We would like to acknowledge the staff from the Harvard Medical School Center for Global Health Delivery - Dubai for their incredible help arranging this symposium. Specifically, Suchitra Kulkarni, Michael Lindeborg, Joseph Sax, Dr. Nasreen Adamjee, Dr. Uche Udeozo, and Jennifer Puccetti were invaluable contributors. We would also like to acknowledge James Dahm for assistance with copy-editing.
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1.0 Introduction, Background and Context

“Equity must play a strong role in the way we look at health care in general and surgical care in particular. The idea is to make sure that surgical care, like any other type of intervention, is available of the same quality and in the same way to people in all parts of the world. How to do that, and how to get there, is what this symposium is all about.”

--Dr. Lubna Samad, M.B., B.S.

1.1 INTRODUCTION / EXECUTIVE SUMMARY

Surgical care is one of the areas of focus of Harvard Medical School’s Center for Global Health Delivery - Dubai, the host of the symposium Global Surgery: Towards Equitable Surgical Systems. Dr. Lubna Samad, lecturer at the Center for Global Health Delivery - Dubai and co-chair of the symposium, opened by describing the landscape of global surgery today. Global surgery addresses a broad array of conditions which exert enormous health burdens around the world. Surgical care is highly cost effective, is feasible to promote worldwide, and can treat up to one third of the global burden of disease. Despite this, five billion people around the world lack access to safe, affordable and timely surgical and anesthesia care.¹

Figure 1. Proportion of the global population without access to surgery


The Harvard Medical School Center for Global Health Delivery - Dubai was established in 2015 to further Harvard Medical School’s mission to create and nurture a diverse community of the best people committed to leadership in alleviating human suffering caused by disease. Dubai was chosen as its site because of its strong leadership and its historical and present-day position as a hub for global connections. The center operates with a dual hub model between Boston and Dubai.

Dr. Samad explained that addressing healthcare delivery gaps – to ensure that the best available intervention, medicine, or procedure is accessible to everyone who needs it – is the focus and guiding principle of the Center.

The Center has three concurrent missions:

• Research – to conduct and publish cutting edge health delivery research on innovative approaches to addressing health problems of critical importance to the region and the world

• Education – to train the next generation of scholars and practitioners from Dubai and the region in global health delivery

• Facilitation – to facilitate global health delivery by creating a space at the Center’s facilities in Dubai that will serve as an important regional hub for discussions and policy formulation on health problems of critical importance to Dubai, the United Arab Emirates, the region, and the world

The Center’s initial focus is addressing healthcare delivery gaps in access to surgical care, diabetes and obesity, mental health, maternal and child health, and infectious diseases. To promote this work, the Center facilitates research through regional research grants and cooperative research awards, hosts workshops and symposia, and releases publications in the areas of focus.

Of the 313 million surgical procedures conducted annually, only six percent are performed in the world’s poorest countries; the unmet need in the world’s low- and middle-income countries (LMICs) is 143 million surgical procedures. This is despite the fact, Dr Samad contended, that while surgical care is expensive for those individuals paying out of pocket, it is a cost effective investment for societies.

Dr. Samad remarked that although state-of-the-art surgical facilities exist in Dubai, the country spends more than two billion USD per year sending UAE citizens to other countries for surgical care. The demand for trauma care is estimated to rise by 227% over the next 20 years in the Gulf Cooperation Council. Therefore, it is vital to ensure that countries have the ability to meet the increasing burden of surgical disease moving forward.

Dr. Miliard Derbew, president of the College of Surgeons of East, Central and South Africa (COSECSA), underscored the need to frame surgery as a public health problem, given that between 11% and 15% of the world’s

---


5 More recent data suggests this number is as high as 28-32% (Shrime MG, Bickler WS, Alkire BC, Mock A. Global burden of surgical disease: an estimation from the provider perspective. Lancet Glob Health 2015; 3: S8-9.)
disability is due to surgically treatable conditions. Injuries alone cause 4.8 million deaths yearly, far exceeding the 3.5 million deaths caused by malaria, HIV/AIDS and tuberculosis combined. In addition, Dr. Derbew cited as obstacles to provision of surgical care the following: training challenges; lack of health system funding in LMICs; inaccessibility of surgeons and facilities; particularly between urban and rural settings; lack of basic supplies, equipment and utilities; and lack of administrative and management capacities.

The lack of surgical care worldwide has important economic ramifications. The world’s poorest economies will lose up to two percent on annual GDP every year through 2030, amounting to a cumulative $12.3 trillion. Dr. Samad emphasized that it is no longer a matter of whether countries can afford to provide surgical care: “The problem is that they can’t afford not to. It’s too expensive not to address the surgical needs of our populations.”

1.2 2015: A PIVOTAL YEAR FOR GLOBAL SURGERY

The growing body of literature arguing for surgery to be a part of global public health culminated in the release of three major publications focused on addressing this unmet need in 2015.

Figure 2. Annual value of lost economic output due to surgical conditions

Source: Adapted from Lubna Samad’s presentation at March 2016 Global Surgery Symposium, hosted by HMS Center for Global Health Delivery-Dubai.

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In March 2015, the Disease Control Priorities 3rd Edition (DCP3) was published with the involvement of notable organizations such as the World Bank, the World Health Organization (WHO), the Bill and Melinda Gates Foundation, and contributions from 80 authors and editors. It is a comprehensive global effort to evaluate the cost-effectiveness and population-wide effect of health interventions, and it has informed the agenda for many international agencies, donors, and country governments. The first of nine planned volumes focuses on Essential Surgical Care, identifying 44 procedures that meet criteria (pregnancy-related, injuries, anomalies, and surgical emergencies) with a cost of merely $10-$100 per disability-adjusted life years averted. The DCP3 predicts that improved access to surgical care can avert 1.5 million deaths annually.

In April 2015, the Lancet Commission on Global Surgery released Global Surgery 2030: Evidence and Solutions for Achieving Health, Welfare, and Economic Development. Developed by a multidisciplinary team of 25 commissioners and collaborators from over 110 nations, the report presents findings on the state of surgical care in LMICs, as well as a framework of recommendations, indicators and targets needed to achieve the Commission’s vision of universal access to safe, affordable surgical and anesthesia care when needed.

May 2015 saw the passage of the World Health Assembly’s (WHA) Resolution 68.15, which holds “Strengthening emergency and essential surgical care and anesthesia as a component of universal health coverage.” Many organizations, including the G4 Alliance (the global alliance for surgical, obstetric, trauma and anesthesia care), were instrumental in bringing this resolution to fruition. Additionally, the broad support for this resolution was demonstrated by the unusually high number of countries that sponsored it (nine countries, with representation from four continents). As with other WHA resolutions, it requests specific actions from Member States and WHO for its enactment.
1.3 LANCET COMMISSION ON GLOBAL SURGERY

The Lancet Commission on Global Surgery (LCoGS) was introduced in greater detail by Dr. John Meara – co-chair of this symposium as well as of the LCoGS. He noted that the publication Global Surgery 2030 arose out of a lengthy process of global consultation. In addition to making the case for the importance of surgical care worldwide, the report provided two practical tools for implementation: a set of six surgical indicators and a template for a national surgical plan.

1.3.1 Global indicator initiative: LCoGS surgical indicators

The LCoGS committee devised a set of six surgical indicators, covering the domains of preparedness, delivery, and impact, that countries can use to evaluate and assess the state of their surgical systems. These indicators are summarized in Figure X and explained in detail in Chapter 2.

1.3.2 National surgical forums and national surgical planning

Dr. Nobhojit Roy, an LCoGS commissioner championing efforts in India, explained that a National Surgical Forum is envisioned as a next step, consisting of broad inter-sectoral leadership and champions of health systems, including representatives of surgery. These forums are meant to explore how to implement recommendations from the LCoGS that are appropriate to the context of that country. They are to be driven and championed by local stakeholders and should provide practical, relevant, and achievable solutions. A framework for the national surgical plan suggested by the LCoGS includes five key domains: infrastructure, workforce, service delivery, financing, and information management.

1.3.3 Outreach and advocacy

A critical avenue to advance the work of LCoGS is through outreach and advocacy. Dr. Meara explained that much of this effort is achievable through the use of social media (Twitter, Facebook and now Periscope), which can foster communication between a truly global community of stakeholders. He also noted that professional groups – the G4 Alliance in particular – are critical partners in helping ensure that surgical care finds its place in the global public health arena.

1.3.4 The National Surgical Plan: translating indicators into action

Dr. Meara explained that a goal of this symposium is to share experiences among countries and refine the national surgical planning process through practical discussion and synthesis of ideas. The ultimate aim is the creation of a practical guide for implementers (be they Ministries of Health or local champions) to drive forward surgical systems both within specific countries and on the global scale.

Lancet Commission on Global Surgery

Vision

Universal access to safe, affordable surgical and anesthesia care when needed

1.4 STRUCTURE OF THE PROCEEDINGS

While previous reports have highlighted the scope of the problem in each domain, these proceedings are designed to identify the processes by which countries, hospitals and clinicians can take on these challenges. To accomplish this, working groups were convened to address specific domains with respect to national surgical planning. The groups then reported on their sessions to spur further discussion among the full assembly.

The conference proceedings are structured around these discussions of the LCoGS indicators and each of the five domains of the National Surgical Plan. In the following chapters we will discuss the surgical indicators and contextualize how their collection can be achieved, focusing in particular on the experience of doing so in Oceania. We will also review each domain of the National Surgical Plan, contextualize it with a case that highlights the domain’s underlying challenges, and discuss the most effective process for addressing the domain in national surgical planning. Additionally, we examine the role of key partners in moving surgical system strengthening from paper to policy, with a focus on professional organizations, academia, and the private sector.

The end of each chapter includes a list of key lessons for implementers that can be surmised from the symposium discussions. Finally, the proceedings conclude with the experience of five countries currently engaged in national surgical planning and the development of models for how new adopters can begin these processes elsewhere.

Figure 3: LCoGS Core Indicators for Monitoring Universal Access to Safe, Affordable Surgical and Anesthesia Care when Needed.

Source: Adapted from Glenn Guest’s presentation at March 2016 Global Surgery Symposium, hosted by HMS Center for Global Health Delivery-Dubai.
2 Surgical Indicators: Data collection in Oceania

Dr. Glenn Guest, director of the AusAID Timor-Leste program and representative of the Royal Australasian College of Surgeons, shared experiences and lessons learned during the collaborative process of collecting data to assess the LCoGS indicators in the Oceania region. Oceania includes Australia, New Zealand, Papua New Guinea, Fiji, Timor-Leste, Solomon Islands, Vanuatu, Cook Islands, Tonga, Federated states of Micronesia, Samoa, Kiribati, Tuvalu, Nauru, and the Marshall Islands.

Dr. Guest remarked that it would have been hugely beneficial to have had the LCoGS guidelines at hand when the Australia & Timor-Leste Assistance for Specialty Services (ATLASS) program was initiated.

Figure 4. The Oceania region

Source: Adapted from Glenn Guest’s presentation at March 2016 Global Surgery Symposium, hosted by HMS Center for Global Health Delivery-Dubai.
program began, noting that much of the program’s work is consistent with those recommendations but could have been accomplished more quickly and effectively under the guidance of clear global objectives. He also noted that while guidelines are a powerful tool, they must be supplemented with practical experience to help further shape them.

According to Dr. Guest, the effort to collect the indicators in Oceania was motivated by the desire to inform the implementation of ongoing, sustainable reporting systems and prove that these systems are achievable by smaller nations. The effort focused on collecting data regarding the indicators for 2-hour access, surgical, anesthesia and obstetric specialists (SAO density), surgical volume (cases per 100,000 people), and perioperative mortality rate (POMR).

Dr. Guest reported that four countries in the region have achieved the goal of the first four indicators, two countries have collected data for two of the indicators, and two countries have reported a single data field (SAO density). Most of the countries are engaged, but progress can be slow. He noted that Timor-Leste is doing relatively well, especially for elective surgery (which includes late surgical presentation for morbid conditions). He then turned to more closely examining data reported for each of those four indicators.

He explained that LCoGS Indicator 1, 2-hour access to Bellwether facilities (those that can perform Bellwether procedures - laparotomy, cesarean delivery and open fracture fixation) was easier to measure and report in larger countries, such as Australia, versus those consisting of few islands, such as Tonga and the Cook Islands.

Table 1. LCoGS Indicators, Oceania Nations

<table>
<thead>
<tr>
<th>Country</th>
<th>Population</th>
<th>Access&lt;2hrs (%)</th>
<th>SAO Density (SAO/100,000)</th>
<th>Surgical Volume (cases/100,000)</th>
<th>POMR (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>23,946,000</td>
<td>98.85</td>
<td>63.9</td>
<td>10,156</td>
<td>0.19</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>1,300,000</td>
<td>50</td>
<td>0.9</td>
<td>433</td>
<td>0.84</td>
</tr>
<tr>
<td>Fiji</td>
<td>933,000</td>
<td>50</td>
<td>0.9</td>
<td>433</td>
<td>0.84</td>
</tr>
<tr>
<td>Tonga</td>
<td>103,000</td>
<td>85</td>
<td>14</td>
<td>5061</td>
<td>0.236</td>
</tr>
<tr>
<td>PNG</td>
<td>4,500,000</td>
<td>2.3</td>
<td>2.5</td>
<td>868</td>
<td></td>
</tr>
<tr>
<td>Solomon Islands</td>
<td>602,000</td>
<td>20</td>
<td>2.5</td>
<td>868</td>
<td></td>
</tr>
<tr>
<td>Cook Islands</td>
<td>13,229</td>
<td>88</td>
<td>22</td>
<td>6758</td>
<td>0.11</td>
</tr>
<tr>
<td>Samoa</td>
<td>190,372</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vanuatu</td>
<td>260,815</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nauru</td>
<td>10,084</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuvalu</td>
<td>9,876</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kiribati</td>
<td>102,351</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marshall Islands</td>
<td>57,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Micronesia</td>
<td>102,109</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Adapted from Glenn Guest’s presentation at March 2016 Global Surgery Symposium, hosted by HMS Center for Global Health Delivery-Dubai.
In Timor-Leste, hospitals are already located in easily accessible areas, but there is still a deficit in trained staff. For LCoGS Indicator 2, SAO density, Dr. Guest reported that Australia “has more than enough” surgical specialists, as do the Cook Islands, where the small population makes this easier to achieve. Australia, Cook Islands, and Tonga have sufficient surgical volume (LCoGS Indicator 3); Timor-Leste, Solomon Islands, and Fiji still have significant work to do to achieve sufficient surgical volume. Dr. Guest reported that that surgical access and POMR (LCoGS Indicator 4) are the most challenging for nations in the Oceania region to report, with data only available for Australia, Cook Islands, Tonga, and Timor-Leste.

