotiating power was required. External health expenditure per capita and donor funding are lower than in the other countries, while out-of-pocket expenditure per capita is very high. As many as 70% of Pakistanis seek care in the private sector, which impacts patients' finances because the private sector is not well regulated. Turning to health system infrastructure and service delivery, Samad explained that the public sector is well-planned to have country wide coverage, but the implementation has been so inefficient that they cannot provide basic essential surgery at the district level. Secondary-level care is very suboptimal, although the tertiary centers are relatively more functional. The private sector of care is well developed, but unregulated. Almost three-quarters of the population is dependent on private sector providers, but the private sector is concentrated almost exclusively in urban areas. The population is at high risk of both catastrophic and impoverishing health expenditures.

Table 5-1. Comparison of Pakistan to other NSOAP countries

	Zambia	Tanzania	Ethiopia	Rwanda	Pakistan
Population (million)	16	55	105	12	207
Physician density (per 100,000)	9	2	2	6	98
Specialist surgical workforce (per 100,000)	1.48	0.46	0.54	0.75	5.53
Health system	Centralized	Centralized	Centralized	Centralized	Devolved
External health expenditure per capita (USD)	16.8	11.7	3.7	25.02	1.425
OOP health expenditure per capita (USD)	19.6	8.3	9.2	14.7	25.3

68 The GINI index measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. A GINI index of 0 represents perfect equality, while an index of 100 implies perfect inequality.

69 Sources: World Bank Data (https://data.worldbank.org/indicator); "Provisional Summary Results of 6th Population and Housing Census – 2017". Pakistan Bureau of Statistics.

Source: Samad presentation; World Bank data

5.4.3 Surgical care deficit in Pakistan

The surgical care deficit in Pakistan is estimated at between 10 million and 17 million each year, reported Samad.[70] In fact, mortality rate due to acute surgical illness is 187/100,000 population, which far exceeds the mortality rate of 164/100,000 for all infectious diseases combined, including tuberculosis, malaria, and acute respiratory illness. This critical information makes the case for strengthening surgical capacity, but this message has not been clearly communicated to policy makers and the public at large. "There is no global fund for surgery," she said. "A mechanism to finance surgical care is the need of the day."

Pakistan has a very high rate of under-five mortality due to congenital anomalies (77.2/100,000) and in older children aged 5-14 years, 15% of mortality is related to injury or accident. Pediatric surgeon density is far below benchmark—at just 0.4 pediatric surgeons per million population—and anesthetists and perioperative care personnel are not currently able address the needs of children. Very little population-based data has been collected on the surgical burden among children, she added. The Global Initiative for Children's Surgery[71] has specifically stressed the need for better communications around children's surgery, because the entire spectrum of surgeons providing care to children is underreported and underrepresented. As they represent such a large proportion of the population and receive a large percentage of surgical care, children warrant much more attention than they currently receive.

5.5 PAKISTAN'S NATIONAL VISION FOR SURGICAL CARE 2025

Samad explained that Pakistan's National Health Vision 2025 is a unified effort to improve health care with provincial autonomy. Its vision statement is to improve the health of all Pakistanis, particularly women and children, through universal access to affordable quality essential health services, and delivered through a resilient and responsive health system, ready to attain Sustainable Development Goals and fulfill its other global health responsibilities. However, the Pakistani National Health Vision does not mention the words 'surgery' or 'surgical care.' Although it includes NCDs and infectious diseases as the two main disease categories, it does not account for the fact that both types of disease often require surgical care, nor does it account for the surgical burden.

The Indus Health Network was the catalyst for moving forward with Pakistan's National Vision for Surgical Care 2025 (NVSC). Samad noted that they use the term provincial SOA plan (PSOAP) instead of 'NSOAP' because of the devolved healthcare structure in Pakistan, which requires that the SOA plan can only be implemented at the provincial level. The federal government cannot dictate a plan, costing, or implementation; it can only push provincial governments to achieve consensus, so that the federal ministry can report on its international commitment to global stakeholders. She noted that WHO has been very important in creating this commitment from Pakistan. Indus created an at-a-glance document to present to ministries and stakeholders, wherein they define the strategic approach of stakeholder engagement in situational analysis, consensus on roadmap, and provincial plans and implementation. The plans will work within six established frameworks: infrastructure, service delivery, workforce, information management, finance, and governance.

The process started with sensitization, said Samad. At the 2016 WHA, Samad invited the Pakistani delegation to a G4 alliance advocacy meeting. Two years later, a delegate

70 Meara et al 2015; Zafar and McQueen 2011
71 www.globalchildrenssurgery.org/

told her that they were convinced at that meeting of the importance of SOA planning, which illustrates the importance of broad advocacy and engagement. The discussion got underway in earnest at the NSOAP meeting in Dubai in 2018. It was clear that the solution in African countries could not be generalized for the entire world and that a solution would need to be tailored for Pakistan. At the 2018 WHA they held a meeting to gather international support that led to a letter of understanding signed by the Ministry of National Health Regulation, Services, and Coordination (MONHRSC). In November 2018 they held a stakeholder's conference that brought together federal and provincial stakeholders, academia and professional societies, international experts and multilateral stakeholders, and public and private surgical care providers. In January 2019, the consensus statement was signed and the NVSC document was drafted the next month, with the MONHRSC committing to recognize the gap in the National Health Vision and to accept the NVSC as an addendum to it. This requires gaining a commitment on the draft from each province, a process that had recently begun and is already yielding positive responses from the provinces that are being integrated into the document. The final document is scheduled to be ready for the WHA in 2019. This process has taken a year, and the result is commitment and consensus; there is not yet a plan for implementation, which will involve working with each province to develop their individual PSOAPs.

5.5.1 Challenges in surgical care delivery in Pakistan

Pakistan's NVSC is unique in many ways, said Samad. It is the world's largest NSOAP, the first Asian NSOAP, the first to involve a decentralized process, the first to focus on children, and the first to focus on neurotrauma. Although the challenges facing surgical care delivery in Pakistan are similar to the challenges in other countries, the solutions will have to be unique to Pakistan. She outlined sets of challenges related to workforce, infrastructure, service delivery information management, governance, and finance.

Pakistan has a critical shortage of health providers; nursing is being emphasized as part of the solution. The country has a large number of graduates—there are 12 medical colleges in Karachi alone—but there is significant gender inequity. College admission no longer has a gender quota and women now form 70% of the medical college entry cohort; however, very few of these women translate their education into formal medical work. Many women in medical college interrupt their schooling to start families, stay home after graduation, or do not join the workplace because of a lack of childcare or flex hours, for example. Many of these medical colleges are government funded, so this inequity is an example of the ineffective utilization of government resources. The quality of medical education is also an issue, demonstrating that quantity of human resources is not a sufficient solution. A concern is that efforts to increase the workforce without appropriate regulation may flood the market with untrained and uncertified practitioners, of which there are already many in Pakistan. Specialists working in urban areas often do not understand the issues in rural areas, yet those are precisely the people who are heading associations and making decisions about accreditation, policies, and task sharing. People working in remote areas need better representation.

Challenges related to infrastructure include severely compromised district-level care and poor infrastructure at both the district and national levels. Service delivery challenges include vertical care silos for programs in tuberculosis, malaria, maternal and child health, and noncommunicable diseases. The referral system is also poor and the system has stark disparity in the provision of care to rural versus urban populations. Information management challenges are also significant. Although there have been efforts to build the data system, the data collected have been very limited and the quality of the data is poor and unreliable. The data system is focused on the district level, with

no reporting of tertiary-level or private-sector data. The devolved health system gives rise to governance challenges. Roles have been well-defined, but the capacity for governance at the provincial level is variable. To address this, health care commissions and regional health boards are being set up. Financing also remains a major challenge. Funding is needed at multiple stages of the SOA planning process: building momentum, gaining commitment, processing feedback, costing, and implementation. Pakistan currently faces an inadequate budget allocation for health, expenditure inefficiencies, and high out-of-pocket expenditures.

5.5.2 Discussion

Hoon Sang Lee, Adjunct Professor, Yonsei University School of Public Health, Korea, and Member, Health Sector Advisory Committee, KOICA asked if Pakistan has considered an alliance with the maternal and child health community to connect with the global funding that is available. He also asked about space to work with professional societies from the planning phase onward. Samad replied that professional societies of anesthesiologists, OB/GYN, nurses, and others have been involved from the outset, starting with initial stakeholder meetings that offered the opportunity to advocate for thinking beyond the urban situation. Some professional groups need ongoing sensitization in the needs of rural populations, she noted. Stakeholders are encouraged to take ownership of the process and to identify solutions. She added that they needed to bring the federal MoH on board from the start in order to engage organizers from other programs. As part of the DCP3 network initiative piloted in Pakistan, surgical stakeholders in the country were also able to provide valuable input on the essential surgery package.

Kanako Yamashita-Allen, Senior Specialist in Health, Nutrition, and Population, World Bank, commented that because the private sector is self-regulated, it may have even more capacity than the public sector, underscoring the need for the public and private sectors to collaborate. She wondered whether this type of collaboration could also be carried out globally with respect to standard setting and quality assurance. Allen also noted that high-tech, innovative efforts are urgently needed to improve financial protection—for example, through mobile-phone-based micro-insurance mechanisms. Samad replied that Pakistan has launched a government-provided insurance program that allows Pakistanis to seek care in the private sector, although it is still in the early stages.

Samad was asked how to address the barrier to innovation posed by the current gatekeepers of surgery in Pakistan, who tend to be highly trained specialists in urban areas with little understanding of what is happening in rural areas. Samad agreed that devolved service delivery is a key issue that arises from the country's decentralized health system. Plans that are not accepted at the district level by service delivery professionals will simply not be effective.

5.6 THE WAY FORWARD IN SOUTH ASIA

During this session, representatives from countries in South Asia were asked to describe the the current state of surgical care in their countries and to identify any unique challenges they face.

5.6.1 Indonesia

An update from Indonesia was provided by Akmal Taher, Senior Advisor to Minister of Health for Improvement Services, Ministry of Health, Republic of Indonesia and Chairman, Indonesian College of Urology. Indonesia has a population of 260 million spread across 17,000 islands, 7000 of which are inhabited. Consequently, Indonesia faces geographic issues related to health care delivery in its 2600 hospitals, 10,000 primary health centers, and 1200 district hospitals. Around 60% of the population have limited access to district hospitals. Indonesia needs a new strategy in order to achieve UHC. In 2014, they established a national health insurance

program that enrolled 216 million people thus far; the entire population should be enrolled by the end of 2019. Access has increased since the rollout of social insurance, but around one-third of reimbursement by social insurance is categorized as catastrophic. They do not yet have more specific data regarding percentage of the population who can access surgical care. With respect to quality, accreditation for primary care centers and hospitals is now mandatory, with 57% of 2600 hospitals accredited to date. Previously, only 30-40 hospitals had JCI accreditation, which was used as the framework to create Indonesian accreditation standards. The country faces challenges caused by decentralization, which will require stronger advocacy and better communication from the 34 provinces to the 500 districts. Data collection will need to be prioritized, because local data are very important for advocacy.

5.6.2 Malaysia

Noor Hisham Abdullah, Director General of Health for Malaysia, provided an overview of the current state of surgical care in his country. Malaysia has a population of 32 million and the health system comprises 800 health clinics, 148 public hospitals, and 251 private hospitals. The country's health expenditure is relatively small, at 4.5% of GDP (2.5% from public sector and 2.2% from the private sector). This requires a focus on optimizing the use of existing resources and finding innovative ways to deliver care. Abdullah noted that he is the first surgeon ever appointed as Director General of Health in the country.

Key challenges faced in Malaysia are managing the public's expectations, providing quality care to rural and urban areas, and integrating primary and secondary care within a patient-centered health system. Malaysia is working to develop a framework for quality care based on the guiding principles of high impact, reasonable costs, desirable outcomes, and optimization of resources to bring health care from urban areas to rural communities. Because they are assessing unmet surgical needs at the horizontal level, they need to bolster engagement from the bottom up. He is hopeful that professional organizations will come together to help Malaysia maximize the use of its resources. Training is needed for specialists as well as for medical officers, nurses, and medical assistants. To address this, medical officers are being trained to do surgery and provide anaesthesia at satellite health centers.

They are embracing digital health to broaden access through service delivery and research. A MOU has been signed to engage in collaborative research in science and engineering, which has led to the development of an electronic stethoscope; they are also working on technology to conduct ultrasounds using mobile phones. These types of innovations are helping to bring healthcare to people in their homes and communities, but resources remain an issue.

Abdullah described a cataract surgery program that is an example of low-cost, high-impact, high-quality delivery of surgical care. The MoH is working with NGOs to perform cataract surgeries with local anaesthesia in a purpose-built facility with two operating theatres on the ground floor. Outcomes have improved as more surgeries have been performed. To date, they have done more than 8000 surgeries, with less than 1% of patients experiencing complications. Patients are typically discharged an hour after surgery. Patients pay the equivalent of US$25, with NGOs funding free procedures for poorer patients.

5.6.3 Myanmar

Kyi Hlaing, Neurosurgeon at North Okkalapa General Hospital, described the state of surgical care in Myanmar. Myanmar is the second largest southeast Asian country, with a population of 55 million people across 67 districts and 330 townships. The country has been developing surgical capacity along with infrastructure since 2010 when they emerged from military control. Public and private sector care are developing in parallel

and there are now six medical schools and five new surgical centers. The district level has surgeons, orthopedic surgeons, anesthesiologists, OBGYNs, and 20 trained neurosurgeons (with 6 more being trained). In two years, there will be more than ten neurosurgical centers, while emergency neurosurgical services can be provided by general surgeons trained in emergency neurosurgery. CT scans have been available since 2016. Many of Myanmar's challenges are related to the need to further develop its infrastructure. Two-hour access to surgery is hindered by limited access to electricity—which is currently just 65%, but it is slowly improving—as well as poor road conditions. Challenges also related to transportation via water between Myanmar's hundreds of islands. Patients often have to be transported on fishing vessels and tropical cyclones in the rainy season can complicate things further. Currently the country has no national health insurance system, but approximately 80-90% of health costs are borne by the government. A national insurance program is expected to be rolled out in the next 5-6 years. Hlaing said that Myanmar is looking to collaborate with other organizations to develop their NSOAP.