2.1 QUESTIONS RISING FROM PRACTICAL WORK OF COLLECTING THE LCOGS INDICATORS IN OCEANIA

Dr. Guest outlined a set of practical questions that arose out of data collection efforts for each of these four LCoGS indicators in Oceania.

LCoGS Indicator 1: 2-hour access to Bellwether facilities

Key questions include the precise definition of a Bellwether Hospital and how reliable it needs to be. Dr. Guest commented that some facilities may have the capacity to do the surgeries, but on some days it may lack the staff and supplies

Box2-1: Applying the Indicators Collectively

Dr. Roy described the example of Sierra Leone where some indicator data was available from 2013. Researchers used data from the Google Maps Engine to generate coverage zones, i.e., locations in a country that are within 2 hours of a surgeon. The coverage zones were overlaid with data from NASA’s Socioeconomic Data and Applications Center (SEDAC) to determine the proportions of populations that were actually able to reach a surgical facility within the 2-hour window. The exercise, which he noted is no longer representative of Sierra Leone’s surgical capacity as this data was collected prior to the Ebola crisis that ravaged West Africa in 2014 and 2015, revealed that 70% (2.3 million) of the population lived within 2 hours of surgical facility staffed with a provider at least 33% of the time. However, the ratio of surgeons was determined to be just 1:150,000 people. Thus from a highly conservative estimate, at least 30% of the population in Sierra Leone did not even live within 2 hours of a surgical provider. Those who did live within 2 hours were seeking care from a surgeon responsible for 150,000 other people.

More granular data can be used to expose great variation in access to surgery, even within a country, as national-level data tell only part of the story. In urban Sierra Leone, for example, the ratio of surgeons to the population was assessed to be 1:80,000, but the picture in rural Sierra Leone was starkly different: just one surgeon per 380,000 people. Dr. Roy remarked that while the data from Sierra Leone may seem grim, it actually compares relatively well or better compared to surgical access in other low-resource areas.
to perform the procedures. Thus in Oceania, they adopted the 50/50 test: if a patient arrives at the hospital and there is a better than 50% chance the Bellwether procedure can be performed on that day, the facility was included as a Bellwether hospital (he noted that they could have added in a correction factor to account for this, but decided it was too complex).

He remarked that there is also a range of accessibility due to seasonal variations in travel times during wet versus dry seasons. They chose to use the best possible conditions for the access indicator (i.e. < 2-hour access if there is a car available), but using a range would be advantageous for this indicator.

**LCoGS Indicator 2: SAO Density**

The key question that arose in the context of the SAO density indicator is whether it should capture the total workforce (i.e. national workforce plus international workforce) or solely the national workforce. Dr. Guest noted that the total workforce provides the best estimate of the current situation, but the national workforce provides the best estimate of the independent capacity and the training requirement. Ultimately, they adopted a rule that a member of the international workforce was counted in the figure if the person was employed by a local government or agency in a permanent role, but not if the person was a short-term worker or employed through a program that was completely funded outside the Ministry of Health.

He also explained that non-medical proceduralists were not included; they are uncommon in the Pacific region, except for the anesthetic workforce in Timor-Leste (which has 18 nurse anesthetists). This is a bigger issue in sub-Saharan Africa, he remarked.

**LCoGS Indicator 3: Surgical Volume**

The definition used in Oceania includes every procedure performed in an operating theatre in the surgical volume data. Dr. Guest cautioned that including cases performed under local anesthesia could falsely reduce the POMR rate. A related question that arose was whether to include cases performed by visiting teams and International surgeons. Dr. Guest noted that including surgeries performed by International visiting teams can falsely inflate the local capacity surgical volume value.

**LCoGS Indicator 4: POMR**

All cases performed in a surgical facility were included, but there is a question about cases performed under local anesthesia. Dr. Guest pointed out that this ratio may provide false reassurance regarding the safety of anesthesia, but noted that this is avoidable if a system of mortality audit and total case collection is in place.
### 3 Surgical Infrastructure

#### 3.1 TEMPLATE FOR A NATIONAL SURGICAL PLAN: INFRASTRUCTURE

<table>
<thead>
<tr>
<th>Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Surgical facilities</td>
</tr>
<tr>
<td>• Facility readiness</td>
</tr>
<tr>
<td>• Blood supply</td>
</tr>
<tr>
<td>• Access and referral systems</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Track number and distribution of surgical facilities</td>
</tr>
<tr>
<td>• Negotiate centralized framework purchase agreements with decentralized ordering</td>
</tr>
<tr>
<td>• Equip first-level surgical facilities to be able to perform laparotomy, cesarean delivery and treatment of open fracture (the Bellwether Procedures)</td>
</tr>
<tr>
<td>• Develop national blood plan</td>
</tr>
<tr>
<td>• Reduce barriers to access through enhanced connectivity across entire care delivery chain from community to tertiary care</td>
</tr>
<tr>
<td>• Establish referral systems with community integration, transfer criteria, referral logistics, protections for first-responders and helpful members of the public</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Assessment Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Proportion of population with 2-hour access to first-level facility</td>
</tr>
<tr>
<td>• WHO Hospital Assessment Tool (e.g., assessment of structure, electricity, water, oxygen, surgical equipment and supplies, computers and internet)</td>
</tr>
<tr>
<td>• Proportion of hospitals fulfilling safe surgery criteria</td>
</tr>
<tr>
<td>• Blood bank distribution, donation rate</td>
</tr>
</tbody>
</table>
3.2 TEMPLATE FOR A NATIONAL SURGICAL PLAN: INFRASTRUCTURE

Dr. Roy explained that surgical access depends on four factors: timeliness, capacity, safety, and affordability, as laid out in Box 3-1. The probability of access to surgery is the joint probability of these factors:

\[ p(\text{Access}) = p(T \cap C \cap S \cap A). \] (Fig. 5)

3.3 INFRASTRUCTURE IN CONTEXT

3.3.1 Understanding infrastructure through the three-delays framework

Borrowing from a model used in maternal and child health care, Dr. Roy explored three types of delays in the surgical system and examples of strategies that might be used to address each of them (Figure 6).

3.3.1.1 First delay: seeking care

Delay in seeking care is the first delay, situated within the referral system (or lack thereof) and further determined by community members’ access to care and attitudes about care-seeking. Dr. Roy explained that the factors contributing to this delay range from financial, geographic, cultural, and educational barriers, to a disconnect or lack of trust between members of the community and their health care providers.

Box 3-1  What is surgical access?

Dr. Roy probed the question of what access to surgery really means in practical terms, identifying four levels of surgical access:

- **Access must be timely:**
  
  *Are patients able to reach a facility in timely manner (within two hours)?*

- **Access depends on capacity:**
  
  *Once a patient reaches the hospital, is it staffed with capable surgeons and anesthetists who are able to perform procedures?*

- **Access depends upon safety:**
  
  *Does the facility have the capacity to perform safe surgery?*

- **Access must be affordable:**
  
  *Can the patient afford to pay for the surgery?*
Figure 5. Interpretation of probability: access to surgery

Source: Adapted from Nobhojit Roy’s presentation at March 2016 Global Surgery Symposium, hosted by HMS Center for Global Health Delivery-Dubai.

Figure 6. The surgical system and the three delays

Source: Adapted from Nobhojit Roy’s presentation at March 2016 Global Surgery Symposium, hosted by HMS Center for Global Health Delivery-Dubai.
Dr. Roy presented Table 2, noting that in many low-income countries only a small percentage of the population can even reach a surgical facility in two hours. He added that middle-income countries do not fare much better in surgical access than low-income countries, particularly when compared to access in high-income countries. Figure 7 highlights the disparity in terms of distance to a hospital stratified by income group.

Highlighting the data from Ecuador (3.3% of the population living within 2 hours of a surgical provider), Dr. Roy commented that the 2-hour access metric can be somewhat misleading: living within 2 hours of a surgeon does not ensure that a patient will actually be able to receive surgical care. Patients must still be able to actually reach the surgeon, be it via car, public transport, or ambulance service. Other barriers include expense, lack of referral system, poor quality, and few public facilities.

One strategy that was implemented in Ecuador by Dr. Edgar Rodas was to take care to the community with mobile surgery units.

### Table 2. Analysis of 2-hour surgical access in countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Population living within 2 hours of a surgical provider (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mongolia</td>
<td>84%</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>55%</td>
</tr>
<tr>
<td>Fiji</td>
<td>53.4%</td>
</tr>
<tr>
<td>Botswana</td>
<td>31%</td>
</tr>
<tr>
<td>Somaliland</td>
<td>18.6%</td>
</tr>
<tr>
<td>Ecuador</td>
<td>3.3%</td>
</tr>
</tbody>
</table>

Source: Adapted from Nobhojit Roy’s presentation at March 2016 Global Surgery Symposium, hosted by the HMS Center for Global Health Delivery-Dubai.

### Figure 7. Distance to hospital per income group

Source: Adapted from Nobhojit Roy’s presentation at March 2016 Global Surgery Symposium, hosted by HMS Center for Global Health Delivery-Dubai.

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Another strategy for addressing the second delay is to scale up low-cost comprehensive referral systems. Dr. Roy noted that this also serves to address the first delay.

As an example particularly suited to LMICs, Dr. Roy described the BRAC model in Bangladesh (Fig. 8). Within this model, a community health worker phones a coordinator to deploy a cycle ambulance and to determine a pickup point that the ambulance service will be familiar with and able to find quickly. Thus the responsibility is distributed evenly between the patient, community, ambulance service, and the facility. This model is able to circumvent issues of people living in homes without street names or house numbers. The BRAC model is a low cost, shared community and tertiary care model.

Another related solution is to strengthen existing modes of pre-hospital transportation. In many settings, such as Uganda, a majority of pre-hospital transportation is provided by the police, taxi drivers, and truck drivers.

### 3.3.1.3 Third delay: receiving care

Patients that are able to surmount the first and second delays often still face the third delay: delay in receiving care. Dr. Roy emphasized that the third delay will only be assuaged when first-level hospitals can efficiently deliver a broad range of surgical and anesthesia services. The district hospital needs to be the hub of surgical healthcare delivery, but often little is functional and essential items are missing. He outlined a set of causes for this third delay:

- Poor core infrastructure (electricity, running water, oxygen)
- Lack of equipment and poor maintenance
- Supply chain issues (lack of essential medications, supplies, and personal protective equipment)
- Inadequate blood banking
- Staffing issues (e.g., poor managerial support)
- Poor processes and protocols (e.g., case coordination and referrals)
Therefore, the strategy he suggested is to focus on the first-level hospital as the core site for broad-based surgical care provision. Investments should focus on enabling first-level hospitals to consistently provide a broad range of procedures, with the provision of three Bellwether procedures as the crucial first step.

3.3.2 Surgical needs and innovations for India’s rural setting

Turning to the surgical infrastructure in India, Dr. Roy described the challenges in providing surgical care in rural areas of India. He highlighted the efforts of a research group focused on surgical needs and innovations particular to rural settings in India. The group focused on addressing four key areas: equipment needs, hospital accreditation, innovation uptake, and access to blood products.

3.3.2.1 Equipment needs

Dr. Roy explained that high costs limit the availability of critical surgical equipment, ranging from cystoscopes to anesthesia machines. Lack of equipment impedes the ability to provide affordable surgical care at the district level, however procuring this equipment requires significant investment. The cost of maintenance services for advanced optical, endoscopic, and electronic equipment poses yet another barrier, further limiting the availability and affordability of surgery.

To address this problem, Roy suggested a set of strategies. The first is to build equipment maintenance capacities by training local biomedical technicians, thereby decreasing reliance on other countries for these services. Second, leveraging group purchasing for equipment and maintenance agreements can serve to improve bargaining power with device manufacturers, reduce prices, increase competition, and ultimately improve services. Further, rural surgical networks could be leveraged for equipment sharing (particularly for specialized, portable equipment). Finally, to address inequity in purchasing power between urban and rural hospitals, tax subsidies and soft loans can assist rural hospitals in purchasing essential equipment.

3.3.2.2 Hospital accreditation

The National Accreditation Board of Hospitals (NABH) in India sets and maintains minimum standards for hospitals, based on high-income, urban settings. Dr. Roy argued that the blind application of these standards to rural settings would render rural surgery impossible, as these high standards are not realistic for such settings. He therefore suggested that the Indian government create a separate accreditation and credentialing board for rural surgical hospitals that mandates a different set of minimal standards, noting that “minimum standards are not sub-standards.”

3.3.2.3 Innovation uptake

Dr. Roy commended providers working in rural areas for devising a wide range of context-appropriate surgical innovations:

- Mosquito net hernia mesh (finally supported by randomized controlled trials after 20 years of use in the field)
- Diagnostic laparoscopies using a cystoscope before CT / MRI
- Radical cure for H. Pylori infection before investigations
- Gas-less laparoscopic surgeries
- Low-cost, battery powered ventilators
- Low-cost negative pressure wound therapy

There are creative workarounds used by rural practitioners to ensure that care is provided, despite deficits in equipment and affordability. However, despite their efficacy, these surgical innovations have not been internationally accepted or legalized, and advocacy for their use is lacking. To increase awareness and uptake of these innovations, it is important to increase the capacity for formal assessment and publications to legitimize their use.
One such strategy includes the development of a research hub to investigate cost-effective innovations and spur technological advances. Further, rural practitioners should collate and document innovations and plan to present these advances for easy dissemination. Partnerships with academic institutions and researchers would also help to bridge the gaps in publication.

3.3.3.4 Strengthen blood collection and delivery

According to Dr. Roy, access to blood is the biggest problem for most rural Indian surgeons. The lack of blood also fuels the third delay, as many rural patients experience barriers due to geographic, economic, and legal challenges.

Rural blood needs are huge, but have not even been quantified yet. Dr. Roy called for academic bodies to quantify the need for blood as a first step. Furthermore, he suggested that the Ministry of Health and Family Welfare add blood and blood products to the National List of Essential Medicines in order to standardize prices for banked blood, ensure availability of blood in emergency situations, and minimize death due to rural patients’ inability to pay. Providers must be trained in safe transfusion practices and provided with adequate numbers of safe testing kits. He also suggested establishing voluntary blood donors in the community, creating an alternative source of blood for rural surgeons when blood banks are not available.

3.4 Infrastructure Working Group Discussion

Mr. Ian Walker, Managing Director for Johnson & Johnson’s Africa engagements, commented that in the global surgery space, data is focused on the act of surgical intervention. But for delivery of surgery, there is a huge amount of upstream work that needs to take place with respect to organization, leadership and management, but also in the supply chain to ensure that the surgeon has the right equipment at his or her disposal and the proper support staff. He maintained that discussions need to be broad enough to take into account nonclinical components such as leadership and management, hospital administration, the role of government in importing medical devices, and so forth.

Given that infrastructure in health program planning is a very broad concept, Dr. Lotfizadeh remarked that capturing every element of it can be challenging and subjective. When building infrastructure and capacity toward achieving health goals, it can be difficult to determine what to budget for and what not to. Thus he suggested that it could be useful to define what falls under the umbrella of infrastructure in order to prioritize how to allocate limited resources.

Box 3-2 Crosscutting solution: unbanked directed blood transfusion

Blood needs in India are compounded due to legal issues surrounding the practice of un-banked directed blood transfusions (UDBT) – the practice of direct transfusion of blood from a donor to recipient. The use of UDBT has been banned in civilian practice since 1997 in India. This is primarily due to concerns of spreading HIV, yet Dr. Roy noted, with appropriate donor screening, this risk can be minimized (see Figure 9). Banning UDBT precludes a safe, important alternative to banked blood. The paradox that results, Dr. Roy remarked, is “What is legal is inaccessible; what is illegal is accessible.”

Dr. Roy advocated that the Association of Rural Surgeons of India (ARSI), clinicians, and international bodies should advocate at the health ministry for the legal provision of UDBT in a way that ensures access, safety, and accountability.
3.4.1 Reporting systems and referral networks

Reporting on behalf of his group, Dr. Kenan Yusif-Zade, head of hospital for State Border Service of the Republic of Azerbaijan Military Hospital, emphasized that improved reporting systems are crucial for surgical access. Universal reporting guidelines should be implemented for reporting information about access to surgery to the WHO database, to Ministries of Health, and to external agencies who can collate information about hospitals and health centers. Improved referral networks are also critical for improving access.

Dr. Martin Smith, Chairman of the Department of Surgery from the University of the Witwatersrand in South Africa, commented that communities need to be aware of what surgical care actually embraces, “because surgery is not about a disease but about a system.” Building trust in the community is an essential component of quality surgical care, he maintained.

3.4.2 Infrastructure audits and assessments

Dr. Smith’s working group agreed that infrastructure assessments and audits\(^1\) are the critical first step in infrastructure planning. The results should be fed into national surgical forums, which serve to develop the national surgical plan. The group discussed the questions of how to more clearly define the concept of functionality and the criteria for defining a functional facility. He suggested that minimal versus non-negotiable standards should be negotiated at the local level, rather than at the global level to take into account the effect of context. He noted that the tools for assessment already exist - the Lancet commission guidelines, the WHO, and the DCP3 all provide good direction for ensuring high standards of care in facilities of all levels.

Dr. Declan Magee, President of the Royal College of Surgeons of Ireland (RCSI), commented on the issue of minimum standards in surgical infrastructure. He referred to Dr. Roy’s

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\(^1\) Dr. Bang contributed that surgical procedures themselves also need to be audited, not just infrastructure (e.g., whether the procedure was really needed, the quality of service, the cost, any malpractices, etc.).
observation that stringent regulations in India inhibit the ability to transfuse blood in many rural institutions. Once minimum standards are established, the issue remains how to manage the interim period before those minimum standards are put in place. Dr. Smith suggested that minimum standards need to be contextual and negotiated, but that once created they should become non-negotiable. He noted, however that a global non-negotiable standard may not be feasible for infrastructure issues. Local surgical care providers have to be part of the conversation, he contended; it is counterproductive to develop a minimum standard that is not adequately contextualized and does not take into account local issues, such as the blood transfusion dilemma in India.

Dr. Samad asserted that imposing minimum standards on hospitals as opposed to providing standard guidelines runs the risk of setting unrealistic and inequitable expectations, particularly for developing nations. She held that caution is warranted when establishing standard practices, which she contrasted with nonnegotiable minimums that may be adopted to justify double standards. Dr. Salim Afshar, faculty at the Program in Global Surgery and Social Change at Harvard Medical School, commented that not all standards are in fact equal. This necessitates devising a reasonable roadmap to guide progression toward equitable standards. Dr. Evans Chinkoyo, a representative from the Zambian Ministry of Health, maintained that the standards should be the same for both public and private facilities; to provide care, both must conform to minimum standards.

### 3.4.3 Infrastructure management and leadership

Dr. Smith suggested that the role of surgeons as managers of infrastructure needs to be further examined. Surgeons are not trained to be effective managers; therefore, it is important to enhance this capacity. Dr. Smith emphasized the need to differentiate between leadership and management; procurement and supply chain issues need management; surgical care provision needs leaders. Furthermore, infrastructure guidelines cannot be developed in isolation from issues such as procurement and supply chain. Dr. Smith’s thinks that, given appropriate training, surgical care providers can be the right people to fill these leadership roles and to determine both the system’s priorities and how the system delivers care.

Dr. Emmanuel Makasa, the Zambian health attaché to the UN, noted that management must be contextualized to the setting; it cannot be completely universal because each facility in the surgical system within which it is situated is unique. Dr. Samad agreed that differentiating management from leadership is critical: “As surgeons we think we can do surgery, so we think we can manage a hospital with a staff of 1500-2000 people. But would I trust the CEO of the biggest company to circumcise my child?” She noted that we should not assume that surgeons are automatic managers – in fact management delivery systems and health management sciences requires training and expertise. Therefore, explicit management expertise should be recognized as a core component of every team.

Dr. Catherine Devries, Professor of Surgery at the University of Utah, noted that there are currently no professional standards, credentialing processes, or curricula for surgical system management. Proficient managers learned to be efficient while on-site in their own hospitals. However, what it takes to become a good surgical systems manager has not been clearly established. In her own institution, they are working toward creating such a curriculum, however this is a new field without any previously defined guidelines. Dr. Andy Leather, of Kings College in London and a co-chair of LCoGS, also agreed that the issue of management is crucial. He referred to his experience in Sierra Leone, where hospital managers have not had prior formal training. Thus, he suggested that national surgical planning should include a management component. Dr. Yusif-Zade pointed out that educating managers will require additional time. He suggested that trained and experienced administrative personnel could be employed in certain positions to alleviate this problem and allow surgeons to focus on providing quality
care. Dr. S. Zafar Zaidi, director of medical services at Indus Hospital in Pakistan, agreed that there need to be more nonsurgical managers, but an interim solution could be to appoint a person to manage nonsurgical responsibilities.

3.4.4 Advocacy in surgical care

Dr. Nandakumar Menon, Surgeon and Director of Gudalur Adivasi Hospital in India, stated the importance of advocacy in surgical care. He also emphasized that different countries need different approaches to get surgical programs off the ground. Countries like Zambia have a government-driven program. However in countries like India where much of the care is delivered in the private sector, a different approach to advocate the development of surgical care is needed. In places like India and Pakistan, where political will is lacking, increasing advocacy and getting the private partners on board is particularly important. Dr. Smith remarked that in developing infrastructure plans, champions in government are a critical success factor, but surgical care providers must also be leaders. He stressed the difference between champions and drivers: surgical care providers need to be drivers, but the champions need to be embedded in the government sector.

3.4.5 Ensuring equity in infrastructure

Dr. Jose Florencio Lapena, professor of Otorhinolaryngology at the University of the Philippines, made the case for considering the equity of the infrastructure itself. Specifically, setting global standards on equipment, instruments and materials may actually contribute to greater inequity. This is because the majority of these infrastructure needs are produced in or sourced from high-income countries, even if the components are manufactured or assembled in low and middle income countries. He remarked that this is true not only for sourcing and supply, but for maintenance and operational costs. To illustrate this, he described the scenario of lightly-used, expensive big-item hospital equipment in disuse because of unavailable or unaffordable spare parts and servicing, or being used only irregularly due to less-than-ideal housing conditions, irregular electric power, tropical humidity and mold. On the other hand, he noted that many LMICs have developed inexpensive technologies and innovations that need to be further refined, promoted, and marketed if the objective of truly equitable global surgery is to be achieved.

3.5 KEY MESSAGES FOR IMPLEMENTERS

- Surgical infrastructure stretches beyond the immediate scope of the operating room to include non-clinical components such as supply chains, management and leadership, and medical devices.
- Implementers must decide whether minimal/non-negotiable standards are relevant to their context and, if so, how to define these standards.
- Infrastructure discussions need to include multiple stakeholders familiar with the local context – e.g. private sector, clinicians, government.
- It is important to professionalize the role of manager and leader in order to maximize efficiency and affordability.
4 Surgical Workforce

4.1 TEMPLATE FOR A NATIONAL SURGICAL PLAN: WORKFORCE

### Components

- Surgical, anesthetic and obstetric providers
- Allied health providers (nursing; operational managers; biomedical engineers; radiology, pathology, and laboratory technician officers)

### Recommendations

- Establish training and education strategy based on population and needs of country
- Require rural component of surgical and anesthetic training programs
- Develop a context-appropriate licensing and credentialing requirement for all surgical workforce
- Training and education strategy of ancillary staff based on population and needs of country
- Invest in professional health-care manager training
- Establish biomedical equipment training program

### Assessment Methods

- Density and distribution of specialist surgical, anesthetic, and obstetric providers
- Number of surgical, anesthetic and obstetric graduates and retirees
- Proportion of surgical workforce training programs accredited
- Presence of task sharing or nursing accredited programs and number of providers
- Presence of attraction and retention strategies
- Density and distribution of nurses, ancillary staff including operational managers, biomedical engineers, and radiology, pathology, and laboratory technicians
4.2 WORKFORCE IN CONTEXT

4.2.1 Supporting workforce from near and far: COSECSA and RCSI

Dr. Derbew and Dr. Magee provided an overview of a joint effort between the College of Surgeons of East, Central, and Southern Africa (COSECSA) and the Royal College of Surgeons in Ireland (RCSI) to improve the surgical workforce in Eastern Africa. The primary objectives of the collaboration are to foster postgraduate education in surgery and to harmonize surgical training across the East, Central, and Southern Africa (ECSA) regions.

The mission of COSECSA is to promote access to and excellence in surgical care, training, and research. COSECSA was established in 2004 and describes itself as a “college without walls” since it covers such a large geographical area. Dr. Magee explained that RCSI has been involved with COSECSA since 2007. RCSI, established in 1794, is Ireland’s largest school of medicine, physiotherapy, and pharmacy. With campuses in four countries, RCSI has nearly 4000 undergraduate and postgraduate students from more than 50 countries as well as 450 surgical trainees.

Before COSECSA, existing infrastructure in East Africa was largely based on university teaching hospitals, without ability to expand. Dr. Derbew also highlighted the workforce gap as contributing to the unmet surgical need: minimal requirements for surgical workforce in the region had not been met, and 85% of the surgeons serve just 15% of the urban population.

Table 3. Number of Surgeons in ECSA Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Population (m)</th>
<th>Surgeons needed per 20,000 pop.</th>
<th>Present</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kenya</td>
<td>40</td>
<td>2000</td>
<td>450 (19%)</td>
</tr>
<tr>
<td>Zambia</td>
<td>11</td>
<td>550</td>
<td>77 (14%)</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>12</td>
<td>600</td>
<td>70 (11.6%)</td>
</tr>
<tr>
<td>Uganda</td>
<td>27</td>
<td>1350</td>
<td>100 (7.4%)</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>83</td>
<td>4150</td>
<td>300 (7.2%)</td>
</tr>
<tr>
<td>Rwanda</td>
<td>10</td>
<td>500</td>
<td>35 (7%)</td>
</tr>
<tr>
<td>Mozambique</td>
<td>18</td>
<td>900</td>
<td>59 (6.5%)</td>
</tr>
<tr>
<td>Tanzania</td>
<td>34</td>
<td>1700</td>
<td>110 (6.4%)</td>
</tr>
<tr>
<td>Malawi</td>
<td>13</td>
<td>650</td>
<td>30 (4.6%)</td>
</tr>
</tbody>
</table>

Source: Adapted from Miliard Derbew’s presentation at March 2016 Global Surgery Symposium, hosted by HMS Center for Global Health Delivery-Dubai.
The founders of COSECSA had the foresight, according to Dr. Magee, to adopt a less conventional model that utilized regional and provincial hospitals as an adjunct to medical school hospitals. This model was designed to expand surgical training in East Africa as well as address the workforce gap.

4.2.2 The RCSI/COSECSA Collaboration Program

RCSI/COSECSA’s cross-college collaboration has access to funding through Irish Aid, with significant in-kind contribution from RCSI. The program incorporates diverse RCSI departments: surgery, exams, anatomy, pathology, physiology, IT, communications, media services, finance, leadership institute. The collaboration is overseen by a joint steering committee equally represented by RCSI and COSECSA members in addition to external members.

The motivation for the collaboration was to improve local infrastructure in ECSA. Dr. Magee noted that RCSI tries to work within the guidelines of the Paris Declaration on Aid Effectiveness. Under this approach, developing countries set their own strategies for reducing poverty, improving their institutions, and tackling corruption while donor countries support these objectives and use local systems to achieve them.