5.6.4 Sri Lanka

Lalantha Ranansinghe, a Neurosurgeon at the National Hospital of Sri Lanka, presented on the state of surgical care in Sri Lanka. Sri Lanka's medical and education system were during the British Colonial and intended to replicate the British system, in which health and education are free for all citizens.The country's ten medical schools produce 2000 doctors each year, although many leave to work in wealthier countries. Continued free healthcare delivery will depend on post-graduate medical training, because government regulation will require SOA specialists to attain post-graduate medical degrees. This may also exacerbate the issue of specialists leaving the country. These issues are critical, because free health care and free education have been vital to Sri Lanka's successes. The private and public sectors in Sri Lanka run in parallel. Public sector workers are allowed to engage in private work during off-hours, which lowers the salary of those working in the public system and may also affect their performance. Maternal mortality was 33.8/100,000 live births in 2018 and the infant mortality rate was 9/100,000 in 2017. Health expenditure in 2014 was US$117 per capita; the target is US$150/capita, or US$3 billion. HIV prevalence is <0.1% and immunization targets are nearly 100%. Sri Lanka has reached family planning goals without compulsion. Given their accomplishments to date, the main goal now is fine tuning. Sri Lanka will soon be a middle-income country.

5.6.5 Nepal

The state of surgery in Nepal was described by Bikash Devkota, Chief of Policy, Planning and Monitoring, Ministry of Health and Population. Nepal has a population of 30 million people governed by 753 local governments. It has a three-tier hospital system. The national policy plans to establish 15-bed hospitals within each local governments' jurisdiction, secondary hospitals with specialty services at the provincial level, and tertiary hospitals managed by the federal government. There are currently more than 2000 physicians and about 500 specialists. The countries offer free, bonded medical educations to help create more specialists, which require those specialists to work for the government for five years to pay back the cost. This provides 150 more doctors for the system each year. The current state of surgery in Nepal is not very clear because there is little attention paid to surgery beyond C-sections. Nepal has mountainous areas that are very remote, giving rise to geographic challenges in reaching patients and delivering safe surgical services. Data collection is relatively weak and the documentation of surgery is limited. However, an annual report captures C-section data and the total number of major and minor surgeries performed in government hospitals. They are planning to provide one year of anaesthesia training

to nurses and paramedics. Medical officers will receive two months of training in how to perform safe C-sections. All deliveries, regular or C-section, are free of cost in Nepal. They also provide government subsidies for free kidney transplants, heart surgery, spinal surgery, and surgery for head injuries. A new rural health support program is planning to strengthen district hospitals in 18 of the 75 districts in Nepal.

5.6.6 Cambodia

H.E. Dr. Or Vandine, Secretary of State for Health, described Cambodia's approach to address its health system challenges. Cambodia is moving from 'ground zero' after the genocide and has to build systems from scratch. Fewer than 50 healthcare providers survived the genocidal regimes, but there are now around 30,000 healthcare professionals—about 25,000 of which are in the public sector. She remarked that different countries may have different ways of doing things with respect to policy making and regulation, but the health outcomes of the citizens should always be the priority. Cambodia is looking for ways to strengthen its healthcare system through building infrastructure and strengthening healthcare professionals' capacities. Human resources development is a key component of system strengthening. The Prime Minister is keen to make progress toward UHC and there is a new government policy regarding a social health protection fund and assisting the poor with healthcare. Around three million poor people can potentially benefit from this funding, which will also be used to provide women with cash during pregnancy. Cambodia's National Health Strategic Plan 2016 -2020 is currently in phase 3, but it does not have any specific focus on SOA. Maternal and child health is a key priority in the national health plan; they are working to improve service delivery and find ways that midwives can improve services and offer safe delivery and obstetric care. Cambodia is undergoing the shift from communicable to noncommunicable disease that is underway in LMICs across the world. Traffic deaths are a serious problem that underscores the need for an emergency care framework in the country.

5.6.7 Vietnam

Cuong Manh Nguyen, Deputy Director General, International Cooperation Department, Ministry of Health, explained that Vietnam has a four-level health system: center, province, district, and community health station. About 7% of the GDP is spent on health. Around 95% of the more than 1200 hospitals are in the public sector. At the primary care level, funding is devoted to ensuring that there are doctors at every medical health station and that all deliveries are carried out by well-trained personnel. Specialized health services are concentrated in center-level hospital and urban areas. As the first step toward an NSOAP, Vietnam has developed a standard guideline for safe surgical care.

5.6.8 Laos

Dr. Bouathep Phoumindr MD explained that in Laos, the MoH is reviewing and restructuring the health system from central to provincial hospitals. Currently, the capital city of Vientiane has five central hospitals, three subcentral hospitals, and five district hospitals. Provincial hospitals have not yet been completed. The government is working to develop the health system, because the quality of service needs to improve in the country's more than 1000 health centers, where mortality rates are high. The government is focused on reducing the mortality rates by addressing primary health centers as the first target. He emphasized that improved SOA care will be critical for reducing maternal and child mortality rates.

5.6.9 Bangladesh

An overview of Bangladesh was provided by Sk Nazmul Huda, Global Program Manager, Fistula Care Plus Project, Engender Health Inc. and Country Program Manager, Bangladesh Office, Engender Health Inc. Bangladesh has a large health system and an extensive health infrastructure. The population has access to

15 hospitals within 30 minutes; there are 600 large government hospitals and 400 smaller (20-40 bed) private hospitals. The private sector in Bangladesh is growing rapidly, which is a matter of concern, because the maternal mortality ratio has risen over the past 10 years—from 94 to 196 per 100,000—attributed in part to the high C-section rate of 86%. Another challenge is that 12,000-15,000 doctors are produced annually from the country's 112 medical schools, but only 4000 nurses are produced annually; there are currently 75,000 doctors, but only 25,000 nurses. Bangladesh does not have effective insurance so out-of-pocket expenditure is very high, at about 67%, and many people are put into poverty by surgical conditions. The rate of road traffic deaths is the second-highest in the world, which highlights the need for a stronger emergency and trauma care system.

5.6.10 Next steps

Panelists were asked to reflect on next steps for their countries and how they could be supported by the global surgery community.

Akmal Taher emphasized the need to improve data collection and communication within the MoH, which is currently scattered across different departments. Local governments, professional organizations, and donors need to be engaged to seek financial and other types of support. He noted that the regional WHO representative will be a key player for Indonesia.

Noor Hisham Abdullah hoped that WHO would take the lead in offering models or solutions to deal with SOA challenge, with SOA professional organizations coming together to facilitate and assist WHO in this process. He suggested that WHO should develop a framework that comprises Standards, Quality, Measurement, Data, and so forth. Once guidance is available, then countries' MoH should take the lead.

Kyi Hlaing said that he will convey the importance of NSOAPs to policymakers and specialist providers in Myanmar. He predicted that they will have financial needs to support this work, however.

Lalantha Ranansinghe said that in Sri Lanka, there is minimal emphasis on surgery because the government is primary concerned about non-communicable diseases. Six people die on the road every day and cancer, hypertension, and diabetes are increasing—around 15% of the population has diabetes. He was not optimistic that the government will devote attention to the SOA issue. They have already provided free ambulance services in selected regions of Sri Lanka, but they will need assistance to roll out the program nationwide.

Bikash Devkota said that Nepal is developing a new five-year strategic health plan and he will try to incorporate NSOAP into that plan. He was hopeful that they could develop indicators based on targets and put systems in place to collect and report those indicators.

Kee Park suggested that to develop awareness on this front with WHO, workshop participants should ask their ministers to write letters to their country and regional WHO offices asking for help with surgical strengthening.

5.7 THE WAY FORWARD IN THE SOUTH PACIFIC

Lord Viliami Tangi, Chief Surgeon Specialist, Vaiola Hospital, Tonga, provided an overview of global surgical indicators in the South Pacific Region[72] (see Figure 5-2). The Pacific Region has many small countries within a vast expanse of ocean; the countries collaborate frequently with support from Australia and New Zealand. The region's countries collected and published data on the LCoGS surgical indicators over a span of six months, with one country's data missing from the publication. He noted that a new dimension has arisen in surgical education in the Pacific, which is grooming strong surgical leaders who are moving into politics and heading hospitals, which is having a positive impact on service provision.

72 Guest et al 2017

Figure 5-2. Surgical indicators in the South Pacific region

Country	Population	Indicator 1 (%) Access <2 hours	Indicator 2 SAO/100 000 SAO density	Indicator 3 Case/100 000 Surgical volume	Indicator 4 (%) POMR
Nauru	10 084	100	30	7130	0.24
Tuvalu	10 837	56	18.5	3417	1.0
Cook Islands	13 229	88	22	6758	0.11
Micronesia	102 109	Not available	7	Not available	Not available
Tonga	103 000	85	14	5061	0.24
Kiribati	110 000	65	8.2	1718	0.11
Samoa	187 000	68	1.6	1552	0.82
Vanuatu	260 815	44	3.2	1277	0.28
Solomon Islands	602 000	20	2.5	868	0.46
Fiji	933 000	67	5.8	1490	0.83
Timor Leste	1 300 000	50	0.9	433	0.84
Papua New Guinea	7 500 000	20	2.3	1264	0.5
New Zealand	4 452 300	90	43	5308	0.43
Australia	23 946 300	98.85	63.9	10 156	0.19

POMR, perioperative mortality rate; SAO, surgical, anaesthesia and obstetrics.

Country	Population	% Risk of catastrophic expenditure* (direct OOP costs)	% Risk of impoverishment <US$1.25 per day (direct OOP costs)
Nauru	10 084	Not available	Not available
Tuvalu	10 837	0	17
Cook Islands	13 229	Not available	Not available
Micronesia	102 109	31	51
Tonga	103 000	8	16
Kiribati	110 000	0	34
Samoa	187 000	5	18
Vanuatu	260 815	14	37
Solomon Islands	602 000	5	57
Fiji	933 000	21	24
Timor Leste	1 300 000	16	72
Papua New Guinea	7 500 000	29	56
New Zealand	4 452 300	8	2
Australia	23 946 300	5	1
Worldwide	7.1 billion	44	47

*Catastrophic expenditure is greater than 10% of annual income or 40% of remaining income after food and housing costs.

Source: Tangi presentation

5.7.1 Fiji

Eddie McCaig, Professor of Surgery, School of Medical Sciences, College of Medicine, Nursing and Health Sciences at Fiji National University, described progress in Fiji. After a coup in Fiji in 1987, 5000 people have emigrated out of Fiji each year, including 50 doctors and 100 nurses annually. By 1990, Fiji had a smaller health workforce than it did in 1980; they were sending people to Australasia for specialist training, but many never returned. In 1997, the Pacific Islands mandated a training program at the Fiji School of Medicine to bring more physicians and nurses

into the workforce through postgraduate training in five disciplines: anaesthesia, surgery, internal medicine, pediatrics, and OB/GYN. Table 5-2 shows that there are currently 150 specialist providers in the Pacific, another 1006 are needed. Providers are trained to a diploma level and three years later they are given a Masters degree, then they can go to Australasia to upgrade to a specialty. However, many face a hurdle in passing the English exam. McCaig explained that trauma and NCDs (especially diabetes) make up a large part of Fiji's disease and surgery burden, so they are training providers to address those needs. Trauma accounts for 10% of surgeries, noncommunicable diseases account for 60% of hospital admissions, with diabetes accounting for 40% of surgeries in hospitals.

Table 5-2. Surgical training programmes in the South Pacific, Papua New Guinea, and Timor Leste

Country	Population	SAO (per 100 000 population)*	Total surgeons trained locally or regionally†	Resident national/ expatriate surgeons trained overseas‡	Regionally trained surgeons working overseas in 2018§	Regionally trained surgeons deceased (retired)	Surgeons working in-country or in specialty training (2018)	Additional surgeons required¶
Papua New Guinea	8 000 000	2·3	93	2	3	8 (2)	82	708
Timor Leste	1 300 000	0·9	8	15	0	0 (1)	22	124
Fiji	933 000	5·8	22	1	6	0	17	66
Solomon Islands	602 000	2·5	10	0	1	0 (1)	8	53
Vanuatu	260 800	3·2	5	0	1	0	4	22
Samoa	187 000	1·6	4	0	0	1	3	18
Micronesia	102 100	13	4	1	0	0	5	5
Tonga	103 000	14	4	1	1	1	3	3
Kiribati	110 000	8·2	1	1	0	1	2	6
Cook Islands	13 300	22	1	1	0	0	2	0
Nauru	10 000	30	0	0	0	0	1	0
Tuvalu	10 800	18·5	0	0	0	0	1	0–1
Total	11 632 000		152	22	12	11 (4)	150	1006

Source: Watters et al 2019

5.7.2 Papua New Guinea

Noah Tapaua, General and Cardiothoracic Surgeon, Port Moresby General Hospital, described SOA planning progress in Papua New Guinea, a large Pacific island with 8.5 million people. It is a diverse country with over 800 languages and 80% of the population lives in rural areas. There is one school of medicine and the SOA density is 2.3/100,000 population. The problem in Papua New Guinea is how to reach the rural population. After a global surgery meeting in Melbourne in 2015, they formed a committee to collect the Pacific Island indicators that catalyzed the development of a health plan policy. They then hosted a SOA symposium for health ministers, prime ministers, and college presidents from the Pacific region and Australasia. In 2018, they presented a policy framework draft at the symposium and are working on a refined draft to be presented later in 2019. They are facing challenges with respect to data collection—there is no central data collection system in Papua New Guinea—and stakeholder communication. The government and MoH are both very supportive, which is a boon.