Initially, the collaboration focused on implementing training programs and establishing robust, transparent methods of examination. However, it has since evolved to span good governance and corporate capacity, education, online learning, e-logbooks, in-service assessments, examinations, leadership and faculty development, IT and webpages, and research methodology.

Dr. Magee described the evolution in RCSI’s responsibilities over the years. During the early stages of the collaboration, RCSI provided more assistance in the actual delivery of service and training. Over time, however, they emphasis has shifted to focus on quality assurance, developing corporate capacity, and sustainability as COSECSA has taken over responsibility for training and service delivery.

Dr. Magee outlined multiple factors contributing to the success of the collaboration. The collaboration is institutional, not personal, and is overseen by a steering committee made up of members of both colleges in addition to independent members. It is funded by Irish Aid, although Dr. Magee noted that future funding will pose a challenge. It is a long-term project with structure, qualifications, and leadership now provided primarily by COSECSA.

4.2.2.1 Education and Training

Drs. Magee and Derbew also described ongoing education and training programs. Dr. Magee remarked that while COSECSA is a unified college, its member countries have unique needs and requirements. The perspectives of surgeons in the different countries are also variable with regard to task shifting and task sharing in the delivery of care. This is taken into account when designing training programs and delivery schemes.

Fellowship level seminars are currently offered in orthopedic and general surgery, with seminars in other specialty areas on the horizon. Essential surgical training is provided to rural doctors in Rwanda, Zambia, and Zimbabwe, with a focus on basic surgical techniques.

The collaboration also provides Train the Trainer courses for all COSECSA trainers; more than 300 surgeons and 28 Master Trainers have completed the course. Dr. Magee noted that one of the deficits in many African countries is the lack of faculty in the basic sciences (physiology, pathology, and anatomy). To combat this deficit, 27 surgeon-scientists completed a three-year basic science training program and are now delivering courses themselves. Additionally, non-medical Clinical Officer training projects are underway in Zambia and Malawi, aiming to build capacity at the district hospital level, a key to health systems strengthening in Africa.

The collaboration jointly developed and administered an Africa-centric surgical e-learning platform including an e-learning package to
support the WHO Emergency and Trauma Care training course and schoolfor Surgeons.net. The world’s first mobile surgical skills training unit was recently launched in Kenya and Tanzania. Future areas of development include simulation training and e-logbooks, which have the potential to advance surgical data collection and replace traditional paper and pen logbooks.

To improve the surgical workforce, COSEC SA initiated a training and education program for surgeons in rural hospitals. There are two levels of training: membership (2 years) and fellowship (further 5 years). Examinations for membership and fellowship utilize an electronic logbook and are delivered by external examiners from RCSI or COSEC SA. Dr. Magee pointed to the establishment of standard operating procedures for these examinations as one of the most important developments that has been achieved.

The partnership has continued to scale up their training programs and increase the number of surgeon participants. The number of registered Membership of the College of Surgeons (MCS) candidates more than doubled between 2013 and 2014 (from 35 to 76) and in the number of registered Fellowship of the College of Surgeons (FCS) candidates saw a several-fold increase between 2004 and 2014, particularly among general surgery and orthopedic specialists. As of March 2016, there were 263 current trainees (including 102 FCS Graduates) and 118 accredited trainers in 34 active training hospitals. In order to continue such expansion, more trainers are needed.

Ultimately, progress in expanding the surgical workforce has been made as a result of this collaboration, but more support is needed from governments and other advocates to address the serious surgical workforce shortage in east and central Africa.

4.2.2.2 Data and Advocacy

RCSI and COSEC SA have created a database with details of every surgeon practicing in the region. It also features an interactive map allowing one to look at individual hospitals in the COSEC SA region and determine the quantity of surgeons, the surgeons’ training and education, and the type of work they are doing. This powerful resource is currently active and updated weekly. The collaboration has facilitated COSEC SA attendance at major international forums.

4.2.2.3 Administration

Dr. Magee commented that COSEC SA faced management challenges as participation grew. To mitigate this, RCSI has provided assistance in developing this capacity by promoting COSEC SA regionally and internationally, developing website and materials, supporting recruitment activities, and assisting with costs of staffing the COSEC SA Secretariat in Tanzania.

4.3 SURGICAL WORKFORCE WORKING GROUP DISCUSSION

4.3.1 Defining and quantifying the workforce

Dr. Jamal Hoballah, Chair of the Department of Surgery at American University in Beirut, emphasized that the key issue in workforce analysis is how to define and quantify the workforce, taking into account surgical specialists and non-physicians who provide healthcare. In general, he noted, using data from sources such as regulatory bodies, accrediting bodies, licensing bodies, specialist societies, medical schools, registries from medical councils or professional bodies, and NGOs can provide a good estimation of the workforce.

Dr. Hoballah identified several challenges with respect to workforce analysis encountered by his working group. He commented that absolute numbers do not necessarily reflect the capacity of the specialists. For example, ophthalmologists can treat many ophthalmologic conditions but cannot address prevalent general surgical conditions. This affects the evaluation of the number of physicians available in the workforce. Doubling counting physicians who provide surgical care in two capacities (DMD/MD, for example) also presents a challenge in workforce analysis. It can also be difficult to determine whether the physicians in registries still practice in country, or practice at all. Finally, workforce estimates reflect quantity and not necessarily quality of care provided.
4.3.1.1 Quantifying non-specialist surgical providers

Dr. Hoballah’s group commented that non-physician healthcare providers are more difficult to quantify with accuracy and vary amongst different countries. Hospitals themselves can be a reliable source of information regarding numbers of non-physicians providing care (e.g., nurse anesthetists and surgical assistants). Other working groups described countries where surgical care is provided by general physicians with two years of additional training, such as in Madagascar, or by advanced nurses, nurse practitioners, and even Bachelor’s degree holders. In Pakistan, community-based nurses are trained to conduct ultrasounds and send them to an obstetrician an hour away to determine whether early referral is necessary. The group agreed that such providers can address gaps in health care, but how their role is defined and quantified remains highly variable.

Dr. Lars Haganer, co-chair of LCoGS, related his experiences working in collaboration with WHO to quantify specialists, trainees, and non-physician surgical providers; though it is difficult to obtain this data, it is possible. Nevertheless, the highest quality data come from specialists. Dr. Meara noted that the LCoGS adopted the definition of SAOs as fully trained and a proxy for available services because it is easier to quantify them than it is to quantify non-physician providers. He clarified that the LCoGS report refers to the full spectrum of the workforce and did not argue that SAOs are all that is necessary. Dr. Meara queried whether the goal should be to count all providers - physician or non-physician - or if that is an undue burden on Ministries of Health. Dr. Hoballah contended that quantifying non-physician healthcare providers is imperative because it helps define the workforce. Further, different procedures require different levels of specialization; some procedures can be performed by non-physicians, while others cannot. Greater understanding of the workforce will aid in determining how to distribute available resources across various workforce patterns.

Dr. Smith commented that in its report, the LCoGS shifted from the designation of specialist to “surgical care provider”. It would be impossible to meet targets for surgical provider numbers without taking into account everyone who is actually providing surgery.

4.3.1.2 Quantifying the international nonpermanent workforce

Challenges surrounding quantification of the international non-permanent surgical workforce (“mission” surgeons, foreign medical teams, and so forth) emerged as another topic of discussion. Dr. Roy remarked that the contribution of foreign medical teams is rarely quantified.

Dr. Catherine Devries, Professor of Surgery at the University of Utah, commented on the prevalent role of Cubans in providing surgical work and questioned why they are not engaged in dialogues or workshops of this sort. She asked whether they are permanent contributors and whether they are counted in workforce assessments. Dr. Smith remarked that Cuban surgeons are heavily relied upon in rural areas where they provide most of the services noted. However, they are registered as medical officers rather than surgeons, making it difficult to quantify them in surgical workforce estimates.

Dr. Guest explained that foreign medical teams working in East Timor were not counted in SAO density unless they were fully or partially funded by the Ministry of Health. He noted: “Indicators should serve to show countries where they are in terms of independence, so if your country is filled with internationals you still have a good idea of your current capacity, but it doesn’t tell you where you should be and what the shortfall is.”

4.3.2 Surgical education to meet workforce needs

Dr. Hoballah remarked that surgical education needs vary among countries and regions. Beyond formal teaching hospitals and academic centers, there are settings where local physicians train other physicians and where technical colleges or other institutions and
organizations (e.g. COSESCA) are involved in training. Ultimately all of these can be part of national surgical planning surrounding education for the surgical workforce.

4.3.3 Roles and responsibilities in the workforce

Regarding the issue of workforce roles, responsibilities, and delineation of privileges, Dr. Hoballah’s group felt that this can also vary by country and region depending upon the availability of specialists and the needs of the country. An area with limited availability of specialists cannot “super-specialize.” Medical colleges and professional bodies should play a role in defining specialist privileges. This can be informed by analyzing geographic variations and gap analyses. Further, if a country decides to rely on non-physician providers to perform certain procedures and interventions, their role should be formalized in the credentialing process. The credentialing process may serve as a means of quantifying that workforce sector. For example, Zambia recognized the need for clinical officer anesthetists and used this realization as an opportunity to quantify them.

4.3.3.1 Task sharing and task shifting

Dr. Magee posed a series of questions with respect to countries with a mixed model of surgical providers (surgeons and other personnel such as clinical or medical officers): how should the scope of practice be defined for each constituent group of the workforce, how should the groups interface, and what role should the surgical community take in terms of governance and regulation? Dr. Lotfizadeh referred to the literature on task shifting and eye surgery; clinical officers in regional and district areas lacking ophthalmologists are permitted to perform cataract surgery, but the license for performing such surgeries is only valid in that region. This reduces competition between trained ophthalmologists and clinical officers.

Dr. Smith contended that we have a responsibility to integrate non-surgeon cadres into surgical care. They should be registered, supported by professional societies, and with a defined scope of practice. Dr. Michelle White, Deputy Chief Medical Officer of Mercy Ships, described the need to develop a supervisory model to identify who a non-specialist can call for help or feedback.

4.3.4 Recruitment and retention

Dr. Smith has observed that, in regions like sub-Saharan Africa, it can be difficult to consistently recruit people into a surgical career. He suggested that national surgical planning should therefore include a recruitment component. Dr. Magee clarified that this is relevant across the world, not just in LMICs; the attractiveness of surgery as a career is being challenged in all health systems. Dr. Derbew pointed to internal “brain drain” as an ongoing problem in African countries where more women are studying medicine yet not specializing in surgery or other specialist areas. He explained that Madagascar employed specialists to work in the rural areas to address the misdistribution of surgeons in urban versus rural areas. But, as evidenced during the era of Ethiopia’s communist government when surgeons were essentially required to practice in rural areas, this strategy can drive those surgeons from the country altogether.

Regarding the retention of surgeons in rural environments, Dr. Adil Haider, Director of the Center for Surgery and Public Health at Brigham and Women’s Hospital in Boston, remarked that surgeons who work in rural or less urbanized environments in the United States make three times as much money as those who work in urban centers. He suggested that this might be an incentive strategy that could be expanded. Dr. S. Zafar Zaidi, Director of Medical Services at Indus hospital in Pakistan, concurred that financial motivation is a primary cause of brain drain. Dr. Andriamanarivo, the Honorable Minister of Health from Madagascar, spoke about this issue of motivation in Madagascar: when a specialist is sent to a province, he or she is promoted to chief of the service and takes on a teaching role in the province’s medical school. Dr. Danielson Veiga, a surgeon at Augustinho Neto Hospital in Cabo Verde, explained that
in his country, surgeons who are deployed to the provinces at an early stage in their careers do not receive any specific incentive and usually stay for a period of about two years.

4.3.5 Impact of the diaspora
Mr. Walker acknowledged the impact of the diaspora and the returning diaspora, on human resources. He suggested that many are reaching a stage where they would like to return to their home countries, full or part time, for personal or philanthropic reasons. Dr. Kennedy Lishimpi, Director of clinical care and diagnostic medicine in Zambia, noted that the diaspora is a great potential resource to increase capacity; many feel the need to get back to their country and can add value from their experience in different types of health systems. To engage the health-related Zambian diaspora, the Ministry of Foreign Affairs worked with the Zambian Medical Association for input about a new policy to engage the diaspora.

4.3.6 Community-level workforce
Dr. Makasa contended that workforce discussions should focus on equitable access and consider the workforce necessary to deliver public health care to the community. Universal access to surgery must be discussed in terms of public health, not just specialized healthcare.

Mr. Richard Vanderberg described his organization Operation Smile’s efforts in Honduras as a means to motivate people at the community level to access surgery. He noted that the landscape for Operation Smile changed several years ago; medical teams were mobilized but patients were not accessing the services. Surveys in the community revealed not only structural and financial barriers, but also an underlying cultural barrier - all three of which “swirled together in the context of poverty.” To better understand these barriers and provide care, they engaged people who read electric meters to also survey for children with cleft palate, finding 600 cases. Ultimately, however, 400 of those fell through the cracks for various reasons. Partners in Health had similar problems maintaining patients in long-term HIV and/or MDR TB treatment programs. To combat such issues, they successfully implemented a model of accompaniment: lay community members literally walked patients to treatment centers. Vanderberg stated “in the context of poverty, the multitude of things that would prohibit you from getting to treatment today are compounded all the time.” Some of the same issues may be relevant to accessing surgery: understanding when surgery is needed, understanding when to get to a particular facility for treatment, understanding how to get people to recurrent treatments requiring multiple visits. In Honduras, parents of children who were treated for cleft palate now play a role in finding those who have been lost in the system.

Dr. Leather commented that members of the DCP3 and LCoGS groups did not focus enough on the community. At a national planning level, he urged ministers and national stakeholders to take that mantle. He noted that there are important lessons to be learned from community health worker programs (e.g., the extension health worker program in Ethiopia). Dr. Rusty Segan of Johnson & Johnson added that many areas run community-level first responder operations in many areas and suggested piloting similar programs in countries engaged in national surgical planning. Dr. Saurabh Saluja, a fellow at Harvard’s Program in Global Surgery and Social Change, noted that there are effective working models for this type of program that are innovative, impactful, and relatively inexpensive with the potential to be applied globally.