5.7.3 Solomon Islands

Rooney Jagilly, General Surgeon, National Referral Hospital, Honiara, explained that the Solomon Islands have a population of 700,000, with 80% of people living a subsistence lifestyle in rural areas. It is a poor, aid-dependent country in which healthcare is free for all and is provided primarily by government services. The Solomon Islands have challenges related to their geographic isolation, limited resources, and lack of supplies. Nurses are the backbone of health service delivery—they staff urban health centers (the first level of care) and area health centers. Physicians are currently only staffed in the provincial hospitals, but area health centers will be staffed with physicians as the workforce grows. There are no medical schools in the country; people are sent to Papua New

Guinea and Fiji for medical education. The SOA workforce is very small—two orthopedic surgeons, three general surgeons, four anesthetists, and four OB/GYNs—and the SOA density is only 12/700,000 population. The surgeons are all in the capital, with the exception of one stationed in the outer provinces. General medical officers staff referral hospitals and are expected to perform C-sections and emergency surgeries. Moving forward, the focus is to capacitate general medical officers to do emergency surgery. NSOAP is not yet underway in the Solomon Islands, but a UHC policy was passed in 2018 that defines the levels of care, services, facilities, supplies, human resources, and so forth. There may be potential to align NSOAP efforts with the national health plan, which he will discuss with the MoH.

5.7.4 Ways forward in the region

Kiki Maoate, Fellow of the Royal Australasian College of Surgeons, Surgical Examiner and Director of the College's Pacific Programs, emphasized the critical role of health leadership. NSOAPs need to be pushed forward at the WHA and promoted at regional meetings of ministers of health. He made four specific proposals for moving the NSOAP process forward in the Pacific. The first is to create a collaborating center in Fiji, which will require technical assistance. The second is to collaborate and coordinate with Asian colleagues such that all ministers have a shared agenda and can thus combine resolutions for emergency and trauma care access with resolutions for access to surgery and anaesthesia. This would also allow for improved resource allocation and support calls for more resources in the region. The third is to create a credentialing process for people coming into the region working as part of NSOAP efforts. This could be done at the level of professional societies, or SOA organizations can add NSOAP to their training programs. Fourth, the language around SOA, trauma, and emergency care is different than the language of bureaucracy. A strong consensus among professional societies and specialists is needed to transform these ideas into policies, which will require technical assistance coming from WHO.

5.7.5 Analysis of NSOAP progress in the region

Sonal Nagra, General and Endocrine Surgeon and Senior Lecturer in Rural Surgery, Deakin University, provided an overview of surgical indicators and NSOAP progress in the Pacific region (see Table 5-3). Currently, the total population of the region is 11.5 million (3.5 million if Papua New Guinea is excluded). Overall surgical volume is 1230 per 100,000. SOA Density in the Pacific is 2.67 (3.5 if Papua New Guinea is excluded), with 307 SOA providers in the region (184 in Papua New Guinea). POMR in the Pacific is 0.53, which equates to 748 deaths and contributes to approximately 1% of mortality. Two-hour surgical access is approximately 30% (50% if Papua New Guinea is excluded), predominantly because of geographic location. Health-seeking behavior is a challenge in the region. Around 90-95% of people will seek care from traditional medicine providers, usually for an extended period of time, before seeking health care in the system. Nagra looked at all of the surgical health plans in the Pacific and searched for the occurrence of words related to surgery in those plans. In 400 pages of policy documents, surgery-related words occur about 100 times. Panelists suggested that NSOAPs should be presented at an upcoming meeting of heads of health and clinical services in the region. Nagra agreed that it should, noting that collaboration in the region is effective because it is relatively small and people can develop personal connections.

Table 5-3. Surgical indicators in the South Pacific

Country	Total surgical volume (n)	Deficit surgical volume (n)	POMR (per 100,000)	Deaths due to surgery (n)	Total deaths (n)	Proportion of surgical deaths (% total deaths)	Life expectancy (years)
Australia	2437440	1234656	0.19	4631	167856	2.759	84.5
New Zealand	249476	-13713	0.43	1073	31546	3.401	83.27
E Timor	5629	59371	0.84	47	6869	0.688	70.43
Fiji	13902	32748	0.83	115	6867	1.680	73.32
Tonga	5213	-63	0.24	13	611	2.048	75.94
Samoa	3057	6793	0.82	25	985	2.546	79.04
Vanuatu	3331	9710	0.28	9	1248	0.747	74.22
Cook Islands	894	-233	0.11	1	-	-	-
Solomon	5225	24875	0.46	24	2790	0.861	72
Nauru	719	-215	0.24	2	-	-	-
Papua New Guinea	101120	168120	0.5	506	56640	0.893	67.9
Kiribati	1890	3610	0.11	2	769	0.270	69.43
Tuvalu	369	171	1	4	-	-	-

POMR: postoperative mortality rateSource: Nagra presentation

5.7.6 Discussion

5.7.7 Engaging with WHO Regional office

Hoonsang Lee asked if the absence of a representative from the WHO regional office speaks to their prioritization of NSOAPs; he emphasized the importance of active engagement and leadership from regional WHO offices. Teri Reynolds said that if the region is seriously considering linking up emergency and trauma care with NSOAPs, there is an upcoming agenda item at WHA that will be focused on system-level UHC. The two resolutions could be integrated into implementation activities going forward. She added that WHO has announced a global emergency and trauma care initiative to expand capacity in the region. Fiji is part of the program and the Fiji country office is a sub-regional office that also serves the region. Although this effort will be focused on the entire emergency care system, there may be further opportunities for integration and collaboration with WHO.

5.7.8 Regional professional associations

Rogo wondered whether a collegiate system like COSECSA in Africa would be a good system for the Pacific region. Kiki Maoate replied that the College of Surgeons has had a relationship with the Pacific Island countries for the past 25 years that was initially focused on service provision, but the relationship has evolved to capacity building and now provides support to clinicians in specialist roles. A Pacific Islands Surgeons Association has been formed, but the numbers the region are too small to have a college or society in each country. The role of the association is to look at what other colleges do and perhaps, over time, the collaboration could go beyond the Pacific Islands to become an Indo-Asia region. Eddie McCaig added that in 2018, a combined Pacific Island surgical meeting was convened with the Australian General Surgical Association and 400 surgeons attended, which fostered a closer relationship between the groups. Liz McCleod, Chair of the RACS Global Health Monitoring and Evaluation Committee, remarked that while it is not the role of RACS to advocate directly to MoHs in the region, professional societies are very trusted and have a strong role as advocates. RACS was consulted and involved in the passage of WHA68.15. They also have a variety of subspecialty coordinators who can offer advice on the development of NSOAPs, data collection and analysis, and monitoring and evaluation.

5.7.8.1 Funding

Lord Viliami Tangi highlighted the lack of discussion about funding. Politicians need to feel a sense of ownership of NSOAPs, but surgeons tend to eschew the interference of politicians. This may be a root cause for the neglect of surgery in the political arena compared to other diseases, like maternal health, tuberculosis, and HIV/AIDS. He urged the group to seize the opportunity to put surgery on the WHO agenda.

5.7.8.2 Optimizing training

Noor Abdullah commented that the unmet surgical needs in developing countries creates a different spectrum of patients, which may be extreme cases compared to the cases seen by trainees in developed countries. He suggested that developed and developing countries could collaborate to optimize training to sensitize trainees and take into account that the skill sets required in developed nations may not be applicable in developing nations (eg, robotic surgery).

5.7.9 Next steps to promote NSOAP development

Teri Reynolds acknowledged the role of COSECSA in supporting emergency care assessment, for example, by convening the member states for training on the WHO registry platform. Professional societies have a significant role to play in providing this type of support for WHO platforms. She recommended that countries embarking upon the NSOAP process should conduct

national emergency care system assessments and identify concrete action priorities from the various stakeholders' perspectives. This process is typically led by the MoH, she added. Myanmar has already carried out the emergency care assessment and have created a document with priorities. Tanzania and Zambia could consider incorporating emergency care system assessments into the next round of NSOAP follow up, and Sri Lanka and Bangladesh have expressed interest in conducting the assessments. She highlighted significant overlap in interest in NSOAPs and emergency care assessments that has great potential to be leveraged. In the Pacific Region, for instance, a global emergency and trauma care initiative has just launched, with Fiji included as a participant; emergency care system assessments that are a component of the initiative could be incorporated into the NSOAP process.

Walter Johnson reflected that the first global surgery meetings held several years ago, was attended by individual surgeons and anaesthesiologists, but there were no obstetricians and no representatives of professional organizations or members of multilateral or bilateral institutions. He was struck by the diversity of the attendees at the present workshop, suggesting that these types of convenings have great potential to bring diverse groups to the tale to facilitate better understanding and develop a shared vocabulary. He highlighted lessons to be gleaned from this workshop about collecting data, developing NSOAPs in various contexts, and dealing with challenges in implementing the NSOAPs. Johnson commended the regional-level work being carried out by SADC and the Pacific Island nations, which underlines the many advances of a regional approach to this work. "But in the end, it's all about the patients," he said. Key challenges to be addressed pertain to funding as well as convincing WHO of the importance of surgical and emergency systems. He urged the workshop participants to emerge as leaders in the national, regional, and global level collaboration that will be needed to move the NSOAP process forward.

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Appendices

Appendix 1. Workshop agenda

National Surgical, Obstetric and Anaesthesia Planning for High-Level Global, Regional, and Country Authorities and Funders

March 20-21, 2019
***Grand Hyatt Hotel*, Dubai, UAE**

OBJECTIVES

1. Understand the current landscape of global surgery and anaesthesia and the key steps to a National Surgical Obstetrics and Anaesthesia Plan (NSOAP) including implementation options and tools.
2. Explore the role that WHO, regional offices and other high-level authorities can play in supporting the NSOAP process in Member States.
3. Explore innovative financing mechanisms for surgical system strengthening.

GOALS

After the completion of the workshop, participants will be able to:

1. Support NSOAP planning processes by engaging and informing key national stakeholders while leveraging external support for developing surgical plans.
2. Frame financing of surgical, obstetric, and anaesthesia care as indispensable to achieving UHC and economic development, and seek strategically aligned financing mechanisms for NSOAPs.
3. Define concrete next steps for advancing NSOAPs globally, regionally and nationally.

NSOAP Workshop Program: Day 1

Wednesday, March 20, 2019, 8:30am - 5:30pm

8:30 – 9:00am	**Registration and Seating**
9:00 – 9:25am	**Welcome and Opening Remarks** *Walter Johnson (World Health Organization), Salmaan Keshavjee (Center for Global Health Delivery – Dubai), & John Meara (Program in Global Surgery and Social Change)*
9:25 – 9:30am	**Welcome Video:** *Dr. Tedros Adhanom Ghebreyesus (WHO)*
9:30 – 10:00am	**The Lancet Commission on Global Surgery and the Case for NSOAPs** *John Meara*
10:00 – 10:30am	**NSOAPs and the WHO HQ: Progress on WHA 68.15, and the Role of WHO** *Walter Johnson*
10:30 – 10:55am	**Theoretical Framework for National Surgical, Obstetric and Anaesthesia Plans** *Desmond Jumbam (PGSSC) & Che-Len Reddy (PGSSC)*
10:55 – 11:15am	**Coffee/Tea Break**
11:15am – 12:15pm	**Panel 1: Milestones in NSOAP Development and Implementation in Africa** **Moderator:** *Shiva Murugasampillay (Zimbabwe)* *Emmanuel Makasa (Zambia), Emile Rwamasirabo (Rwanda), & Ben Nangombe (Namibia)*
12:15 – 1:00pm	**Adapting the NSOAP framework to the Pakistani context** *Lubna Samad (Indus Health Network)*
1:00 – 2:30pm	**Lunch and group photo**
2:30 – 3:15pm	**Panel 2: Global Surgical Indicator Tracking: Progress, Challenges and Opportunities** **Moderator:** John Meara *Emi Suzuki (World Bank), Lord Viliami Tangi (Tonga), & Haitham Shoman (PGSSC)*
3:15 – 3:30pm	**Coffee/Tea Break**
3:30 – 4:00pm	**The SADC Resolution: A Regional Approach to NSOAP Development** *Emmanuel Makasa (Zambia) & Shiva Murugasampillay (Zimbabwe)*
4:00 – 4:30pm	**Fireside Chat: The role of WHO Regional Offices in the NSOAP process** *Walter Johnson (WHO) & Ravaghi Hamid (WHO EMRO)*
4:30 – 5:00pm	**Macroeconomics of Surgical Care** *Blake Alkire (PGSSC)*
5:00 – 5:30pm	**Closing Remarks:** *John Meara*

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NSOAP Workshop Program: Day 2

Thursday, March 21, 2019, 8:30am - 5:00pm

8:30 – 8:45am	**Review of Day One and Overview of Day Two objectives** *Walter Johnson*
8:45 – 9:30am	**Strategies for Working with the World Bank to Promote NSOAP Development and Implementation Globally** *Khama Odera Rogo (World Bank)*
9:30 – 10:30am	**Panel 4: Mobilizing Global Resources for NSOAP Development and Implementation** ***Moderator:*** *John Meara* *Maria Cruz De Ciria Mantilla (AECID)*, *Hoonsang Lee (KOICA), Monique Wubbenhorst (USAID), & Kanako Yamashita-Allen (World Bank)*
10:30 – 11:00am	**Coffee/Tea Break**
11:00am – 12:00pm	**Panel 5: The Role of Professional Societies in NSOAPs** ***Moderator****: Lubna Samad (Indus Health Network / GICS)* *Adrian Gelb (WFSA)*, *Faysal El Kak (FIGO), Syed Shershah (International Society of Obstetric Fistula), & Kee Park (PGSSC/WFNS)*
12:00 – 12:30pm	**WHO Resources for Emergency and Trauma Care Implementation** *Teri Reynolds (WHO)*
12:30 – 2:00pm	**Lunch**
2:00 – 3:00pm	**Panel 6: The Way Forward in South Asia** ***Moderator:*** *Kee Park (PGSSC)* *Akmal Taher (Indonesia), Noor Hisham Abdullah (Malaysia), Lalantha Ranansinghe (Sri Lanka), & Bikash Devkota (Nepal)*
3:00 – 3:30pm	**Coffee/Tea Break**
3:30 – 4:15pm	**Panel 7: The Way Forward in South Pacific** ***Moderator:*** *Lord Viliami Tangi (Tonga)* *Kiki Maoate (New Zealand), Eddie McCaig (Fiji), Noah Tapaua (Papua New Guinea), & Rooney Jagilly (Solomon Islands)*
4:15 – 4:45pm	**Drafting and Review of Consensus Statement on The Way Forward** ***Moderators*****:** *John Meara and Walter Johnson*
4:45 – 5:00pm	**Closing Remarks:** *Walter Johnson*
7:30 p.m.	**Group Dinner at the Raffles Hotel**

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Appendix 2. Workshop participants

Nasreen Molla Adamjee, MD, MA
Lecturer on Global Health and Social Medicine, Harvard Medical School

Dr. Nasreen Molla is the Director of Research and Programs for the Harvard Medical School Center for Global Health Delivery – Dubai. Dr. Adamjee is a passionate public health doctor and one of the pioneer members of Interactive Research and Development (IRD). Her primary focus is multidrug-resistant tuberculosis (MDR-TB). Dr. Adamjee earned her medical degree from the prestigious Aga Khan University and Hospital, Karachi and then earned her diploma and masters' degrees in Infectious Diseases from the London School of Tropical Health and Hygiene.