4.3.7 Summary of surgical workforce working group discussion
The symposium participants agreed that issues surrounding surgical workforce are both diverse and complex in nature. While collaborations such as that between RCSI and COSECFA have begun to build capacity, there is need for continued innovation. In counting the number of qualified surgical providers, debates are ongoing regarding those who should be included in such quantifications. We must continue to discuss the role of task shifting/sharing as well as the non-permanent workforce in providing surgical care and inclusion in workforce density. Further, we need to define their appropriate scope of practice and corresponding accreditation. Lastly, we
must continue to focus on the best ways to provide surgical care at the community level.

4.4 KEY MESSAGES FOR IMPLEMENTERS

• Innovative programs that look beyond traditional training models may be best suited to strengthen the surgical workforce.

• Partnerships in workforce training should be aligned with local country objectives.

• Implementers must determine the role of non-physicians in providing surgery, establish training programs, and define their scope of practice. Further, they must decide how to integrate these cadres into surgical care and decide how to include them in the workforce count accordingly.

• Implementers must consider how to incorporate foreign medical teams into workforce estimates. In some countries they represent a near- permanent workforce whereas in other places they only travel for brief periods of mission work. The nature of their role should inform how they are addressed in workforce planning and whether they are counted as part of the domestic workforce.

• Addressing workforce needs for surgery must reach back to the community level. This could include lay first-responders, an accompaniment model for care, or a multitude of other innovative means of engaging people at the community level.
5 Financing Surgery

5.1 TEMPLATE FOR A NATIONAL SURGICAL PLAN: FINANCING

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<th>Components</th>
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<td>• Budget allocation</td>
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<th>Recommendations</th>
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<td>• Cover basic surgical packages within universal health coverage</td>
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<td>• Risk pooling; minimize user fees at the point of care</td>
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<td>• Track financial flows for surgery through national health expenditures</td>
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<td>• Use value-based purchasing with risk-pooled funds</td>
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<td>• Surgical expenditure as a proportion of gross domestic product</td>
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<td>• Surgical expenditure as a proportion of total national health-care budget</td>
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<td>• Out-of-pocket expenditures on surgery</td>
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<td>• Catastrophic and impoverishing expenditures on surgery</td>
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5.2 FINANCING SURGERY IN CONTEXT

5.2.1 Financing surgery and anesthesia care: The Zambian experience

Dr. Makasa’s presentation focused on ideas being considered in anticipation of Zambia’s National Health Forum, many of which could be applicable to other LMIC settings.

5.2.1.1 Why does financing for surgery and anesthesia care need special attention?

Dr. Makasa described the current situation in Zambia, illustrated by the indicators supported by the WHA68.15, Lancet Report, and DCP3 as well as internal country-wide assessments of Zambia in 2010. Zambia has a small population spread over a large geographic area. The surgical landscape in Zambia is characterized by limited availability of safe, affordable surgical and anesthesia care due to lack of adequate workforce, infrastructure, equipment, surgical supplies, and diagnostics. Further, the data that are needed to evaluate and address these issues are not being captured. There are huge gaps in service delivery for surgery and anesthesia care, which require significant resources and financial support. Thus, his presentation focused on potential sources of financing and how the resulting funds can be invested to close the existing gaps.

Dr. Makasa explained that currently, surgery and anesthesia care are being provided free of charge to the population. However, while the service component of surgery may be free in Zambia, patients must buy many of necessary supplies and consumables themselves in order to receive care. This can impose catastrophic expenses upon patients. Furthermore, patients often face significant wait times at public facilities and
therefore seek alternative care in the private sector where they have to pay out of pocket. Patients must also travel to health care sites, find accommodation, and so forth, thereby incurring additional costs which can forestall access to care.

Limited information is available regarding financing of surgery and anesthesia care in Zambia, particularly information with enough detail to track financing information. Dr. Makasa emphasized that significant investment will be needed to resolve this.

5.2.1.2 How can we frame the narrative on financing surgery and anesthesia care?

Dr. Makasa highlighted the importance of the language used to frame the narrative on financing surgery and anesthesia care. In order to convince policymakers and non-medical colleagues, it is important to frame system strengthening as an investment with returns rather than sunk-cost expenditures. Doing so will require coordinated, coherent and comprehensive national policies aligned to current national and international priorities and commitments, such as universal health coverage (Sustainable Development Goal target – SDGs, United Nations, 2015) - of which surgery/anesthesia is a key component. However, he cautioned against investment in surgical services without a clear plan for how the money will be used.

He called for innovation in mobilizing and investing resources, allocating resources for service provision, tracking finances transparently, and most importantly, demonstrating impact. Financing cannot take the form of a once-off investment; it must be an investment that can surmount future contingencies, such as change in government leadership or economic recessions. He emphasized that continued investment in the provision of surgical services is only possible with demonstrated impact.

National ownership and strong leadership are crucial for donors, private sector development, and other stakeholders. These parties will not be willing to invest in the absence of leadership and a clear plan. He noted that partners will only invest long-term if the government is invested in long-term outcomes in parallel. Ideally, bilateral investment from governments and partners should be fully mapped out and coordinated to contribute meaningfully and sustainably to the development of long-term national capacity.

5.2.1.3 What are the funding options available for surgery and anesthesia care?

Dr. Makasa explained that generally, sources of funding for surgery and anesthesia care are either domestic or international. “National ownership means that we have to look to ourselves first as a country,” remarked Dr. Makasa. “Where are we going to get the money, as Zambia, to invest in surgical and anesthesia services?” He noted that the most important domestic foundation for funding in Zambia is a costed plan, integrated into the national health plan with its own budget line.

Zambia is preparing to roll out social health insurance, which may serve as another source of income to be invested. In the past, all funding came from the government budget, but continued provision of free surgical services by the government is unsustainable. Ideally, this new pool of funds will expand the private sector. At present, many physicians in Zambia do not set up private practices because patients cannot pay. The new insurance program will pay for patients, thus encouraging private sector involvement in the provision of these services.2 Dr. Makasa suggested that the private sector could also play a role in setting up training and education programs (the demand for which is huge in Zambia) to address human resource issues. He also proposed taxation on products such as tobacco and alcohol to generate additional funds to invest.

External/international support comes from partners in the form of grants, but these also require proper planning, costing, and leadership to encourage continued assistance. Dr. Makasa noted that in-kind support is available, but still costs money (e.g., medical missions).

2 Ghana and other African countries have used this approach.
5.2.1.4 Key messages

Dr. Makasa emphasized that to improve access to safe and affordable surgical and anesthesia care for all, investment is urgently needed. This requires tracking investments as well as demonstrating their socioeconomic impact.

Sustainable financing for safe and affordable surgery and anesthesia care will require comprehensive and integrated policies and strategies as well as innovation, advocacy, and strong national ownership. Zambia must evolve its health financing profiles from a heavy reliance on direct (and potentially catastrophic), out-of-pocket payments towards an indirect financing mechanism that pool risk (e.g., general tax revenue, social insurance or private insurance models). A combination of public-sector financing, private-sector financing, and external sources could be the way forward for most LMICs, including Zambia, but this will require better coordination with National Surgical Planning processes and alignment of different financing sources.

5.3 FINANCING WORKING GROUP DISCUSSION

Mr. Walker emphasized that having a financing plan in place is crucial, noting that within the SDGs, surgery is inherent but not specifically highlighted. He cautioned that those who are involved in funding allocation tend to direct funds only to areas specifically featured in the SDGs. Thus, explaining the importance of surgery in the context of a well-developed plan is crucial.

Echoing Dr. Makasa’s point, Dr. Chinkoyo emphasized that the right language must be used to promote surgical services and increase visibility so financiers can understand their importance. The language must be uncomplicated so that laypeople can understand the importance of the surgical system and the benefits surgical system strengthening provides to the overall health. For example, strengthening surgical services at lower-level facilities reduces referrals, decreases overcrowding, and ultimately reduces the cost of providing services.

5.3.1 Capital investments and operational costs

Mr. Walker differentiated between development and operational funding needs in attracting financing. Capital and operational expenses both need to be covered to provide effective surgical care. For example, functional operating rooms cannot perform surgery if they lack disposable surgical equipment, and likewise, staff with plenty of disposable equipment cannot perform surgery if they do not have a functional operating room.

Regarding the division of finances into capital and operating expenses, Dr. Zaidi noted that in the space of surgical care there is much work to be done. In terms of capital expenses, exploring unconventional options could be a means of bringing down costs (for example, budgeting for top-notch equipment that is far more expensive than an equally workable solution available). Companies have increased prices, so like-minded people need to cooperate and work together to bring costs down, he suggested. Dr. Chinkoyo noted that different countries utilize different financing ratios; more developed countries do not need the same amount of resources for capital investment as they do for running costs, whereas less-developed countries need resources for both capital investment and running costs. For capital investment, most financing comes from outside sources, such as foreign governments and NGOs, while domestic resources are used to support running costs.

Mr. Rudy commented that perhaps the field of surgery has been overly burdened by taking responsibility for capital investments in hospitals that also affect other diseases and areas of public health – particularly power, water, and oxygen. He urged for caution in assigning these problems specifically to surgery, because other nonsurgical disciplines have the same infrastructure needs and should share in the responsibility. Dr. Makasa agreed, reiterating that while we are trying to make
surgery visible and transparent, it is important not to isolate surgery in the process. It needs to remain integrated with other disciplines: “we want it visible but still integrated.”

Dr. Chinkoyo noted that general financing for surgical services can be divided into training and provision of services. Regarding allocation of the training budget, Walker queried whether they should be housed in the Ministry of Health or the Ministry of Education (where tertiary education is often housed). It was stressed that regardless of which Ministry houses it, the most important consideration is to ensure that the training budget encompasses what is required, which will require significant coordination between the two Ministries.

**5.3.2 Budgeting**

Mr. Walker raised the issue as to whether there should be a specific budget for surgery at the local, regional, and national level. In many countries spending on HIV is a finite sum, but the actual amount spent on surgery in countries is not clearly quantified. Doing so could allow comparison of expenditures on surgery in different countries. This kind of benchmark data is crucial, but not yet available. The group also raised the concern that tracking expenditures for surgery specifically could have unintended consequences due to the crosscutting nature of the discipline — “It is an absolute requirement to make surgical budgets more transparent, but we also want to be very careful that we don’t isolate surgery.”

Dr. Chinkoyo suggested that financing for surgical services should involve joint planning. Clinicians should be at the center of these discussions so they can participate in the coding of procedures, because once procedures are coded they can be costed systematically. He also noted the importance of strengthening district hospitals. First and foremost, this will require broad discussion around strengthening district facilities rather than solely discussions on financing surgical services. Local context and burden of disease should be used to design services and supplies for these facilities and to determine appropriate supply chains, rather than blindly allocating resources and sending supplies. Furthermore, activity based budgeting, rather than traditional budgeting, is recommended.

Dr. Chinkoyo also noted that issues often arise around the financing of public facilities versus private facilities, support from NGOs, and out-of-pocket financing from individual patients; he stressed that these variables should be considered in all discussions of surgical system strengthening.

**5.3.3 Improving supply chain efficiency**

Given that the funding flows and financing mechanisms in private and public sectors are variable, Mr. Walker suggested that a better understanding of upstream supply chains is needed to achieve efficient delivery of surgical care. He highlighted the huge amount of waste that results from inefficient supply chains and questioned whether they should be sourced by central tendering or individual hospitals. Additionally, the roles of governments and Ministries of Finance with regard to tariffs and import duties must be clarified to ensure that the process is efficient and all costs are accounted for. He predicted that addressing these upstream issues will maximize expenditures on facilities and care delivery without wasting money on inefficiencies in the supply chain.

**5.3.4 Protective measures for exchange rate fluctuations**

Noting that most LMICs have been significantly affected by the global economic meltdown, with many economies grinding to a halt, Dr. Chinkoyo called for protective measures to support these nations. He stated that for poor countries, most commodities are externally sourced using a hard currency (such as USD). There need to be ways of protecting these currencies so that even if a country’s economy declines, they do not lose too much value. Dr. Makasa added that protection needs to be ensured both externally and internally; for
example, over the past year, Zambia’s currency has lost more than double its value, leaving the country with half the amount of monetary value they had originally budgeted. To address this challenge, the Ministry of Finance and the Central Bank have negotiated with the government to house the budget in the central bank. This would provide greater protection, as the currency will be less exposed and therefore less susceptible to fluctuations in exchange rates – “we cannot afford not to provide these services to the people.”

5.3.5 Tracking financial flows into surgery

On the issue of tracking financial flows to surgery, Dr. Leather asked whether it would be more pragmatic and transparent to first map financial flows to the district hospital, not just surgery alone. As an example, Dr. Leather noted that in Sierra Leone it would be impossible to ask for flows into surgery at the moment. Understanding financial flows into the district hospital, however, would be a huge step forward. Given that the fifth message of the commission discusses surgery as an indispensable element of healthcare, the real focus should be the platform – the district hospital. “We should avoid being too granular and try to get too much detail... It might be best in some cases to stop at the district hospital. Then you can work with the district hospital to impeccably use their budget.”

Dr. Makasa noted that in Zambia, the frontline of their approach to improving surgical services remains the district hospital, with a plan to scale up services there. Once financial tracking support exists at the district hospital level, the system would be better able to handle more specific tracking needs, such as for surgery and other sectors.