Blake Alkire, MD, MPH

Faculty, Program in Global Surgery and Social Change, Harvard Medical School

Blake Alkire is an attending Otolaryngologist at Massachusetts Eye and Ear Infirmary and a faculty member at the Program in Global Surgery and Social Change (PGSSC) at Harvard Medical School. Over the past decade, his research has focused on developing models to assess the economic cost and benefit of surgical interventions in low- and middle-income countries. Blake received an undergraduate degree from Vanderbilt University, an M.D. from Harvard Medical School, and an M.P.H. with a concentration in global health from the Harvard School of Public Health.

Ernest Barthélemy, MD

Paul Farmer Global Surgery Research Fellow, Harvard Medical School

Ernest is a Neurosurgery resident at Mount Sinai, New York City, where he also obtained his MD. Prior to medical school, he earned a Master's degree in kinesiology at Columbia University. A polyglot Haitian-American, Ernest developed his interest in global surgery as a clinical volunteer with Partners In Health in post-earthquake Haiti. He has published work on neurosurgical disease burden in Haiti and, as a PGSSC fellow, is focused on Haitian health system strengthening through development of neurosurgical capacity.

Lachlan Butcher

Manager of the Global Health department at the Royal Australasian College of Surgeons

Lachlan Butcher is the Manager of the Global Health department at the Royal Australasian College of Surgeons (RACS). With a background in health security and project management, having worked across Asia, the Pacific, and Africa – with over a year spent in Sierra Leone for the Ebola Response, Lachlan leads the College's specialist clinical education & training programmes and global health initiatives with partner Ministries of Health and medical education institutions across the Asia-Pacific region.

Luke Caddell, MS

Research Associate, Program in Global Surgery and Social Change, Harvard Medical School

Luke is an MD-MPH candidate at the University of Miami Miller School of Medicine. His current interests include the provision of surgical care in austere environments, extending healthcare infrastructure through technological innovation, and advocacy for itinerant populations. His most recent work has been with nomadic herders in Mongolia and the Human Rights Clinic of Miami.

Traychit Chanthasiri, MD

President of Lao Society Anesthesiologists

Dr. Traychit Chanthasiri is currently the Head of the anesthesiology department at Mahosot Hospital in Vientiane LAO, PDR, the Chair of the Anesthesiology, Resuscitation and Emergency Medicine at the University of Medical Health Sciences, and the President of the Lao Society of Anesthesiologists. Dr. Chanthasiri earned his medical degree at the Vientiane Medical University.

Mack Cheney, MD

Executive Director of the Kletjian Foundation

Dr. Mack Cheney is the Executive Director of the Kletjian Foundation. Utilizing a multidisciplinary approach to solve patients' complex otolaryngologic problems, he guided the establishment of the facial nerve clinic and the free flap clinic at Massachusetts Eye and Ear Infirmary (MEEI). As an educator, he has inspired fellows to careers in academic otolaryngology, in addition to teaching, lecturing, and authoring a textbook on facial surgery. In 1999, Dr. Cheney first began accompanying cleft lip and palate missions and incorporated the program into the residency program at MEEI. Participating as a surgeon, organizer, and teacher, he initiated a microtia program, which now carries out annual trips to Ecuador, Peru, Guatemala, and Vietnam, to create ears for those born without them. His experiences in the field and as an educator have led to him to his current role: guiding the development of academic surgical programs in underserved countries to encourage local growth and leadership.

Scott Corlew, MD, MPH

Lecturer, Program in Global Surgery and Social Change, Harvard Medical School

Scott Corlew is a lecturer with the Program for Global Surgery and Social Change at Harvard Medical School. Prior to surgical training, he practiced primary in the US Public Health Service; he is a general surgeon and plastic surgeon who has worked in the past with the NGO sector to assist in expansion of surgical care in low-income countries. His research interests are in examining characteristics of the surgical workforce in developing countries, economic assessment of surgical care, and financing of such care. His medical degree is from Emory University and he holds an MPH from Harvard School of Public Health.

María Cruz de Ciria Matilla, MD

Head of Health Sector Division, Spanish Agency for International Development Cooperation

Dr. María Cruz de Ciria Matilla is a Traumatologist & Orthopaedic Surgeon, who currently works as Head of Health Sector Division at Spanish Agency for International Development Cooperation. Dr. Ciria completed her medical degree at Universidad Complutense in Madrid, and later completed her specialist training as a Traumatologist & Orthopaedic Surgeon at Universidad Autónoma in Madrid. She holds a Masters degree in Health Services Management from the London School of Hygiene and Tropical Medicine, and a Postgraduate in management development cooperation.

Lem Dara, MD

Head of surgical oncology unit at Calmette Hospital; Chairman, Medical Advisory Committee

Professor Dara Lem graduated from the University of Health Science (UHS), Phnom Penh, Cambodia in 1993. He completed his specialization in general and digestive surgery in 1999. Fellowship in University Hospital of Gent, Belgium (Surgical Oncology) in 2000. He is presently a head of surgical oncology unit at Calmette Hospital. He also holds the position of Chairman, medical advisory committee. Professor Dara is a past-president of Cambodian Society of Surgery (CSS) between 2013-2015. In his presidency, he is actively involved in the reform of surgical society, especially in laparoscopic surgery by developing good collaboration among healthcare professionals in Asia and throughout the world. He is highly recognized as a pioneer of surgical oncology by introducing standard techniques in digestive and gynecologic for Cambodia. He received the Honorary Fellowship of the Royal College of Surgeon of Thailand for the 2017. He is an inspiring teacher and is currently a course director of general and digestive surgery in UHS. His greatest joy is sharing experiences with colleges and students. No matter how busy his schedule is, he will never forget taking time to spend with his lovely family.

Bikash Devkota, MD, MS

Chief of Policy, Planning and Monitoring; Ministry of Health and Population, Nepal

Dr. Bikash Devkota is Chief of Policy at the Planning and Monitoring Division of Ministry of Health and Population in Nepal. Dr. Devkota completed his medical degree at Lugansk State Medical University, Ukraine. Later, he completed his Master of Surgery in Pediatrics from Russian State Medical University at Moscow. Dr. Devkota has more than 20 years of work experience in different hospitals of Nepal as a government employer. He also served in remote areas of Nepal, where he conducted several health camps and surgical procedures. Since a couple of years, he is working in the Ministry of Health and Population as Planning Chief. He is engaged in the process of revision of national health policy for long term health plans contributing to the specialized and quality health service for the marginalized people of his country.

Faysal El-Kak, MD, MS, ARCOG

Vice President, Federation of International Gynecology, Obstetrics (FIGO)

Faysal El-Kak, MD, MS, ARCOG is the Vice President of the Federation International Gynecology, Obstetrics (FIGO), Clinical Associate of Obstetrics and Gynecology and Sexual Health at American University of Beirut Medical Center (AUBMC), and Senior Lecturer of Health Behavior and Sexuality in the Faculty of Sciences at the AUB.

Adrian Gelb, MBChB, FRCPC

Secretary, World Federation of Societies of Anaesthesiology

Adrian W. Gelb is Distinguished Professor in the Department of Anesthesia and Perioperative Care, University of California San Francisco (UCSF). He is currently the Secretary of the World Federation of Societies of Anaesthesiology (WFSA) and previous Chair of the Patient Safety & Quality of Practice Committee. WFSA is an umbrella organization for 150 national anesthesia societies. After training in Cape Town and working in rural South Africa, he immigrated to Canada where he was the Chair of Anesthesia at the University Western Ontario. He has held leadership roles in multiple Anesthesia Societies and also as the Board Secretary of the G4 Alliance. His Global Health interests include Global Health Policy, National Surgical Obstetric & Anesthesia Planning (NSOAP), Outcome Metrics, and Patient Safety. He works with a number of WHO groups. He is the author of >350 publications and has given > 300 invited lectures.

Piotr Gierszewski, PhD
Foresight Reacher, Nesta, United Kingdom

Piotr is a Foresight Researcher at Nesta, an innovation foundation in the UK. He is responsible for research and design of new initiatives at Nesta's Challenge Prize Centre which tackles big underserved global challenges such as the Surgical Equity Prize. Before joining Nesta, Piotr worked in a research capacity as a technology scout for a science commercialisation consultancy and a postdoctoral life scientist at the University of Cambridge.

Anh Duc Ha, DrPH, MSc
Deputy Chief – Cabinet Office, Minister's Assistant, Ministry of Health, Vietnam

Dr. Duc Ha currently holds a honourable position as the Deputy Chief of Cabinet Office in the Ministry of Health and also the Assistant to the Minister of Health in Hanoi, Vietnam. Dr. Duc Ha has earned his DrPH on International Health from Boston School of Public Health and an MSc in Population and International Health from Harvard School of Public Health. In addition to the aforementioned titles, he is also the Vice President of Vietnam Young Health Professional Association Expert, General Affair division, Cabinet Office in the Ministry of Health and a senior research scientist at Health Strategy and Policy Institute, Ministry of Health and the Institute of Population, Health and Development. Within the academic field, he devotes his time as the Adjunct Associate Professor in Department of Quantitative Health Sciences at the University of Massachusetts and the Adjunct Lecturer at Hanoi School of Public Health, National Institute of Nutrition and Hanoi Medical University in Hanoi, Vietnam.

Inaam Haq, MD, MPH

Program Leader for Human Development, Africa Region, World Bank

Dr. Inaam Ul Haq is a Program Leader for Human Development (Health Nutrition and Population, Education and Social Protection) in the Africa region of the World Bank. He is based in Tanzania with the Country Management Unit covering Tanzania, Burundi, Malawi, and Somalia. Dr. Haq is a public health physician with experience in the field of development, public health, and health systems management. As a Program Leader, he leads the policy dialogue and facilitates setting direction for three sectors with the Global Practices Management in the four countries. Dr. Haq was born in Malawi and is physician by training having graduated from the Rawalpindi Medical College, Rawalpindi, Pakistan a Master's in Public Health from the School of Public Health, Harvard University, with a concentration in international health.

Noor Hisham Abdullah, MD
Director General of Health, Malaysia

Dr. Noor Hisham Abdullah is a Senior Consultant Surgeon in Breast and Endocrine Surgery, Putrajaya Hospital and the current Director General of Health of Malaysia. His area of expertise is breast endocrine cancers, with numerous published papers and textbook chapters in endocrine surgery and a special interest in bringing personalized healthcare back to the community and home. He is a Councilor-at-Large in the Executive Board of International Society of Surgery (ISS) and chairs the Global Surgery Committee of ISS. He trained in breast and endocrine surgery with the Royal Australasian College of Surgeons and obtained his Master of Surgery and medical degree from the National University of Malaysia.

Kyi Hlaing, MD

Neurosurgeon at North Okkalapa General Hospital

Dr. Kyi Hlaing is an attending Neurosurgeon at North Okkalapa General Hospital, currently works as a clinical professor at the University of Medicine, Yangon, Myanmar. Dr. Hlaing completed his bachelor and master degrees from the University of Medicine, Yangon. He has finished his neurosurgical residency in Yangon General Hospital. One of his research interests is traumatic brain injury, and he is also engaged in the development of emergency neurosurgical centers in the big cities of Myanmar.

Sk Nazmul Huda, MBBS, MPhil, PhD
Global Program Manager, Fistula Care Plus Project, Engender Health Inc.
Country Program Manager, Bangladesh Office, Engender Health Inc.

Dr. Sk Nazmul Huda is the Global Program Manager, Fistula Care *Plus* Project, EngenderHealth Inc. and the Country Program Manager, EngenderHealth Bangladesh Office. He has twenty five years of progressive experience in Public Health Program Management and Research. Being appointed by GAVI Alliance, he was the special adviser to the Health Minister of Bangladesh from 2013 to 2014. He was an adviser to Noble Laureate Prof. Md. Yunus of Grameen Bank before joining GAVI Alliance. He was the Principal Investigator for the WHO sponsored National Survey on Surgery, Obstetrics and Anesthesia Capacity in Bangladesh. Dr. Huda did his MBBS and M.Phil from Dhaka University, Diploma in Epidemiology from Imperial College UK, Diploma in Nutrition from University of Philippines, and Ph.D. in Public Health Sciences from University of Alberta, Canada. He is the Secretary of the South Asian Group on Fistula and related disorders.