5.4 KEY MESSAGES FOR IMPLEMENTERS:

- Partners will only commit to long-term investments if the government is committed to long-term investments in parallel.
- When considering financing for surgical care, capital and operational expenses both need to be covered.
- Financing surgical care should not be over-burdened by apportioning to surgery capital investments that also support other areas of health care, such as power, water, and oxygen.
- Continued investment in the provision of surgical services is only sustainable when it demonstrates impact.
6 Information management

6.1 TEMPLATE FOR A NATIONAL SURGICAL PLAN: INFORMATION MANAGEMENT

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<td>• Research agenda</td>
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<th>Recommendations</th>
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<tr>
<td>• Develop robust information systems to monitor clinical processes, cost, outcomes and identify deficits</td>
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<tr>
<td>• Identify, regulate, and fund surgical research priorities of local relevance</td>
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<th>Assessment Methods</th>
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<tr>
<td>• Presence of data systems that promote monitoring and accountability related to surgical and anesthesia care</td>
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<td>• Proportion of hospital facilities with high speed internet connections</td>
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6.2 INFORMATION MANAGEMENT IN CONTEXT

6.2.1 Information Management at the WHO

Reiterating that 2015 was a pivotal year for global surgery, Dr. Johnson explained that from the WHO standpoint, the biggest event was the publication of the Sustainable Development Goals (SDG), the ambitious targets that replaced the Millennium Development Goals (MDGs). Most relevant to global surgery are the sub-targets under the third SDG, a number of which related directly to surgery.

6.2.1.1 WHO Situational Analysis Tool

Dr. Johnson explained that the WHO has been involved with data collection for many years; its Situational Analysis Tool has thus far been used to collect data from 14,000 facilities in 70 countries. However, he noted that it does have some problematic elements. It is composed of 256 parts and is very lengthy to complete. It is a relatively old tool that is entirely paper-based and responses must be manually entered into the database. Dr. Johnson recommended the development of a new digital platform that can be used in the field and can automatically update the data base.

6.2.1.2 GLOBAL SURGICAL WORKFORCE (SAO)

Dr. Johnson reported that the WHO is pushing for the data to be included in the Global Health Observatory, an easily accessible and interactive database that provides country-specific information along various statistical dimensions.

6.2.1.3 Building the System

The WHO Handbook of indicators and their measurement strategies developed 100 core indicators, including the six indicators highlighted by the LCoGS, as well as:

• Health service delivery
• Health workforce
• Health information systems
• Access to essential medicines
• Health systems financing
• Leadership and governance

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34 Monitoring the building blocks of health systems: a handbook of indicators and their measurement strategies.”
World Health Organization. October, 2014
Global Surgery: Towards Equitable Surgical Systems

Figure 10. The WHO also provides a platform for surgical workforce mapping

Source: Adapted from Walt Johnson’s presentation at March 2016 Global Surgery Symposium, hosted by HMS Center for Global Health Delivery-Dubai.

BOX 6-1. Case Study: Mongolia

Mongolia is a sparsely populated country in Central Asia, with 2/3 of population living in the capital and the others scattered throughout the rest of the country (there are no roads outside of the cities). Under the Soviet Union, an integrated network of hospitals was developed.

In a study assessing surgical capacity in Mongolia, authors found significant deficits in infrastructure and human resources at the first-level hospitals. Surgery is performed primarily in Aimeg, the central hospital. Dr. Johnson noted, however, that the study on surgical access that included only nonrandomized facilities, so its results may not be representative of the entire country. Other studies have demonstrated that, overall, 80% of the population have 2-hour access and 99.1% have 6-hour access.

The WHO has developed dashboards for data so that Ministries of Health can easily understand the state of the health care system. By making data easy to visualize, data can be utilized to drive national health policy and develop national surgical care plans.

Dr. Johnson stated his concordance with the position of the Director-General of the WHO, Margaret Chan, and the President of the World Bank, Jim Kim, that indicators should not be a burden. He suggested that six core indicators are sufficient; Ministries of Health can then collect and report additional indicators tailored to country-specific needs, requirements, and interests.

He emphasized the need for institutions to incorporate data collection as a core part of the system. Efforts to promote this inclusion might involve establishing training programs for data collectors as part of system building, making data inputs flexible to country-specific needs, and working with Ministries of Health to input as much data as possible into the Global Health Observatory.

He pointed to the dearth of uniformly collected data on surgical conditions/care in LMICs continues at the population and facility levels as an ongoing problem. Additionally, when data are collected, uniform methods of data collection are often not used and there is reliance on non-validated instruments with poor sensitivity.

Dr. Johnson stressed that gaps in knowledge caused by failure to use appropriate indicators hinders the ability to monitor change, track interventions, and build robust advocacy and funding platforms for surgery. Inappropriate data use leads to both inappropriate allocation of resources and inappropriate policy decisions. The end result, he cautioned, is that health systems are operating inefficiently, with poor surgical delivery platforms and surgical care below appropriate standards of care.

6.3 INFORMATION MANAGEMENT
WORKING GROUP DISCUSSION

Dr. Lotfizadeh commented that in the domain of information management, there are multiple balances to be struck. For instance, where should the information be stored, and who should be managing it?

The National Ministry of Health seems appropriate, but there are other bodies and entities to be involved. The next issue concerns the type of data that should be collected. The group agreed that the core indicators suggested by the LCoGS serve as a good starting point. Further considerations include the relative merits of paper-based versus electronic data collection in various settings. The best modality for collecting data (and whether community workers and NGOs could be involved) and whether the process should be top-down from the Ministry of Health.
Dr. Zaidi stressed that data collection needs to be protocol driven, with those on the ground clearly understanding the system within which they are working. The group agreed that data collection should be protocol driven, supported by invested partners, and locally tailored, with appropriate sampling strategies adopted in the early phases.

### 6.3.1 Modality of data collection

Identifying and utilizing suitable technologies to support data collection, as well as modalities of data collection, were recurring themes in the discussion. Dr. Lotfizadeh suggested that a potential solution is an open source platform for data collection; perhaps the WHO could develop a questionnaire or platform with specific predefined indicators that could then be distributed at the country level to facilitate the collection of the most important indicators. This gives rise to the issue of whether or not a one-size-fits-all approach works. It would avoid the need to re-create the wheel in every setting, yet platforms developed for one country or region are not necessarily the most appropriate for others.

Dr. Lotfizadeh also remarked that the accuracy of data collected is an important concern, as is the extent to which that data is relied upon. Private-public partnerships might be used as a means of helping to facilitate accurate and reliable data collection (for example, Operation Smile in Vietnam). Dr. Zaidi noted that one of the reasons for poor data collection and delays in reporting is the paper-based systems; these issues could be remedied by installing an electronic data collection system. Furthermore, mobile phone-based reporting may be hampered by poor telecommunications services in many countries. Dr. Johnson recommended that trained and compensated data collection staff should be built into a national surgical programs, because nonacademic surgeons may not be the most reliable sources. Dr. Makasa remarked that surgeons, as the primary sources of data, are subject to audits for academic and management purposes, and therefore must be involved in the process. Dr. Johnson agreed, noting that postoperative forms entered straight into a databank would be ideal.

### 6.3.2 Incentivizing data collection

The group agreed that data collection must be incentivized in some way, with financial or training incentives for example. Incentives must stretch from the higher-level organizations that process data down to the individuals at the facility level actually collect the data. Data collection cannot be the responsibility of the surgeon alone.

Dr. Lotfizadeh remarked that an important issue is motivating people to report information at the clinical, hospital, village, town, and district levels. Perhaps an incentive-based system could be used to motivate reporting. However, to affect a more systemic change, the focus and purpose of reporting and collecting data must be well understood by those responsible for the task. “This would shift from a system in which we want the data to figure out what’s being done wrong and who’s doing it wrong so that we can place blame, to a system where we want the data so we can work together to improve outcomes and improve the system.” He also commented that there is a potential role for data-driven industries, such as IBM and Google, in teaching the health sector how to be more effective in data collection, as well as how to instill a culture of data science and mining. Dr. Johnson agreed, noting that these types of companies have immediate access to data because they are earning a profit from it.

Dr. Johnson also called for inculcating a culture of data collection within institutions: “Changing the culture of an institution is probably the hardest thing to do. You can...
change a process overnight with a memo, but changing people’s ideas and perceptions – which is the culture of an institution – is a very difficult thing to do. It has to come at every level.”

6.3.3 Ownership of data

One of the working groups suggested that ownership of data should be the responsibility of the Ministry of Health. However, if ownership of these data are at this level, then there may need to be an outside data champion to actually advance the work (this is context specific). In some countries data exists mostly outside of the Ministry of Health in places such as the insurance industry, medical associations, or the private sector.

Dr. Zaidi noted that the issue of country level ownership is crucial, particularly in countries where the private sector is operating outside the auspices of the Ministry of Health. Private-sector providers may be reluctant to report data because they fear the consequences of bad results, but there needs to be a mechanism built-in to capture information regarding the large number of surgical procedures that are taking place outside of the formal government sector. Dr. Hoballah noted that in many countries, such as Lebanon, the government transfers funds to the private sector which enables the Ministry of Health to hold the private sector accountable for providing required information. Dr. Zaidi added that in some cases, data provided by the Ministry of Health

Box 6-2 PHIC in the Philippines

As an example of an insurance company serving as a source for data, Dr. Lapena explained that in the Philippines, healthcare providers and patients are registered with the PHIC (the country’s national insurance organization). Most surgical procedures are therefore recorded in the PHIC database. Generally, patients claim full case-rates for certain basic surgical procedures (but add out-of-pocket costs for others) and providers claim remuneration. Almost all of hospitals are PHIC-accredited.

He cited the VP of the PHIC as reporting that the PHIC is able to provide some data that are available in its accreditation and claims databases. They have no POMR data, although it could probably be obtained at the facility level and be extrapolated to get a national estimate. Regarding the cost to the patient undergoing the specific procedures, they have data on the amount that PHIC pays per procedure, but the database may not capture the actual cost to the patient (including the out-of-pocket payment). The hospital is supposed to provide the data in claim forms, but many do not provide it. Even if they do, they may not be accurate. Encoding of that data is optional and as their regional offices are targeting faster turn-around time, that data is usually not encoded.
Global Surgery: Towards Equitable Surgical Systems

may not be of much value, because it is related to different parameters. Better sources of information might include medical associations, colleges, or private hospital associations. He suggested that regional statistic centers may work in some countries, but in others (e.g., India and Pakistan), the scope of the data collected is too broad, if available at all.

Dr. Lotfizadeh pointed to the need to examine the concept of how collecting health data fits into the greater topic of collecting data in general. Madagascar has a national data center for compiling information related to a wide range of indicators, both directly and indirectly related to health. For example, the condition of roads can directly affect rates of trauma.

6.3.4 Local value of data

The impact of data must flow back to the community, which will also increase buy-in on data collection. Dr. Zaidi remarked that the community needs to be convinced about the importance of their involvement; the national plan should directly address the community from whom the data is collected. The bulk of data at present is coming from urban areas, but more data and publications addressing community-based surgical care are urgently needed (access to care, morbidity, mortality, etc.).

Dr. Afshar commented that Ministries of Health should not only strive to make data collection easier, but help to promote a culture of using that data locally toward quality improvement. This imbues the data with more value, particularly in limited resource settings where the value may be less explicit and motivation to collect it is lacking. There is an opportunity to integrate this into developing management skills for improvement at the local level. As clinicians and leaders, it can be very difficult to change policy, so it is vital to find novel ways to influence policy. Local data is the best tool to accomplish this. Data that is owned only at the Ministry of Health level restricts its use in influencing policy, particularly as global surgery is emerging as a concept in its own right.

Dr. Derbew called for better sensitivity to countries’ particular research priorities. Research that addresses locally relevant problems and finds solutions will be more likely to receive support from local governments and institutions. Other types of research should find alternative sources of support. Dr. Lotfizadeh agreed that data collection and storage requires sensitivity to each country’s individual systems and cultures.

Dr. Segan noted that creating value for the system requires understanding the real burden of disease from the community perspective. For example, if orthopedic services are available in the catchment area for a district hospital, how many people will be enabled to go back to work where they could not have before? Dr. Guest maintained that no

“In research we have an obligation to show the safety net of the adequacy of the system to meet basic needs, but if one of the key messages from the Lancet Commission [on Global Surgery] is that surgery is a cost-effective, value-creating enterprise, we must demonstrate that value at the community level where the impact is felt.”

--Dr. Rusty Segan
research done in the developing world should be carried out without a local partner, with the idea of passing on not only the results of the research, but the skill of doing the research. All papers published in the developing world should have a local author included.

6.3.5 Standards and best practices in information management

Regarding the development and monitoring of best practices in quality assessment, Dr. Haider questioned what kind of leadership should be developed to create these best practices. For instance, data from the national trauma database in the United States was used in different ways by different people. This led the American College of Surgeons to create the national trauma data standard for collecting data, while best practices for using that data was created by another group. These guidelines were never mandated or endorsed, but people found that these standards made data collection much more feasible. He wondered what kind of venue could lead to a similar change in the global surgery space. Dr. Johnson commented that the WHO tends to be the default option for taking on these responsibilities, but it cannot do everything. The creation of guidelines is a complex, multiyear process. Creating best practices and standards of care, and publishing lessons learned during the processes of data collection are things the WHO can do, but it would involve forming something like a Lancet Commission on Information Systems.

Dr. Samad noted that it would be helpful to have core data parameters collected in many different settings and countries, coupled with a way to expand the menu of data parameters to meet the needs of specific groups (e.g., cleft lip and palate need additional sets of data for assessing outcomes in a certain way). The G4 Alliance has an information management committee mandated to review existing methods of collecting data on both international and national levels, because there are groups working in multiple countries that have already devised various methods of collection. The aim should be to find the best ways to collect quality indicator data. The G4 Alliance recognizes that the WHO is working with limited resources, and is eager to reach out to the WHO’s informatics group to understand their needs and how the G4 Alliance might provide support. Dr. Johnson asked whether it would be useful to look at multiple levels of data collection (local/regional/national); Dr. Samad replied that some parameters would certainly be of interest at a macro level and others at a micro level, but maintaining a constant level of commonality allows all stakeholders to work toward similar parameters (surgical volume, mortality rates, etc.). Aligning the World Bank, the WHO, and partner organization needs is important, because mandating a set of indicators that are not relevant to people on the ground will obviate those indicators. The G4 Alliance is in a good position to assist with this because a number of large groups are represented on its board. The next step is to try and devise common parameters (e.g., postoperative mortality for obstetrics and gynecological care versus fistula care versus cleft lip and palate surgery).