Geoffrey C. Ibboston, MSc, MD, FRCSC, FACS

Specialist general surgeon; Senior consultant for the United Nations Institute for Training and Research (UNITAR)

Geoff Ibbotson is a specialist general surgeon, currently serving as a senior consultant for the United Nations Institute for Training and Research (UNITAR) and building a Geneva-based platform for Global Surgery. He studied medicine at the University of Toronto and did his surgical training at the University of Calgary. A fellow of the Royal College of Physicians and Surgeons of Canada and the American College of Surgeons, he holds academic appointments at both the University of Calgary and University of Alberta. He previously served as the Director of Trauma for North West Alberta and as the Chair of the Alberta Provincial Trauma Committee.

Dr. Ibbotson has experience as a frontline surgeon and disaster management leader in the countries of Nepal, Afghanistan, Indonesia, Pakistan, and Kenya.

Joseph Incorvia, MScGH

Research Assistant, Safe Surgery 2020 Initiative, Program in Global Surgery and Social Change, Harvard Medical School

Joe is a Research Assistant at the PGSSC for the Safe Surgery 2020 Initiative. He holds a MSc in Global Health from Duke University and a BS in Biochemistry from Elon University. His interests include access to health services, strengthening healthcare systems, and healthcare economics and policy in low-resource settings. His research interests are specifically focused on the development of health care systems that prioritize high-quality and accessible care, through which he has looked at through the lens of global surgery. Joe has work experience in Ghana, Uganda, Ethiopia, Tanzania, Cambodia, and Laos. He plans on pursuing a career in health policy and governance where he can inform and implement health policy on both a domestic and global scale.

Rooney Jagilly, MBBS, MMed (Surgery)

General Surgeon, National Referral Hospital, Honiara, Solomon Islands

Dr. Rooney Jagilly is one of four General Surgeons working for the Solomon Islands Government. He graduated with a MBBS from the University of Papua New Guinea in 1989. He worked in rural hospitals before doing postgraduate studies in Surgery. He graduated with a Masters in Medicine (Surgery) from the university of Papua New Guinea in 2002. He has been working as a General Surgeon at the National Referral Hospital in Honiara Solomon Islands since 2003 to present. He was also Medical Superintendent of the National Referral Hospital from 2013 to 2017.

Walter Johnson, MD, MPH, MBA

Head, Emergency and Essential Surgical Care Programme, World Health Organization

Dr. Walter Johnson has worked part-time at WHO since 2012, joining WHO full time in 2015. His primary responsibility is fulfilling the mandates of WHA Resolution 68.15 on strengthening emergency and essential surgical care and anesthesia as a component of universal health coverage. Dr. Johnson completed his medical degree at Loma Linda University in California, holds a Masters degree in Business Administration from the Peter F. Drucker and Masatoshi Ito School of Management at Claremont Graduate University in California, and a Masters in Public Health from that same institution.

Desmond Jumbam, MScGH

Health Policy Analyst, Program in Global Surgery and Social Change, Harvard Medical School

Desmond T. Jumbam, MSGH is a health policy analyst with the Program in Global Surgery and Social Change at Harvard Medical School. Desmond co-led the development of the National Surgical, Obstetric and Anaesthesia Plan in Tanzania. He has advised several countries on the development and implementation of NSOAPs including Zimbabwe, Pakistan, Namibia, and Malawi and continues to support the implementation of the Safe Surgery 2020 initiative in Tanzania. Desmond is most interested in research around innovative and sustainable financing for surgical systems scale up in developing countries. He completed his undergraduate degree in biological sciences from Taylor University and holds a Master of Science in global health from the University of Notre Dame.

Salmaan Keshavjee, MD, PhD, ScM,
Director, Center for Global Health Delivery--Dubai, Harvard Medical School

Salmaan Keshavjee is the Director of Harvard Medical School's Center for Global Health Delivery—Dubai. He is also a Professor of Global Health and Social Medicine at the Department of Global Health and Social Medicine (DGHSM) at Harvard Medical School and Associate Professor of Medicine in the Division of Global Health Equity at Brigham and Women's Hospital.

Nang Mo Kham, MPH

Senior Health Specialist, World Bank Myanmar

Nang Mo Kham is Senior Health Specialist at the World Bank, Myanmar. Before joining the Bank in 2013, she has worked for over a decade with UN agencies and international organizations in development and management of HIV/AIDS, STIs, Tuberculosis, and Malaria programmes, contract management, capacity building and organizational development of civil society organizations and networks. Kham holds a Bachelor of Medicine from University of Medicine, Yangon and a Master of Public Health from Mahidol University. She was also a Hubert H. Humphrey Fellow in Public Health Policy and Management.

Bhagawan Koirala, MD, FACC
Head of Department, Cardiothoracic and Vascular Surgery, Institute of Medicine, Tribhuvan University, Kathmandu
Co-chair, NCDI Poverty Commission, Nepal

Dr. Bhagawan Koirala graduated from Kharkiv National Medical University, Ukraine in 1989 and finished his post-graduation from National Institute of Cardiovascular Diseases, Dhaka University in 1994. Dr. Koirala completed his fellowship in cardiac surgery at Baystate Medical Center, Massachusetts and later at the Hospital for Sick Children (University of Toronto), Canada in 2000. Dr. Koirala is known for pioneering the Open-Heart Surgery Program in Nepal since 1997. He also led the Nepal's first Heart hospital (Shahid Gangalal National Heart Center) as the Executive Director and so far, has performed over 10,000 cardiovascular surgeries personally or directly supervised the surgeries. He started the "Poor Patients Relief Program" in 2003 which provides free heart care including surgery to children under 15, the senior citizens above 75 years and the needy. Apart from serving as the executive director at the two national heart centers (Shahid Gangalal National Heart Center and Manmohan Cardiothoracic Vascular and Transplant Center), Executive Director of Trubhuvan University Teaching Hospital, Dr. Koirala has also served as the Executive Vice-Chair of Health Profession Education (HPE) Commission, formed by the government of Nepal to draft an HPE bill. He has also served as a member of Policy Advisory Committee of the Ministry of Health of Nepal and facilitated the inclusion of non-communicable diseases as policy agenda in the national health policy. Dr. Koirala is credited not only for pioneering open-heart surgery in Nepal, but also for giving hopes to the poor people from child to the elderly with subsidized cardiothoracic surgical treatment. He believes that "No child of this country shall die of heart disease just because of poverty." Currently, he holds a position of Head of Department of Cardiothoracic and Vascular Surgery at the Institute of Medicine, Tribhuvan University, Kathmandu and also serves as a national Co-chair of Nepal NCDI Poverty commission.

Hoonsang Lee MD, MPH

Adjunct Professor, Yonsei University School of Public Health, Korea
Member, Health Sector Advisory Committee, KOICA

Hoon Sang Lee is currently an Adjunct Professor at Yonsei University School of Public Health in Korea. Dr. Lee is also a member of Health Sector Advisory Committee of KOICA and a member of Board for Korea Society of Global Health. Previously, he had been a health advisor of KOICA HQ and KOICA Ghana office, where he oversaw programs on maternal and child health as well as health system strengthening in Asia and Africa. He had previously worked as a medical officer at Korea CDC, managing national hepatitis B and measles immunization programme, and was involved in the North Korea health programme for immunization support. He studied Economics and Public Policy at the University of Chicago, received his MD from the Yonsei University School of Medicine, and received his MPH from the Johns Hopkins School of Public Health.

Marissa Leffler, MPP

Health Program Director, UBS Optimus Foundation

Marissa leads the health portfolio for the UBS Optimus Foundation. The Foundation focuses on programs with the potential to be transformative, scalable and sustainable in the areas of child health, education and protection. In her role, Marissa rigorously selects and actively supports programs run by entrepreneurs that use new approaches and technologies to solve problems that prevent children from surviving and thriving. Prior to UBS Marissa spent over 10 years at the U.S. Agency for International Development (USAID), where she most recently served as the Innovation Team Leader in the Global Health Center for Innovation and Impact.

Nareth Ly, MD, MPH

Senior Health Specialist, World Bank Cambodia

Nareth Ly is the Senior Health Specialist at the World Bank Cambodia Office working for projects that aim to improve accessibility, equity, and quality of health service delivery, and to strengthen ownership and accountability of the public health system with the specific focus on improving reproductive, maternal, newborn, child health and nutrition, and non-communicable diseases. She led polio eradication, initiated maternal and neonatal tetanus elimination, and measles elimination in Cambodia. Nareth received her Medical Degree at the University of Health Sciences in Cambodia and her Master Degree on Public Health from the University of Queensland in Australia.

Emmanuel M. Makasa, BSc.HB, MBChB, MPH, M.Med(Ortho)

Global Surgery Ambassador

Professor Emmanuel Malabo Makasa works on Wellness/Health Policy in the Zambian Civil Service – Public Service Management Division (PSMD) and he is the immediate past Assistant Registrar Licensure of the Health Professionals Council of Zambia. He is an Honorary Adjunct Professor for Global Surgery in the Department of Surgery, School of Clinical Medicine, Faculty of Health Sciences of the University of Witwatersrand, Johannesburg, South Africa. He had served for five years (2012-2017) as the Republic of Zambia's Global Health Diplomat at the United Nations in Geneva and Vienna during which time he led the 194 Member States of the World Health Organization (WHO) to strengthen Emergency and Essential Surgical Care and Anaesthesia through Primary Health Care, as a component of Universal Health Coverage and the 2030 Agenda for Sustainable Development.

Tearikivao (Kiki) Maoate ONZM, FRACS

Fellow of the Royal Australasian College of Surgeons
Surgical Examiner and Director of the College's Pacific Programs

Dr. Kiki Maoate is one of New Zealand's leading Paediatric Surgeons and Paediatric Urologists based at Christchurch Hospital. Kiki is a Fellow of the Royal Australasian College of Surgeons and is a surgical examiner and Director of the College's Pacific Programs. He is also member of the Pacific Islands Surgeons Association. Kiki holds the position of Associate Dean Pacific Health, University of Otago, based in Christchurch. He is a well-respected leader in the Cook Island community and Pacific health sector in New Zealand and the region. Kiki was awarded the New Zealand Order of Merit in 2014 for his dedication and commitment to Pacific Health in New Zealand and the region, and is recognized for his long standing commitment to developing, supporting, and mentoring the many Pacific surgeons both in training and qualified in the region.

Eddie McCaig, MBBS, MMed(Surgery), FRACS

Professor of Surgery, School of Medical Sciences, College of Medicine, Nursing and Health Sciences at Fiji National University

Dr. Eddie McCaig is a Professor of Surgery at the School of Medical Sciences, College of Medicine, Nursing and Health Sciences at Fiji National University. Dr. McCaig earned his Diploma in Surgery and Medicine at Fiji University.

Elizabeth McLeod
Chair of the RACS Global Health Monitoring and Evaluation Committee

Liz is a paediatric surgeon from Melbourne. She has worked with Global Health at the Royal Australasian College of Surgeons for 10 years, primarily in the Pacific and South East Asia and in the areas of service delivery, and program design and evaluation. She has a Masters of Public Health with a research interest in program evaluation and aid effectiveness, and is currently the Chair of the RACS Global Health Monitoring and Evaluation Committee.

John G. Meara, MD, DMD, MBA

Director, Program in Global Surgery and Social Change

Plastic Surgeon-in-Chief, Department of Plastic & Oral Surgery, Boston Children's Hospital

John G. Meara, MD, DMD, MBA is the Kletjian Professor of Global Surgery, Director of the Program in Global Surgery and Social Change, and Professor of Surgery in the Department of Surgery at Harvard Medical School. Dr. Meara serves as the Plastic Surgeon-in-Chief of the Department of Plastic & Oral Surgery at Boston Children's Hospital. He was Co-Chair for the Lancet Commission on Global Surgery and was a commissioner on the Lancet Global Health Commission on High Quality Health Systems in the SDG Era and the Lancet Oncology Commission.

Shiva Murugasampillay, MBBS, MSc

Public Health Physician & Health System and Disease Control and Elimination Specialist

A veteran global public health medical specialist of 40 years, he has expertise and experience as a clinician in district and provincial hospitals and as a public health physician in development of public health and disease control and elimination projects, programs and health system in districts, provinces and national level in Zimbabwe, Southern African Development Community and all three levels of the World Health Organization. Currently, he is Co-Director Global Public Health, independently advising and supporting public, faith based, not for profit and private organizations in strengthening public health system and disease control programs structures, capacity and systems for renewal of Primary Health Care towards the Africa Agenda 2063 and SDG3 2030.

Sonal Nagra, MBBS, MMedSurg, FRACS

General and Endocrine Surgeon
Senior Lecturer in Rural Surgery, Deakin University

Dr. Sonal Nagra is a General and Endocrine Surgeon and also the Senior Lecturer in Rural Surgery at Deakin. He is involved in the supervision and training of junior medical staff at University Hospital Geelong where he has an appointment as a VMO. He has an interest in Research and is involved in projects both locally, regionally and internationally. He has a strong Global Health interest particularly in the Pacific through efforts in improving research, education and enhancing surgical services. His research aspirations focus on improving surgical services in LMICs, Emergency Laparotomies and Unplanned Returns to Theatre. Sonal was also fortunate to represent Fiji as a National Squash Representative for over 10 years playing at various international competitions including the Commonwealth Games in 2006.

Benetus Nangombe, Master of Public Policy & Administration, LLB

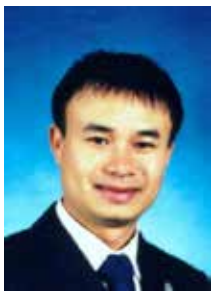
Executive Director of the Ministry of Health and Social Services, Namibia

Ben Nangombe is Namibian civil servant, currently serving as Executive Director of the Ministry of Health and Social Services. His previous senior management and executive roles include serving as Deputy Permanent Secretary: Executive Policy Services and Media Liaison in the Office of the President (Namibia), as well as Director: Research and Media Liaison in the Presidency. He is a holder of a Master of Public Policy and Administration, BJuris and LLB (Honours) degrees among others. He has extensive experience in the Public Service sector in the areas of policy analysis, strategic planning, Performance Management, Policy Research, legal research and analysis as well as change management to name a few. His broad and extensive exposure of over 24 years to the operations of government and public service departments at the highest level, especially in the Executive Branch as well as interactions in the public policy space nationally, regionally, and internationally represent strong skill sets, vital to the operations of the Ministry of Health and Social Services. He assumed the post of Executive Director in August 2018.