Dr. Johnson noted that, from the WHO’s perspective, it is difficult to build in the kind of flexibility desired in the platform – a standard platform needs to be used. Dr. Samad suggested that the G4 Alliance could connect with the WHO (at the appropriate stage) to help ensure that the platform is useful and applicable from the WHO standpoint.
6.3.6 Data collection protocol and metrics

Dr. Johnson asked whether indicators will change over the next five years, to which Dr. Meara replied that this is a topic of discussion, but there is no conclusion as yet about how the indicators would be modified.

Dr. Leather raised the issue of independent accountability: en masse, surgical stakeholders have mutual accountability, but independent accountability is lacking. Regular publications of progress updates pertaining to the LCoGS indicators would initially identify gaps at the country level, which should be filled in over time. Each report might have a section covering new processes and introducing more granular data, which could feed into the development of new indicators: the LCoGS should be duty-bound to propel this process forward.

Dr. Samad commented that if it takes a year to develop a data platform, for example, and an additional couple of years to implement it in a certain number of countries, changing the indicators will give rise to a host of problems. Indicators need to be locked in for 3-5 years, he stated.

Dr. Leather warned that it is important not to change the goalposts: some sort of agreement needs to be reached on what the metrics are. Inventing new indicators may be beneficial, but voices in the wider global health community also need to be heard. For instance, while regular publications of the child health community have powerful influence, global surgery struggles to come up with population-level clinical outcomes (postoperative mortality is more relevant to quality, for example). He commented: “It’s an iterative process; these metrics will mature, advance, and improve, but this maturing is rebalanced with stable indicators that enable early reporting to advance the global surgery movement.”

6.3.7 Research

On the issue of research, Dr. Johnson emphasized the obligations of researchers to the communities that they are researching, noting that there are many cases of researchers failing to heed this responsibility. For instance, a researcher may go into a community to research breast cancer in BRAC+ women and then publish the data, but fail to inform the women who are at risk. Communities need to be involved in, and preferably benefit from, the results of research.

Dr. Makasa commented on the need to encourage research on the economic impact of surgery. This information is needed to justify sustained investments, particularly as they pertain to the public health aspect of surgical and anesthesia care. Research not only increases knowledge, but also helps to keep surgical services in the limelight and disseminate information about the services to the community. Dr. Johnson agreed, highlighting the need to bridge the gap between surgeons and the public health sector, who have very different mindsets and different language.

Dr. Leather maintained that there are three reasons why research is critically important: (1) better evidence is needed to inform the global health community on the importance of surgery; (2) scaling up requires research to prove the efficacy of interventions; and (3) the methods to promote the implementation of evidence must also be examined. This needs to happen at the local level to generate quantitative and qualitative data from the community.

Dr. Afshar commented that another reason to conduct research as part of the national surgical plan is the ability to test the effectiveness of interventions in system strengthening so they can eventually be applied to other countries. There needs to be a common forum for these publications to allow for communication and engagement with the right stakeholders.
6.4 KEY MESSAGES FOR IMPLEMENTERS

- New technologies and digital platforms should be incorporated into ongoing data collection to allow data to be easily visualized and understood.
- Data sources are diverse: while data are often held by the government, sources also include NGOs, the private sector, the insurance industry, and more.
- Data must flow back to the community to increase buy-in on data collection, ensure the relevance of data that is being collected, and maximize the role of data in advocacy.

- Data collection must not burden the community. Data collection should be incorporated into the culture of the system and data requirements should be kept lean, relevant, and adaptable. The LCoGS indicators serve as a useful starting point.
- Once a platform for data collection is created, indicators should not be changed for 3-5 years to allow for aggregation of meaningful results.
- Research is critical to national surgical planning processes and must be included in national plans. The research must be relevant to the community and researchers must fulfill their obligation to the communities being researched.
7 Service delivery

7.1 TEMPLATE FOR A NATIONAL SURGICAL PLAN: SERVICE DELIVERY

<table>
<thead>
<tr>
<th>Components</th>
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<tbody>
<tr>
<td>Surgical volume</td>
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<tr>
<td>System coordination</td>
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<tr>
<td>Quality and safety</td>
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<table>
<thead>
<tr>
<th>Recommendations</th>
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<tbody>
<tr>
<td>All first-level hospitals should provide laparotomy, caesarean delivery and treatment of open fracture (the Bellwether Procedures)</td>
</tr>
<tr>
<td>Integrate public, private, NGO providers into a common national delivery framework; promote demand-driven partnerships with NGOs to build surgical capacity</td>
</tr>
<tr>
<td>Prioritize healthcare management training</td>
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<tr>
<td>Prioritize quality improvement processes and outcomes monitoring</td>
</tr>
<tr>
<td>Promote telemedicine to build system-wide connectivity</td>
</tr>
<tr>
<td>Promote system-wide connectivity for telemedicine applications, clinical support and education</td>
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</table>

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<thead>
<tr>
<th>Assessment Methods</th>
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<tbody>
<tr>
<td>Proportion of surgical facilities offering the Bellwether Procedures</td>
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<tr>
<td>Number of surgical procedures done per year</td>
</tr>
<tr>
<td>Surgical and anesthetic related morbidity and mortality (perioperative)</td>
</tr>
<tr>
<td>Availability of system-wide communication</td>
</tr>
</tbody>
</table>

7.2 SERVICE DELIVERY IN CONTEXT

Timor-Leste covers the Eastern portion of Timor Island, with 14 districts spread across mountainous terrain. After a long history of occupation by Indonesia between 1975-1999, a 1999 referendum returned an overwhelming vote for independence which was finally achieved in May 2002. However, the 1999 Indonesian military withdrawal resulted in destruction of infrastructure and displacement or emigration of the majority of the skilled workforce in the country, leaving no healthcare, legal, or education systems in place. Dr. Guest characterized 1999 as “Ground Zero” for the health system in Timor-Leste. There were approximately 20 junior medical doctors and no specialists for a population of 700,000. The hospital was still intact, but had no equipment. Now, after 15 years of independence, Timor-Leste is a relatively stable government, a growing economy, and an increasing population that has reached almost 1.3 million as of March 2016.
7.2.1 Royal Australasian College of Surgeons (RACS) Program in Timor-Leste

Multiple partners have contributed to the growth of the health sector in Timor-Leste (ATLASS, UN/WHO, CordAid-Taco, and the governments of China and Cuba). Accompanying these efforts, the Ministry of Health has provided steadfast leadership despite difficulty coordinating partners speaking many different languages, with diverse cultures and even more diverse interests.

The Australia & Timor-Leste Assistance for Specialty Services (ATLASS Program) was established in 2001. It is funded by the Australian government, but managed and delivered by the Royal Australasian College of Surgeons. ATLASS is partnered with the Ministry of Health, the University of Timor-Leste, and many others.

In 2001, Timor-Leste had one surgeon and one anaesthetist in-country (with external teams visiting once a month). In the early stages, ATLASS primarily focused on clinical service delivery. Capacity building was done ad hoc with no structured program and consisted mainly of apprenticeship-style training with thousands of operations and consultations performed side by side with East Timorese doctors and nurses.

Training initially suffered from a difficult educational environment, noted Dr. Guest, who reported a lack of culture of long-term learning in Timor-Leste at the time. There was low enrolment, and candidates were often poorly motivated. Education by short-term expatriates lacked continuity, and there was no formalized education structure or medical accreditation framework. Clinical commitments were high and the facilities for teaching were poor.

Nevertheless, the early years did serve to establish a strong foundation for the future. The initial phases yielded robust experience in local clinical requirements, understanding of community attitudes, and awareness of the strengths and weaknesses of the local infrastructure and support systems. Team members gained language skills and cultural competence while developing local networks, relationships, and credibility as a long-term presence.
Dr. Guest described the next phase of ATLASS as the “golden era” of educational opportunity. Cuba concentrated on undergraduate medical training, educating 1000 Timorese doctors split between Cuba and Timor over six years. RACS focused on postgraduate medical training, developing in-country courses under the National University of East Timor.\textsuperscript{15} Graduates of these programs have gone on to take on clinical and teaching leadership positions in country.

The Timorese have now collected all LCoGS metrics and requested assistance to set up their Surgical and Anaesthetic Audit, both of which prove significant progress in health systems strengthening. To assess service delivery achievement, ATLASS examined the proportion of procedures performed by Timorese doctors in 2002 versus 2015 (Table 4).

### 7.2.2 ATLASS Program key achievements

Dr. Guest emphasized how much improvement has been realized in a relatively short time in Timor-Leste. As of March 2016, there are five in-country specialists (surgeon, anaesthetist, emergency physician, obstetrician, and pediatrician), three permanent support staff in country, and two Australia-based full-time staff.

There is high quality clinical care provided by in-country resident teams receiving continuous mentorship and supervision from Timorese leadership to maintain high standards. Visiting teams provide increased access to subspecialty services, particularly for remote communities. In-country resident teams also provide input into a variety of systemic matters, such as the design of training centres, biomedical maintenance services, equipment for new hospitals, and quality improvement initiatives like neonatal and maternal mortality investigations.

### 7.2.3 ATLASS Program lessons

Local partners are essential for instilling national ownership, as is long-term strategic planning and having trusted personnel on the ground. Dr. Guest remarked that clinical work is a great way to understand the local environment and build credibility. Long-term goals must be consistently coupled with flexibility and the practice of giving credit to all partners who have contributed to the combined effort.

> “You’re better off working with someone than against them...you can always learn something from local people; they have a different health paradigm; they do things in a different way. I think I’ve learned a lot from working with them and understanding how they do things in their own country. Once I understood that, I could actually see how we could work together.”

--Dr. Glenn Guest

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\textsuperscript{15} Diploma of Family Medicine; Postgraduate Specialty Diploma to prepare students for education in other countries.; Master’s Program in Paediatrics, nurse anaesthetic training (a Ministry of Health Certificate Program); and external speciality training (surgeons, anaesthetists, ophthalmologists) in other countries with suitably context-, disease-, and resource-specific settings.
### 7.3 SERVICE DELIVERY: PRACTICAL IDEAS

Dr. Guest emphasized that national surgical planning must lead to actionable processes: determining what is important, what is achievable, and the best way to achieve it. Within the national surgical planning framework, he situated service delivery as the central outcome through which all the other components (people, infrastructure, financing, and IT) merge to produce a significant, high-impact result. Healthcare is a highly complex system, he noted, that encompasses multiple perspectives on service delivery (e.g., Ministers for infrastructure, finance, and employment will have very different priorities). But like most systems, if all of the components are of high quality, then the output is generally of high quality. However, he warned that it only takes one poor quality component to put a strain on the other components; the system may be able to cope in the short term but over time, the quality will degrade. He continued on to state that even a system comprised of the highest quality components will still generate poor outputs if these components are not working well together.

Per the LCoGS, the components of service delivery are surgical volume, system coordination, quality, and safety. Dr. Guest highlighted service delivery as the only "real" marker of whether the system is actually working, noting that surgical volume is relatively easy to measure, thought it is a fairly coarse measure of the system’s efficacy (with the caveat that a coarse practical measure is better than a more complex measure that will never be collected in practice). He also emphasized that surgical volume data needs to be collected in tandem with a measure of the system's safety.

To spur discussion, Dr. Guest provided the following schematic of a surgical system’s components and potential barriers (Fig. 12):

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**Figure 12. Service delivery in a surgical system**

Source: Adapted from Glenn Guest’s presentation at March 2016 Global Surgery Symposium, hosted by HMS Center for Global Health Delivery-Dubai.
Box 7-1. Actionable service delivery priorities to include in a national surgical plan

Dr. Guest provided a suggested set of actionable service delivery priorities for inclusion in national surgical plans:

- Ensure all hospitals have internet available to the health care workers
- Ensure all hospitals have a list of phone contacts of relevant people to seek advice
- Implement a requirement to maintain a mortality registry (thus avoiding the need for prospective analysis)
- Implement a requirement to maintain surgical procedures registry (e.g., theatre registration)
- Require a registration and accreditation process for all SAOs
- Provide education to the population and to referrers
- Use a reliable booking system to avoid disappointment
- Implement a system to communicate back to referrers regarding patient admission
- Support a professional body representing SAOs
- Promote a linkage between professional bodies in regional areas (e.g., COSECSA, PISA)

Dr. Guest commented that receiving surgical treatment through a system involves a multi-stage journey with many different components, each of which must function appropriately and successfully for the patient to receive appropriate surgical care.

7.4 KEY MESSAGES FOR IMPLEMENTERS:

- Long-term goals of partnerships must consistently be coupled with flexibility and the practice of giving credit to all partners who have contributed to the combined effort.
- Within national surgical planning, service delivery is a central outcome through which all the other components (people, infrastructure, financing, and IT) merge together.

- National surgical planning must lead to actionable processes: determining what is important, what is achievable, and the best way to achieve it.
- For international groups, assisting with care delivery is an important way to understand the local environment and build credibility.
8 Key partners in national surgical planning and implementation: academia, professional bodies, and the private sector

8.1 ACADEMIA: THE ENGINE FOR NATIONAL SURGICAL PLANS

Dr. Haider remarked that academia has historically left national surgical plan implementation up to others and has focused instead on protecting the academic “brand” from being “tarnished.” He called upon academics to transform the credibility derived from academia into leadership to affect real change in NSP implementation, using innovation, entrepreneurship, collaboration and communication as key drivers. He cited DCP-3 and LCoGS as excellent examples of the type of modern academic leadership he champions.

8.1.1 Potential impact of academia on LCoGS indicators

Academic work can change policy, according to Dr. Haider, citing as an example a trauma center in an underserved area of south Chicago constructed only after an academic publication highlighted the lack of care there. Further, he referenced a study by Zafar et al.\(^16\) that analyzed disparities in access to surgical care in Pakistan between urban and rural populations.

The study demonstrated that even the very poor in urban areas have much better access to surgery than those in rural areas. Academic work that addresses the determinants of surgical access has the potential to ignite action to solve infrastructure-related issues.

In the context of the LCoGS’ surgical work-force indicator (Indicator 2), Dr. Haider cited another study\(^17\) which found (somewhat controversially) that in Tanzania, non-physician clinicians achieved surgical outcomes equal to those of physicians. Again, this shows how academic work can inform infrastructure issues related to provision of surgical care.