Cuong Manh Nguyen, MD, MSc

Deputy Director General, International Cooperation Department, Ministry of Health, Vietnam

Dr. Cuong Nguyen is the Deputy Director General of International Cooperation Department in the Ministry of Health who is Responsible for managing and maintaining consistent cooperation between the Vietnam MOH with WHO, UN agencies, Japan, Korea and other International Organizations such as GAVI, GLOBAL FUND, IAEA, ICRC... to mobilize the support for Vietnam Health Sector. Dr. Cuong Nguyen earned his MSc in Public Health at the University of the Philippines Manila and a M.D. in Hanoi Medical University. In addition, he used to hold honorable titles such as the Deputy Chief of Cabinet Office cum Assistant to the Board of Directors where he managed and supervised overall weekly/monthly plans for the Board. Furthermore, he used to work in the General Department of Preventive Medicine where he was responsible for drafting and submitting Health Quarantine Regulations of Viet Nam as well as the regulations for the Quarantine Procedures for Communicable Diseases at the border gates of the country which equivalent to the IHR implementation currently in Viet Nam.



Viet Phuong Nguyen, BA

Regional Vice President for Development and Asia Pacific Country Representative Vietnam, Operation Smile

Mr. Nguyen is the Regional Vice President for Development of Operation Smile in Asia Pacific and also the Country Representative for Operation Smile Inc. in Vietnam. Mr. Nguyen earned his B.A in economics from the Foreign Trade University with 18 years of experiences serving Operation Smile in different positions and capacities. In his career, he has helped developed extensive programs for Operation Smile, recruited the in country volunteer base, managed medical volunteer engagement along with sustainable programs and recently provided critical leadership in designing appropriate fundraising strategies for local and international communities. Mr. Nguyen's key areas of interest are in understanding the relationship between private and public sectors in developing countries to better promote capacity building and advocacy through initiatives of fundraising and program development support. By developing these activities, Mr. Nguyen generates great values both in kind and financial support to support the Operation Smile's activities in Vietnam and around the region. In addition to the abilities of mobilizing resources, Mr. Nguyen is a regular contributor to the growth of community by offering teaching and sharing experience with local and international associations and civic groups. He is a long time member of the American Chamber of Commerce in Vietnam (AMCHAM) and currently serving on the Board of many in-country student groups.

Kee B. Park, MD

Lecturer, Program in Global Surgery and Social Change, Harvard Medical School

Dr. Kee B. Park is a Paul Farmer Global Surgery Scholar. A diplomate of the American Board of Neurological Surgeons, he helped train the first cohort of neurosurgery residents in Addis Ababa, Ethiopia and Phnom Penh, Cambodia. As the Director of DPRK Programs for the Korean American Medical Association, he leads medical and health projects to support health systems strengthening in DPRK. He graduated from Rutgers Medical School and trained in neurosurgery at Temple University.

Rolvix Patterson, BA

Research Associate, Program in Global Surgery and Social Change, Harvard Medical School

Rolvix Patterson is a research associate at Harvard Medical School's Program in Global Surgery and Social Change (PGSSC) and a 4th year MD/MPH candidate at Tufts University School of Medicine. A future otolaryngologist/head and neck surgeon, he intends to address disparities in head and neck cancer care as a surgeon-researcher and advocate. His interests span surgical systems development, health policy, and research equity. Rolvix is committed to harnessing these skills to promote surgical capacity development in Haiti.

Alexander Peters, MD

Paul Farmer Global Surgery Research Fellow, Program in Global Surgery and Social Change, Harvard Medical School

Dr. Alexander Peters is a Paul Farmer Global Surgery Research Fellow at the Program in Global Surgery and Social Change at Harvard Medical School, and resident in general surgery at Weill Cornell Medical College. Prior to medical school, he worked as a financial analyst in New York. His research centers on improving the delivery of high-quality and cost-effective surgical care, health economics and financing, medical education, and health innovation in low-resource settings. He is currently also pursuing an MPH in Global Health and Population at Harvard T.H. Chan School of Public Health.

Bouathep Phoumindr, MD

Deputy Director General, Department of Health Care and Rehabilitation, Ministry of Health

Dr. Bouathep Phoumindr is Deputy Dean of the Faculty of Medical Technologies, Chairperson of Rehabilitation Medicine Department, Vientiane, Laos, and Deputy Director General of the Department of Health Care and Rehabilitation at the Ministry of Health in Laos. She is Head of Quality Standards of the University of Health Sciences and in her Deputy Dean position responsible for the Curriculum and Research development. During her former hospital career, she was Chairperson of the Rehabilitation Medicine Department of the Faculty of Medical Sciences and key person of Rehabilitation Medicine and as an Educational Administrator, she was a lecturer and trainer for medical students and physical therapy students. At the Mahosot Hospital, she was the Chief of Physical therapy Service and trainer for Physical therapy students in collaboration with Handicap International. She is a practitioner and trainer for acupuncture.

Sushil Nath Pyakuryel, MBBS
Chief Specialist, Ministry of Health and Population, Nepal

Mr. Sushil Nath Pyakuryal started his government job in 1980 as an X-Ray technician and worked as a Medical Superintendent from 1989 to 1993 in different districts of Nepal. From 1993 to 2013, he worked as a district health officer in various district of Nepal as chief of the health facility. From 2013 to 2018, he worked as a Regional Health Director in three regions of Nepal. He is a Chief Specialist in the Ministry of Health and Population from 2018 until now.

Lalantha Ranasinghe, MBBS, MS, FRCS

Consultant general surgeon, National Hospital of Sri Lanka, Colombo

Dr. Lalantha Ranasinghe is a consultant general surgeon at the National Hospital of Sri Lanka, Colombo. He is a member of the Board of Study in Surgery, Post-Graduate Institute of Medicine, Colombo and is a member of the court of examiners in MD Surgery. Honorary senior lecturer in surgery to the Faculty of Medicine, University of Colombo. Served in various parts of the country during the war. He is the former Vice-President of the Sri Lanka Medical Council.

Hamid Ravaghi, PhD
Regional Advisor, Hospital Care and Management,
Department of Health System Development, WHO EMRO

Dr. Hamid Ravaghi is working as regional advisor for Hospital Care and Management at the Department of Health System Development in WHO EMRO. Hamid holds a PhD degree in Health Policy and Management from University of York, UK. He is an associate professor with over 20 years working experiences in health system and strong background in hospital care and management at national and international levels. He has been General Director of Hospital management and clinical excellence in Ministry of Health and Medical Education, Iran. He was the Dean of School of Health Management and Information Sciences, Iran. He has taught in various post-graduate programs and senior continuous education course. Hamid has published several articles on different aspects of healthcare organizations and hospital management.

Ché-len Reddy, MBChB, MPH
Paul Farmer Global Surgery Research Fellow, Program in Global Surgery and Social Change, Harvard Medical School

Ché-len Reddy, MBChB, MPH is a physician from South Africa and a Paul Farmer Global Surgery Fellow at the Program for Global Surgery and Social Change at Harvard Medical School. At the PGSSC, he is the lead Fellow providing support for surgical systems strengthening in the in the SADC region. He's interested in the political dimensions of health systems, global health security, and the diffusion of innovative surgical technologies into global health systems. He received his medical degree from the University of Cape Town Medical School and MPH from Harvard T.H. Chan School of Public Health.

Teri Reynolds, MD, MS, PhD
Programme Lead, Emergency and Trauma Care, Department for Management of Noncommunicable Diseases, Disability, Violence and Injury Prevention, WHO

Dr. Teri Reynolds, a citizen of the United States, completed her MD, MS in Global Health Sciences, and fellowship in Emergency Ultrasound at the University of California, San Francisco; emergency medicine specialisation at Highland Hospital in Oakland, California; and PhD in Literature at Columbia University in New York. She was Associate Professor and Director of Global Health for the Department of Emergency Medicine, University of California, San Francisco, and directed the Emergency Medicine Residency and research programmes at Muhimbili National Hospital in the United Republic of Tanzania. As chair of the African Federation for Emergency Medicine (AFEM) Scientific Committee, she developed the AFEM Emergency Care Curriculum and the AFEM regional Trauma Data Project. Dr. Reynolds, who has served previously as both consultant and staff Technical Officer at WHO, joined the WHO Department for Management of Noncommunicable Diseases, Disability, Violence and Injury Prevention (NVI) in May 2015 to lead the emergency and trauma care programme. The programme focus is the strengthening of integrated emergency care systems to address a range of acute illness and injury. Current initiatives include the WHO Emergency Care Systems Framework, the Emergency and Trauma Care Systems Assessment Tool, the Basic Emergency Care Course, the Trauma Care Checklist, and the Minimum Data Set for Injury. Dr. Reynolds also coordinates the Global Alliance for Care of the Injured.

Lina Roa, MD

Paul Farmer Global Surgery Research Fellow, Program in Global Surgery and Social Change, Harvard Medical School

Lina Roa is a Paul Farmer Global Surgery Research Fellow at the Program for Global Surgery and Social Change at Harvard Medical School and a resident in Obstetrics & Gynecology at the University of Alberta. She obtained her MD from the University of Toronto and is currently pursuing an MPH at Harvard T.H. Chan School of Public Health.

Khama Rogo, MD, MMEd O/G, Ph.D. FCOG(ECSA)
Lead Health Sector Specialist and Programme Head, Health In Africa Initiative, World Bank Group

Trained as an obstetrician-gynecologist, Dr. Rogo later earned his Fellowship and PhD in Gynecologic Oncology from Sweden. He is Founding Fellow of College of Obstetricians and Gynecologists of East Central and Southern Africa. He currently serves as the Lead Health Sector Specialist and Head of the Health in Africa Initiative, a private sector in health focused program of the World Bank Group. Prior to that, he was Senior Advisor for Population and Reproductive Health at The World Bank.

After a fulfilling career in academic medicine in three continents, he shifted his focus to Global Health, and has been an articulate advocate for reproductive health and rights for over two decades. He is strongly committed to community health, reproductive health, and actively participated in all the definitive global and regional reproductive health conferences of our time: Safe Motherhood (Nairobi, 1987), ICPD (Cairo, 1994), Beijing (1995) and Safe Motherhood plus 10 (Colombo, 1999). He served as a consultant to all major international development agencies. He previously served on the FIGO Committee on Women's Sexual and Reproductive Right and represented KOGS in the FIGO Postgraduate Studies Committee at the Singapore Congress. As Ipas Vice President for Africa and Global Affairs (1998-2000), he introduced MVA in Africa against formidable forces and built scale up program to implement Ipas's regional and global strategic vision to promote women's reproductive health and rights.

Lauri Romanzi, MD, MScPH, FACOG, FPMRS

Project Director, Fistula Care Plus, Engender Health Inc.

Lauri Romanzi is the Project Director of the Fistula Care Plus project. Dr. Romanzi is a U.S.- trained gynecologist with sub-specialty board certification in Female Pelvic Medicine and Reconstructive Surgery (FPMRS). Having joined Fistula Care Plus in April 2015, she appreciates the value and challenge of shared vision in the context of change.

Emile Rwamasirabo, MD, FCS(ECSA)

Chief Consultant Urological Surgeon, King Faisal Hospital/OSHEN, Kigali, Rwanda

Chief Consultant Urological Surgeon at King Faisal Hospital/OSHEN, Kigali, Rwanda; Clinical Professor of Urology at the University of Rwanda and urology residency promotor and current director. He was Ambassador of the Republic of Rwanda to Japan in 2005 to 2009; Chairman of Rwanda Medical and Dental Council (2012 - 2016); Vice-Chancellor of the National University of Rwanda (1998 – 2004); team leader of the Rwanda National Surgical, Anesthesia, and Obstetrics Plan (NSAOP) on behalf of the Ministry of Health and the Rwanda Surgical Society (2017 – 2018); currently national consultant for the design of the Rwanda Medical Procedures Coding (RMPC).

Anan Sacdpraseuth

Chair, Department of Gynecology and Obstetrics, Faculty of Medicine

Dr. Anan Sacdpraseuth is Chair of the Department of Gynecology and Obstetrics at the Faculty of Medicine and Mahosot Central Hospital in Vientiane, Lao PDR, and Chair of Gynecology and Obstetric Services at the Ministry of Health.

Lubna Samad, MBBS, MRCS, FCPS, MPH

Pediatric Surgeon, Indus Hospital, Karachi, Pakistan
Lecturer, Center for Global Health Delivery--Dubai, Harvard Medical School

Dr. Lubna Samad is a pediatric surgeon at the Indus Hospital, Karachi, and heads the Center for Essential Surgical and Acute Care at Indus Health Network. She is a Lecturer at Harvard Medical School's Center for Global Health Delivery in Dubai, member of the G4 Alliance and the Global Initiative for Children's Surgery. She is dedicated to improving access to quality surgical care for those who need it the most, working on service delivery and research initiatives as well as spearheading a national effort for surgical systems strengthening. She works actively with the global surgery community to find locally relevant solutions to bridge the health delivery gap.

Vonthanak Saphonn, MD, PhD
Rector, University of Health Sciences, Cambodia

Professor Vonthanak is the Rector of the University of Health Sciences, Cambodia (UHS). He is also an Adjunct Associate Professor of Epidemiology at UCLA Fielding School of Public Health. He received his Medical Doctor degree from the UHS in 1995 and his PhD in epidemiology from the University of California, Los Angeles in 2003. Over the last 20 years he has been authors and co-authors of more than 80 peer-reviewed articles and book chapters. He has contributed to development of research and policy in Cambodia and internationally with different capacity as local and international consultant.

Kim Savuon, MD

Deputy Director, Department of Hospital Services, Ministry of Health, Cambodia

Prof. Kim Savuon, MD, Psychiatrist, is Deputy Director, Department of Hospital Services. He graduated in Mongolian Medical University. He had worked at National Center for Tuberculosis and Leprosy Control until 2014 assigned to be Chief of Bureau of Mental Health, Department of Hospital Services. He has been lecturer to medical students of International University in Phnom Penh. Prof. Kim Savuon wrote chapter of Routledge Handbook of Psychiatry in Asia. Within his responsibilities, he has facilitated with different health development stakeholders including WHO, GIZ, and other professional associations to improve quality of health services. He has been assigned to be member of several working groups to develop National Guidelines particularly Infection Prevention Control, Antimicrobial resistance (AMR), Antimicrobial Stewardship (AMS), Clinical Practice Guidelines to implement within national and sub national levels of health system in Cambodia.

Swati Sharma, MBA

Senior Program Manager, Dalberg Global Development Advisors

Swati Sharma is a Sr. Program Manager at Dalberg Global Development Advisors, currently managing the expansion of the Safe Surgery 2020 program in Southeast Asia. She has received her MBA from INSEAD and has experience in project management and sustainability strategy across three geographies, being Asia, Africa, and Europe. Prior to Dalberg, she has worked with development organisations such as the World Business Council for Sustainable Development (WBCSD) and the Global Green Growth Institute (GGGI) engaging corporates and governments, respectively, to launch programs which support sustainable growth of their priority sectors with maximum social and environmental impact. Swati is passionate about technology, innovation and sustainability and their role in the future of business and governance.

Dr. Syed Shershah, MBBS, DORCPI, FRCOG

Consultant Obstetrician & Gynecologist, Koohi Goth Hospital
President, Pakistan National Forum on Women's Health

Dr. Shershah Syed, Consultant Obstetrician & Gynecologist, graduated in 1979 from Dow Medical College, Karachi, trained in obstetrics & gynaecology in Ireland and received his fellowship from Royal College of Obstetrics and Gynaecology London. From 1990-2011, he worked as Associate Professor and Head of the OBGYN Department at Sobhraj Hospital and Sindh Government Qatar Hospital Karachi. He has remained elected as Honorary Secretary General of Pakistan Medical Association (PMA) for six years and President of Society of Obstetrician & Gynecologists of Pakistan (SOGP) for four years. He is also an Elected Member of Pakistan Medical & Dental council (PMDC). Dr. Shershah is a human right activist and his special interest is in women right issues & violence against the girl child. He closely works with NGOs like Women Front, Amnesty International, Aurat Foundation, Gawahi, and War Against Rape. He has also been worked on Maternal and Child Health issues in collaboration with UNICEF, USAID and UNFPA as well as local NGOs like Aahung, HANDS, Packard Foundation, Taraquee Foundation, etc. He also actively participated in emergency relief and medical aid services during disaster situations like Earthquake in Northern Areas of Pakistan in 2005 and flood disaster in 2010 and 2011. At present, he is the President of Pakistan National Forum on Women's Health (PNFWH). Currently under his leadership, various women's health related projects are in progress like Fistula Project (for prevention and treatment of genitourinary fistula), Nutrition Project (for improving nutritional status of infants, young child and pregnant women), and Tutors Training Program for Nurses and Midwives. In recognition of his services for women's reproductive health and rights, especially on maternal and child health issues, he was appreciated and rewarded by various international forums.

Haitham Shoman, MBBCh, MPH, DIC
Paul Farmer Global Surgery Research Fellow, Program in Global Surgery and Social Change, Harvard Medical School

Haitham earned an MBBCh from Cairo's Ain Shams University, completed surgical rotations later DIC, MPH from Imperial College London. His global health experience includes health economics, health policy and health systems strengthening. He worked for European Commission's Joint Research Centre, WHO, and Cambridge University Hospitals. He commits to using cost effective surgery for health systems development through education, innovation, outcomes-based research as a PGSSC fellow.

Chon Sinoun, MD
Deputy Director, Department of Hospital Services, Cambodia

Dr. Chon Sinoun, Deputy Director, Department of Hospital Services, graduated at the University of Health Science, Cambodia. Since 1994, she is in the position Chief of Quality Assurance Office, Hospital Services Department, Ministry of Health Cambodia. Since 2005, she was assigned and responsible for quality improvement, conducting Level 1 and Level 2 assessment in collaboration with URC. She coordinated and facilitated in many working group of developing CPA guidelines and Clinical Practice Guidelines. She has been in the National Surgical Safety Checklist Working Group which was coordinated and supported by the WHO in 2012. This checklist was introduced to apply at National and Referral Hospitals. To improve the quality of surgery, obstetric. And anesthesia, the checklist is included in the National Quality Enhancement Monitoring Tools which is currently implemented on a quarterly basis as quality assessment.

Rebecca Sliwoski, MS, MBA
Director of Strategy and Partnerships at the Kletjian Foundation

Rebecca Sliwoski is the Director of Strategy and Partnerships at the Kletjian Foundation, which advocates for universal access to safe, affordable surgical and anesthesia care and while also shifting the philanthropic needle towards integrated global health spending. Rebecca also runs an independent consulting business and serves on boards for international development organizations, public health firms, corporate foundations, and universities.

After receiving her degree in Behavioral Sciences from University of Michigan, Rebecca ran a community-based organization in Tanzania. Rebecca then attained her MBA/MS in Global Health Policy and Management from the Heller School at Brandeis University. Her role previous to the Kletjian Foundation was leading strategic communications and business development for a USAID/PEPFAR-funded social protection organization.

Christopher Strader, MD
Paul Farmer Global Surgery Research Fellow, Program in Global Surgery and Social Change, Harvard Medical School

Chris is a General Surgery resident at University of Massachusetts in Worcester, Massachusetts. His previous global health experience includes work with emergency medicine and diabetes education in the Democratic Republic of Congo. While with PGSSC, Chris is looking forward to becoming involved in projects focused on delivery of care and obstacles to delivering that care with a regional emphasis on Sub-Saharan Africa.

Claude Suréna, MD
Member of the Cabinet of the Haitian Ministry of Health and the Population
Healthcare Advisor in the Office of the Prime Minister of Haiti

Dr. Claude Suréna is a member of the cabinet of the Haitian Ministry of Health and the Population (MSPP), where he has held numerous positions throughout his career in public health. A pediatrician and neonatologist by training, he has consulted on several national projects, such as the Global Fund's HIV/AIDS control project. He has also served as president of the Haitian Medical Association. Following the earthquake of January 12, 2010, Dr. Suréna was appointed by the President of the Republic of Haiti as National Coordinator of the health sector's disaster response. He has been Chairman of the district 7020 Haiti Task Force of Rotary International and also Chairman of the Disaster Relief Committee for the same district. He is currently a Healthcare Advisor in the Office of the Prime Minister of Haiti and has served as Vice-President of the Haitian Red Cross. A former president of the Rotary Club of Pétion Ville, Haiti, Dr. Suréna has twice been honored as a Paul Harris Fellow of Rotary International.

Chiho Suzuki, MD
Senior Health Specialist, World Bank Zambia

Dr. Chiho Suzuki is a senior health specialist at the World Bank Zambia. Dr. Suzuki earned his Doctor of Philosophy in International Health and Development at Tulane University, a Masters in Public Health, specializing in International Health and Development at Tulane University.

Emi Suzuki, PhD
Demographer, World Bank

Emi Suzuki, Ph.D., is a Demographer at the World Bank with over 15 years of experience in the World Bank's demographic and health statistics. Her areas of interest are population, demography, health statistics, health SDGs, and global health monitoring. She currently leads the work to produce high-quality population and global health statistics in the World Development Indicators (WDI), World Bank's flagship statistical publication. Emi holds a PhD from the Johns Hopkins Bloomberg School of Public Health.

Akmal Taher, MD, PhD

Senior Advisor to Minister of Health for Improvement Services, Ministry of Health, Republic of Indonesia
Chairman, Indonesian College of Urology

Akmal Taher obtained his medical degree in 1980 from the University of Indonesia. After serving the compulsory duty at a community health center, he graduated as a urologist in 1988. He was a research fellow at the Hannover Medical School and Institute for Peptide Research in Hannover from 1990 to 1992, and also obtained his Doktor Medikus and his PhD degree in 1993 on the same school. At present, he is the Special Advisor to the Minister of Health for Improvement Services of the Ministry of Health of the Republic of Indonesia. In 2010-2015, he was the Director General of Health Care Services of the Ministry of Health Republic of Indonesia. In 2005-2010, he was the Director of Cipto Mangunkusumo National General Hospital, Jakarta, which is the main teaching hospital of the Faculty of Medicine University of Indonesia. Recently, in November 2017, he was elected as Chairman of Indonesian College of Urology.

Lord Viliami Tangi, MBBS, FRACS

Chief Surgeon Specialist, Vaiola Hospital, Tonga

Lord Tangi (Dr. Viliami Tangi) is currently the Chief Surgeon Specialist at Vaiola Hospital, the main referral hospital in Tonga. He is a Fellow of the Royal Australasian College of Surgeons (FRACS). Lord Tangi was appointed Minister for Health, Tonga in March 1999, a post he held for almost twelve years. He was appointed directly from the clinical settings. Lord Tangi was also the Deputy Prime Minister, Tonga from May 2006 to the end of 2010. For the last two years, he has been a member of the Privy Council of Tonga.

Noah Tapaua, MBBS, MMed(Surgery), Higher Dip. in Cardiothoracic Surgery

General and Cardiothoracic Surgeon, Port Moresby General Hospital, Papua New Guinea

Noah Tapaua is a consultant General and Cardiothoracic surgeon at the Port Moresby General Hospital in Papua New Guinea (PNG). He is also an honorary senior clinical lecturer at the University of Papua New Guinea School of Medicine & Health Sciences and the Surgical Coordinator at the Port Moresby General Hospital. He recently established the PNG National Permanent Pacemaker Implant program and working toward fully establishing a cardiothoracic service in his country. Dr. Tapaua is the chairman of the PNG Surgical, Obstetrics and Anaesthesia National Health Plan Policy working committee. He is a member for the PNG Surgeons Association, the PNG National Doctors Association and the Pacific Island Surgeons Association.

Ngoc Thang
Masters Student of Keough School of Global Affairs at the University of Notre Dame

Ngoc (Brian) Thang is currently a Master Student of Keough School of Global Affairs at the University of Notre Dame. He has spent one year (two months in Tanzania) working with PGSSC to develop a 20-page case study on the development of the NSOAP in Tanzania. Before coming to Notre Dame, he has worked in both the private and public sectors in Vietnam, focusing on economic policy initiatives for the Vietnam Chamber of Commerce and Industry. He holds a bachelor's degree in economic law from Hanoi Law University in Hanoi, Vietnam.

H.E. Dr. Or Vandine, MD, MPH
Secretary of State for Health, Cambodia

Her Excellency Dr. Or Vandine first received a degree as a Primary Nurse (Nurse Practitioner) before pursuing her Medical Doctor degree in 1988 due to the immense need in Cambodia. She was opted to serve at the Provincial Hospital in Siem Reap, a province beset by Khmer Rouge and other insurgencies. In 1994, she became the first Cambodian woman to be awarded a Fulbright Scholarship to study at Yale University, USA, for the degree of Master of Public Health and in 2009, she received "Alumni Public Service Honor Roll Award" from this school.

In 1998, she was appointed as Chief of Cabinet for the Minister of Health, and Chief of the Communicable Disease Control Department (CDC) to be responsible for establishing this department for the Ministry of Health of Cambodia where previously non-existed. In 2003, following an assignment for WHO in the Western Pacific Region located in Manila, she was appointed to be Deputy Director of the CDC Department, where she became Manager, Principal Recipient of the Ministry of Health (PR-MoH) for the Global Fund Grants to Fight AIDS, TB, and Malaria (GFATM). In 2006, she was promoted to be Director of the Department of International Cooperation of the Ministry of Health. In November 2013, she was appointed as Director General for Health, and in January 2019 she was appointed Secretary of State for Health by the King of Cambodia.

Dominique Vervoort, MD
Research Associate, Program in Global Surgery and Social Change, Harvard Medical School
Chair, InciSioN (International Student Surgical Network)

Dominique Vervoort obtained his MD at the KU Leuven in Belgium in 2018 and currently works as a Research Associate at the Program in Global Surgery and Social Change at Harvard Medical School where he focuses on National Surgical, Obstetric, and Anesthesia Planning in Pakistan. He introduced the field of global cardiac surgery to literature, dedicated to addressing the lack of access to safe and affordable cardiac surgical care for six billion people worldwide, and is currently working on the matter through health policy, health economics, and outcomes research.

Dominique is co-founder and Chair of InciSioN, uniting over 5,000 students and residents in Global Surgery in over 80 countries, and founder of the Global Cardiac Surgery organization. In July 2019, he is entering the MPH/MBA dual degree at the Johns Hopkins Bloomberg School of Public Health and the Johns Hopkins Carey Business School, after which he intends to pursue a career in paediatric cardiac surgery with a focus on strengthening cardiac surgical services in low- and middle-income countries.

Kathryn Wall, BA
Program Coordinator, Program in Global Surgery and Social Change, Harvard Medical School

Kate Wall is the Program Coordinator for the Program in Global Surgery and Social Change at Harvard Medical School and Boston Children's Hospital. She is interested in health policy development as it relates to surgical and health systems strengthening.

Susan Wardle, BA, Grad Dip Spec Ed, Grad Dip Bus (OD), MBA, GAICD
Executive General Manager, Partnerships of the Royal Australasian College of Surgeons

Susan Wardle was appointed Executive General Manager, Partnerships of the Royal Australasian College of Surgeons in 2018. This portfolio develops and strengthens partnerships within the surgical community and the broader communities it serves. Functions include global health, conferences and events, communications and advocacy, and the foundation for surgery.

Susan has most recently provided consulting services in areas of strategy, communication, issues management, stakeholder relations and advocacy with health, membership and philanthropic organisations. Prior to this, Susan spent 10 years at Epworth HealthCare as Executive Director, Strategy, Marketing, and Business Development. Her earlier career includes leadership roles in public and private health, technology, energy, and education sectors.

Monique Wubbenhorst, MD, MPH
Senior Advisor, Family Planning and Reproductive Health, USAID

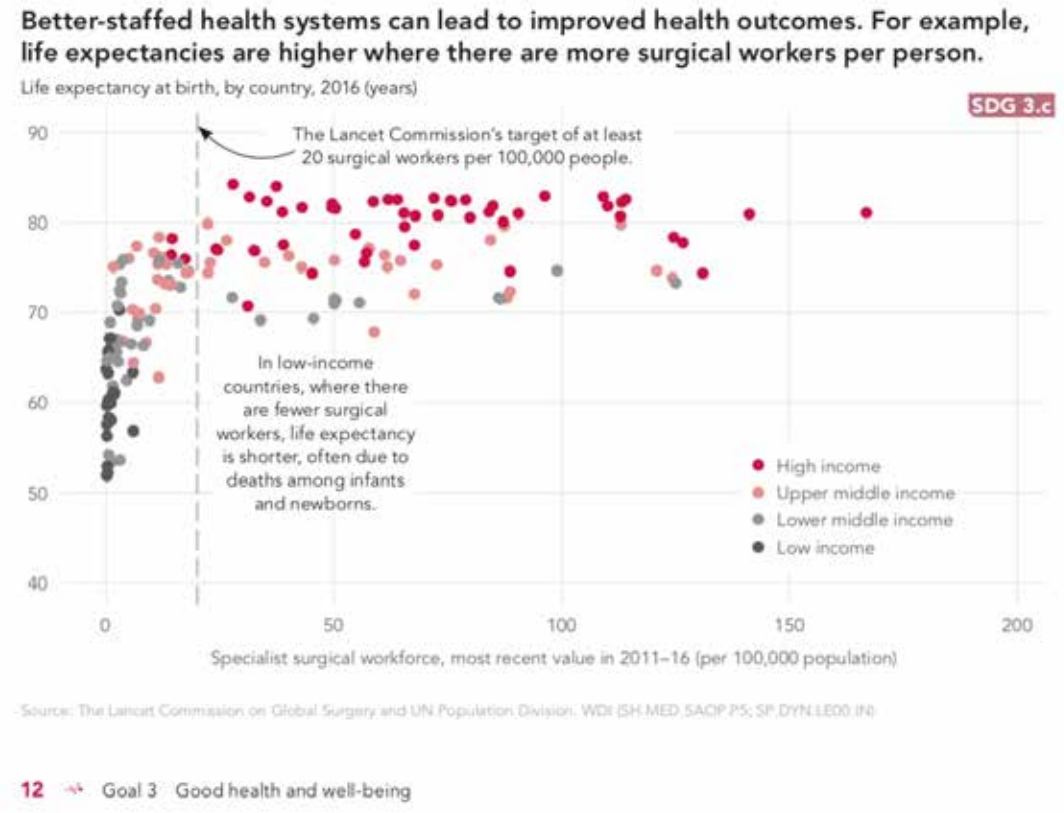
Dr. Monique Chireau Wubbenhorst, MD, MPH, FACOG, FAHA, is currently Senior Advisor in Global Health at USAID in Washington DC. She received her MD from Brown University, her MPH from Harvard University, and did her residency in OB/GYN at Yale-New Haven Hospital, and her postdoctoral fellowship in health services research at UNC-Chapel Hill. She is a fellow of the American College of Obstetricians and Gynecologists and the American Heart Association. Dr. Chireau Wubbenhorst has been involved in patient care, teaching, research, and policy work in inner city locales, rural North Carolina, and Native American reservations in the US, as well as in Kazakhstan, Ghana, South Sudan, the Philippines, Nepal, Cameroon, India and South Sudan.

Kanako Yamashita-Allen

Senior Specialist in Health, Nutrition, and Population, World Bank

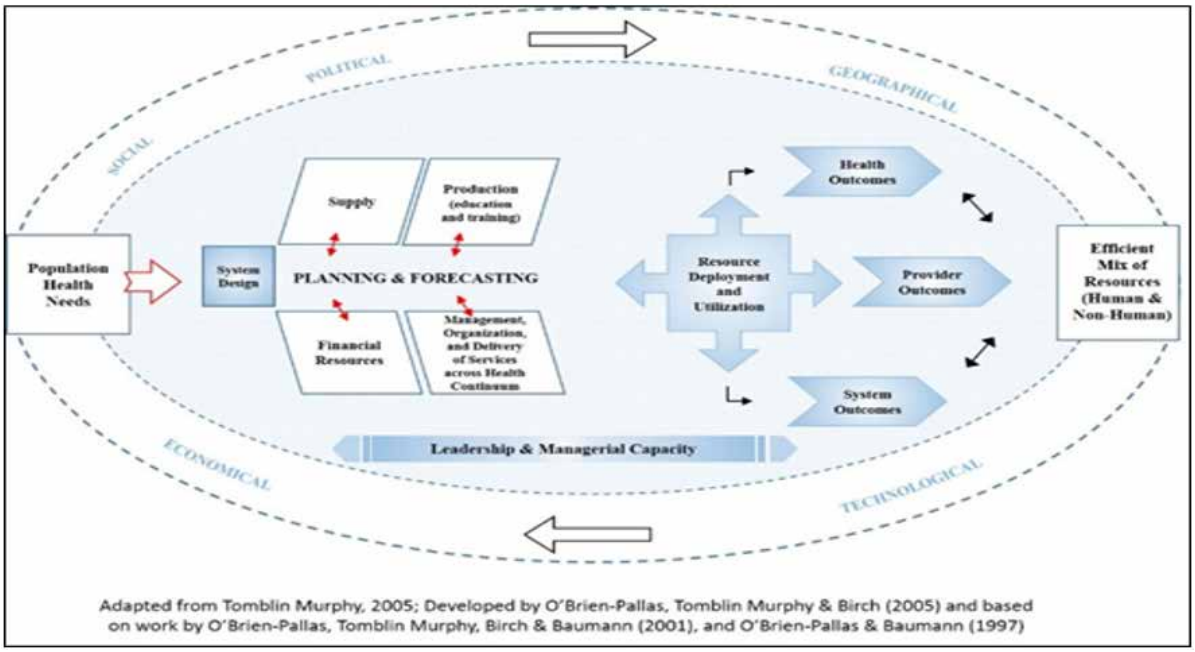
Kanako is a Senior Health Specialist in the Health, Nutrition, and Population of the World Bank and is a Task Team Leader for Sri Lanka and Pakistan programs. She has over 20 years of experience in the health sector working with governments, NGOs, and the private sector in the health sector covering maternal and child health, HIV/AIDS, quality of care, community participation, and institutional capacity building in South Asia, East Asia, Southeast Asia, and Africa.

Appendix 3. Example of World Bank Group promotion of global surgery indicators



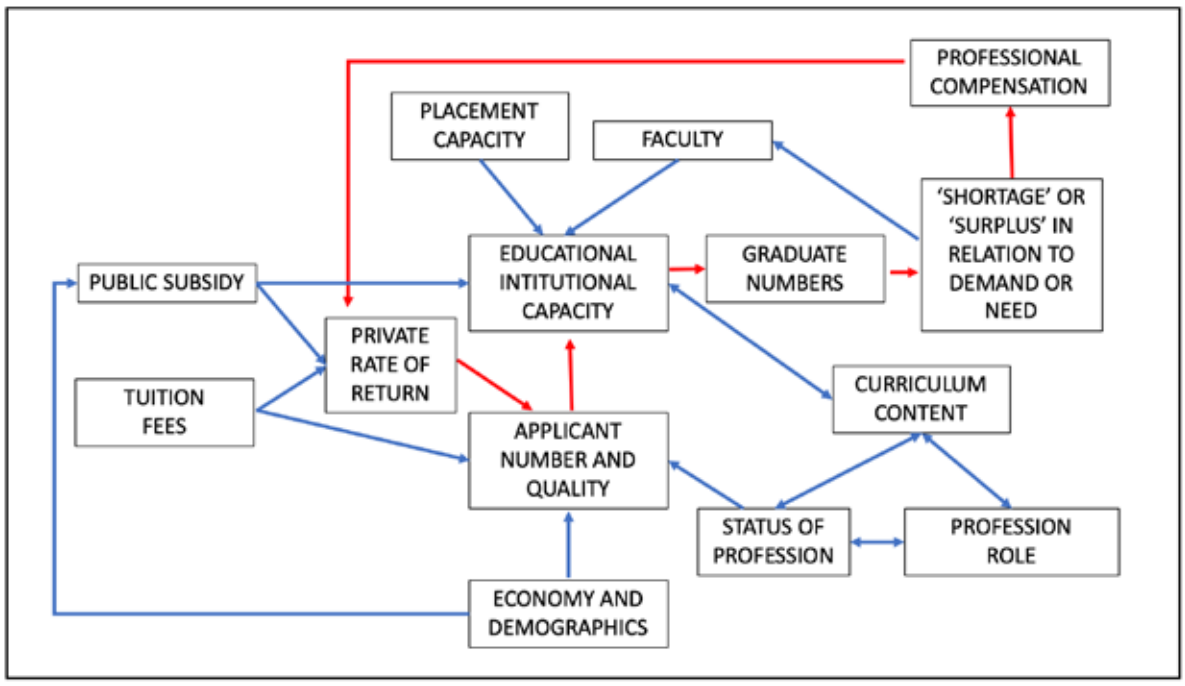
Source: Meara presentation

Appendix 4. Simulation model for developing human capital for health



Source: Rogo presentation; adapted from Tomblin-Murphy 2005

Appendix 5. Interrelationship between the health professional job market and health professional training opportunities



Source: Rogo presentation
"Park K., Tariq K. et al., Comprehensive Policy Recommendations for Heand and SPine Injury Care in LMICs [online]: https://docs.wixstatic.com/ugd/d9a674_1ba60c38a07341a7bbbe8b1e3f0ff507.pdf"

Appendix 6. Comprehensive Policy Recommendation for Head and Spine Injury Care in LMICs

	Surveillance	Prevention	Pre-hospital care	Surgical system	Rehabilitation
Infra-structure	-Integration through agile platforms -Leverage international partnerships for surveillance	-Safe roads	-Contextualized pre-hospital system	-80% of population within 4-hours of neurotrauma center -Strengthen pre-existing trauma infrastructure for neurotrauma	-Contextualized allocation of space and stuff for neuro-rehabilitation -Facility stratification for severity
Workforce	-Fit for purpose workforce for data collection, analysis, and interpretation -Align international collaborations to support local workforce capacity - Flexible and strategic use task-shifting and task-sharing to optimize human resources	-Robust workforce for public health education and implementation	-Neurotrauma care training of emergency medical personnel	-1 neurosurgeon per 200,000 people at minimum -Task-sharing of surgical workforce is preferred over task-shifting -Dramatically increase neurosurgical training capacity	-Ensure rehabilitation training capacity is adequate -Ensure competency throughout continuum education
Service delivery	-Minimum data to include demographics, diagnosis, mechanism, severity, and outcome measure -Use existing trauma registry -Use WHO Trauma System Maturity Index to monitor progress	-Strengthen public education -Encourage safety-conscious "Ride hailing" services -Strengthen enforcement of safety laws	-Prevent hypotension and maintain oxygenation -Time from injury to neurotrauma facility should not exceed 4-hours	-Standardization of essential neurotrauma equipment -CT scanner in all neurotrauma facilities -Critical care unit in all neurotrauma facilities -Leverage telemedicine as a tool for increasing coverage - Innovate for low-resource settings	-Sensitive to gender and age sub-groups - Partner with family for delivery of non-technical physical therapy
Financing	-Maximize external funding -Build internal capacity -Use open-source platforms	-Promote health benefits of public investment in safe roads -Partner with external organizations for advocacy	-Cost-effective training models -Utilize low-cost or free digital technology	-Embed neurotrauma within universal health coverage package -International partnerships for neurotrauma capacity building	-Embed neurorehabilitation within universal health coverage package
Information management	-Utilize WHO International Registry for Trauma and Emergency Care (IRTEC)	-Tracking of safety law compliance	-Encourage data collection by emergency medical personnel	-Track neurotrauma workforce and operative mortality	-Collection of neurorehabilitation outcome data
Governance	-Empower ministry of health leadership -Utilize reporting requirements to improve accountability and compliance	-Regulatory framework to strengthen enforcement -Comprehensive helmet laws - Workplace safety regulations	-Inclusion of pre-hospital care in national health plans	-Draw on existing international technical resources to assist with neurotrauma capacity building -Promote neurotrauma as vital to achieving national and international health and development goals	-Rehabilitation is indispensable to a quality health system

Source: https://docs.wixstatic.com/ugd/d9a674_1ba60c38a07341a7bbbe8b1e3f0ff507.pdf

Appendix 7. SADC NSOAP process

Phase	Steps	Partnerships	Leadership
PHASE-I Partnership and planning	Partnership mapping Stakeholder & Partners Consultations-SOA Partnership forum Secretariat Task force & working Groups Road Map and funding for NSOAP development	Ministry of Health and Child Welfare Professional associations University Health funders	Secretariat Task force & working groups
PHASE-II Situation analysis	Country socioeconomic development profile Health system analysis and profile SOA situation analysis and profile. Strategic priorities	Private sector Multilateral and bilateral partners WHO-UNFPA, UNICEF, WB-ADB, IDB-BRICS	Secretariat Task force & working groups
PHASE-III Strategy	Values, vision, mission, goals Strategic objectives and activities Logical performance framework Outcome and impact indicators and targets		Secretariat Task force & working groups
PHASE-IV Strategic plan	Gap analysis Business/operational plan (2-3 year) PSM plan Performance framework and M&E plan Costing, budget, and financial plan Implementation framework and program management		Secretariat Task force & working groups
PHASE-V Finalize/launch plan; resource mobilization	Publish the SOP Resource mobilization Annual action plan		Secretariat Task force & working groups

Source: Makasa presentation

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