Discussing opportunities for partnership, Dr. Haider cited several examples of how academics can be a part of an accompaniment model for surgical care. For instance, through the Human Resources for Health Program, Dr. Robert Riviello of Brigham and Women’s Hospital in Boston is heavily involved in surgical care delivery, research training, and educating Rwandan surgical residents in Rwanda. As a second example, Dr. Haider noted the involvement of Dr. John Scott, also of Brigham and

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Box 8-1 National-level academic coordination and partnerships 811

Need for country-wide national academic coordination among institutions developing NSPs by:

- Jointly creating a list of all programs and host a yearly meeting
- Implementing innovative training paradigms; using technology and innovation to jump generations
- Adopting internal quality controls and locally reliant data programs
- Promoting alternate payment models
- Comparing to region/ income level countries

\(^{16}\) Zafar et al. 2013
\(^{17}\) Beard et al. 2014
Women’s Hospital, in the Non-Technical Skills for Surgeons in Rwanda (NOTSS) program, which aims to develop a context-sensitive curriculum for training surgeons in LMICs. This curriculum is being incorporated into the Rwandan residency program, and collaboration with COSECSA is also extending this training throughout the region. Dr. Haider also mentioned POCORI, a program for patient-centered outcomes in Pakistan. Finally, Dr. Haider flagged Harvard’s Program in Global Surgery and Social Change (led by Dr. John Meara), home of the Paul Farmer Global Surgery Fellowship, as a vital program in the training of present and future leaders in academic global surgery which attracts students and residents from around the country and around the world.

Dr. Haider described several studies that illustrate the use of innovative academic work to drive quality improvement. He mentioned how Indus Hospital’s Pehla Qadam program for treating clubfoot leverages the power of social media by using Facebook for fundraising, quality control, and quality improvement. The program also publishes before and after treatment photos and submits all data to the Poonseti International Registry.

Another study focused on quality improvement in the trauma program at a hospital in Karachi by developing a trauma database, a trauma fellowship, and trauma grand rounds. As a result, the program saw decreased mortality among patients. Other work has tapped into cultural and religious beliefs among the population in Pakistan to improve access. Every Ramadan, it is customary for people with the means to do so to pay 2.5% of their wealth as an annual religious donation. Capitalizing on this practice, Indus Hospital built a USD 85m medical infrastructure based on funding that would arrive during Ramadan. In fact, 98% of all philanthropic donations (USD 26m) received by this hospital in the first five years were generated locally. Information management is another way academics can make a difference, according to Dr. Haider. He described a study that explored the potential value of developing an International Trauma Data Bank, using large-scale information management to compare trauma care data from different countries.

8.2 PROFESSIONAL BODIES

8.2.1 G4 Alliance: Leveraging priority for surgical systems strengthening on the global health agenda

The G4 Alliance is a professional body dedicated to breaking down barriers to surgical care access around the globe, focusing on strengthening workforce capacity, infrastructure, financing mechanisms, supply chains and other critical obstacles to universal health coverage.

“Evidence and data are part of the critical path but in themselves will not enact large scale change.”

— Fizan Abdullah, MD, PhD

Dr. Fizan Abdullah, director of the G4 Alliance, explained that the mission of the organization is to advocate for the neglected surgical patient, driven by a vision of universal access to quality essential surgical, obstetric, trauma, and anesthesia care. Its practical aim is to provide a platform for organizations to increase access to safe, essential, and timely surgical, obstetric, trauma, and anesthesia care.

The G4 Alliance encourages the representation of multiple stakeholders working in the field of global surgery through a coalition of member organizations from around the world dedicated to prioritizing surgical care through advocacy, policy implementation, and resource mobilization. It includes 67 member organizations representing over 300 organizations from more than 150 countries.

20 40,000 in-patients treated; 5-fold increase in surgical procedures; 84% of in-patients treated for surgical procedures; bed occupancy increased from 65% to 91%.
22 These four disciplines were chosen because surgical provision at district hospitals primarily involves these 4 disciplines.
23 Its governance structure is a one organization, one vote structure; permanent council members are subject to ten conditions of service to promote ethical behavior and prevent conflicts of interest.
BOX 8.1 5 Key Elements for Success: achieving large-scale change through collective impact

<table>
<thead>
<tr>
<th>Common agenda</th>
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<tr>
<td>Common understanding of the problem</td>
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<td>Shared vision for change</td>
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<tr>
<th>Shared measurement</th>
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<tbody>
<tr>
<td>Collecting data and measuring results</td>
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<tr>
<td>Focus on performance management</td>
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<tr>
<td>Shared accountability (political process must follow scientific process)</td>
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<tr>
<th>Mutually reinforcing activities</th>
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<tr>
<td>Differentiated approaches</td>
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<td>Coordination through joint plan of action</td>
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<tr>
<th>Continuous communication</th>
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<tr>
<td>Consistent and open communication</td>
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<td>Focus on building trust</td>
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<tr>
<th>Backbone support</th>
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<tr>
<td>Separate organization(s) with staff</td>
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<tr>
<td>Resources and skills to convene and coordinate participating organizations</td>
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countries and six continents, with members drawn from academic institutions, professional societies, social enterprises, non-profits/NGOs, and public and private sector organizations.

8.2.1.1 G4 Alliance Strategy

Dr. Abdullah examined the three core pillars of the G4 Alliance: advocacy, policy implementation, and resource mobilization. The advocacy component is directed toward a global action plan to influence policymakers, funders, and governments by changing perceptions of surgery through a network of member organizations and prominent personalities. Policy implementation is aimed at driving policy change at the WHO and the UN, collaborating with governments, and developing a policy implementation framework to support national surgical programs. Efforts in advocacy and policy implementation thus far have included advocating for the inclusion of surgical care as part of the SDGs and engagement in the post-2015 SDG Open Working Group Process at the United Nations. 24 At the WHO, the Alliance successfully led a campaign for the inclusion of surgical indicators in the WHO Core 100 list (engaging 100+ global organizations in 72 hours). In addition to planning meetings held by the WHO Global Initiative for Emergency and Essential Surgical Care (GIEESC), the G4 member delegation was engaged at the 68th World Health Assembly (WHA) to encourage more than 150 countries to support the WHA resolution for Surgery and Anesthesia, in coordination with Embassy of Trinidad and Tobago. Multiple calls to action have been issued: support for engagement of non-state public and private sector actors with the WHO; development of WHO Surgical Health Indicators; prevention of ketamine scheduling (ketamine is a commonly used anesthetic); and relief during the Nepal earthquake. Advocacy events and meetings include the official G4 Global Launch during 68th WHA in Geneva, regional launch events and meetings as part of the G4 Consultative Process UN, and side events on Surgery and Universal Health Coverage and on Safe Surgery.

The third pillar aims to support resource mobilization for surgical systems strengthening investments. Dr. Abdullah clarified that this plan strives to raise money for the global surgery initiative by developing a

24 With official statements delivered at UN SDG Open Working Group Sessions and UN intergovernmental negotiations in collaboration with Women’s Major Group
Global Surgery: Towards Equitable Surgical Systems

Figure 13. G4 Alliance: Proposed indicators to monitor and evaluate surgical systems

<table>
<thead>
<tr>
<th>Domain</th>
<th>Best for</th>
<th>Indicator</th>
<th>Reference</th>
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<tbody>
<tr>
<td>Access</td>
<td>Access to timely essential surgery</td>
<td>WHO Core100**</td>
<td></td>
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<tr>
<td></td>
<td>Specialist surgical workforce density</td>
<td>WHO Core100**</td>
<td></td>
</tr>
<tr>
<td>Trauma Care</td>
<td>Estimated proportion of seriously injured patients transported by ambulance</td>
<td>WHO VIP</td>
<td></td>
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<tr>
<td>Trauma + Obstetrics</td>
<td>National whole blood donation rate</td>
<td>WHO GDBS</td>
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<tr>
<td>Obstetrics</td>
<td>C-section rate</td>
<td>WHO Core100+</td>
<td></td>
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<tr>
<td>Anaesthesia</td>
<td>Proportion of operating theatres with pulse oximetry</td>
<td>WHO PSPop</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ratio of anaesthetists to surgeons</td>
<td>WHO Core100**</td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td>Surgical Volume</td>
<td>WHO Core100**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Perioperative mortality rate (POMR)</td>
<td>WHO Core100</td>
<td></td>
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<tr>
<td>Trauma Care</td>
<td>Inpatient trauma mortality rate</td>
<td>ACS COT</td>
<td></td>
</tr>
<tr>
<td>Obstetrics</td>
<td>Maternal Mortality Ratio (proportion due to maternal haemorrhage, obstructed labour)</td>
<td>WHO Core100**</td>
<td></td>
</tr>
<tr>
<td>Anaesthesia</td>
<td>Neo-natal mortality</td>
<td>WHO Core100</td>
<td></td>
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<tr>
<td></td>
<td>POMR on operative day</td>
<td>WHO Core100**</td>
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**Financial Risk Protection**

<table>
<thead>
<tr>
<th>Surgical System</th>
<th>Protection against impoverishing expenditure</th>
<th>WHO Core100**</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Protection against catastrophic expenditure</td>
<td>WHO Core100**</td>
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Source: Adapted from Adil Haider’s presentation at March 2016 Global Surgery Symposium, hosted by HMS Center for Global Health Delivery-Dubai.

A funding strategy for global advocacy and country level implementation, fostering public and private sector partnerships, and curating relationships with high-level sponsors and funders.

The Alliance is currently working on rolling out a global consultative process to develop a platform for collective advocacy, policy implementation and resource mobilization to support the WHO’s efforts and national health systems strengthening.

Dr. Haider, who also serves as a G4 Alliance board member, provided an update on the efforts of the G4 Alliance’s Goals Targets and Indicators (GTI) and key messages from working groups. The recommendations of these working groups were:

Figure 14. Data indicators for uniform comparison of surgical care across organizations

<table>
<thead>
<tr>
<th>Burden</th>
<th>Population-level incidence and prevalence measures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Assessment of DALys attributed to condition; proportion of DALYs avertable by treatment</td>
</tr>
<tr>
<td>Access</td>
<td>Proportion of general population able to access facilities providing condition-specific care</td>
</tr>
<tr>
<td>Quality</td>
<td>Annual volume of condition-specific procedures</td>
</tr>
<tr>
<td></td>
<td>Post-operative mortality/morbidity</td>
</tr>
<tr>
<td>Financial Protection</td>
<td>Inclusion into national insurance coverage</td>
</tr>
<tr>
<td></td>
<td>Protection against impoverishing and catastrophic expenditure</td>
</tr>
</tbody>
</table>

Source: Adapted from Adil Haider’s presentation at March 2016 Global Surgery Symposium, hosted by HMS Center for Global Health Delivery-Dubai.
drafted in a consensus document in early 2016 that is pending ratification in May 2016. Each domain has specific indicators related to access to quality care and financial risk protection. Dr. Haider noted that members from specialty disciplines (e.g., cleft palate treatment) are welcome to propose how they would assess specific surgical conditions, but he noted that condition-specific organizations should nonetheless collect data in a uniform way that allows all organizations to compare data consistently (Fig. 14).

The G4 Alliance Impact Strategy is a series of consecutive efforts, Dr. Abdullah explained:

1. To drive policy change at the WHO & UN, including WHA resolution implementation;
2. To assist Ministries of Health in developing national health plans to augment surgical capacity;
3. To strengthen health systems and increase support from governments and funders; and
4. To support the development of industry, supply chains and overall demand in emerging markets to support functional and sustainable surgical health systems.

Dr. Abdullah maintained that a key feature of the G4 Alliance is its commitment to collaboration - garnering support to engage in advocacy, policy implementation and global fundraising through the most inclusive, ethical, and transparent way possible to impact the global health landscape.

8.2.1.2 Advocacy & Policy
Implementation: Learning from other global health movements

Dr. Abdullah remarked that it is important for the global health community to learn from other organizations in terms of collaborating in a collective and meaningful way. Dr. Haider agreed, noting that other global health movements have successfully used unifying goals and actionable targets to drive their specific agendas forward. Two of these movements are profiled below: the NCD Alliance and GAVI.

8.2.1.2.1 Non-Communicable Disease Alliance

The Non-Communicable Disease (NCD) Alliance uses targeted advocacy and outreach to ensure that NCDs are recognized as a major cause of poverty, a barrier to economic development, and a global emergency. It is a coalition of 2000 organizations in over 170 countries, including the International Diabetes Foundation, UICC, World Heart Federation, and the International Union Against Tuberculosis and Lung Disease.

At the NCD Alliance’s inception, few if any countries had an explicit NCD strategy, but as a result of NCD Alliance efforts, 92% of countries now have national plans or policies addressing NCDs. A roadmap for activities through 2020 aims at incorporating NCDs into every major international, regional, and national conversation about public health and policy.
Strategies for implementation include international, national, regional, and local meetings with a wide range of partners and organizations, to work toward achieving consensus at key international meetings. The NCD Alliance gathers and promotes the latest policy work on NCDs to build a broad evidence base in order to press governments to recognize that NCDs are a global development priority requiring an urgent response.

In 2009, the NCD Alliances made four major demands:

1. For the United Nations General Assembly to hold a Summit on NCDs;
2. For the inclusion of indicators of NCDs in the MDGs at the September 2010 UN MDGs Summit, and inclusion of NCDs in the SDGs, the successor goals to the MDGs instated in 2015;
3. For access to affordable, high quality essential medicines for NCDs in low- and middle-income countries; and
4. For integration of NCDs into health systems, particularly at the primary health care level


8.2.1.2.2 The Global Alliance for Vaccines and Immunization

Created in 2000, Global Alliance for Vaccines and Immunization (GAVI) is an international organization that has brought the public and private sector together with the shared goal of creating equal access to vaccinations for children. Dr. Abdullah commented that GAVI’s efforts have taken a very discrete path, directly relevant and applicable to global surgery.

GAVI used five major principles of advocacy to achieve large-scale change:

1. Aggregating demand and procurement;
2. Encouraging competition;
3. Increasing transparency;
4. Encouraging tiered pricing; and
5. Improving access to sustainable prices for graduating countries.

GAVI aggregates demand and procurement by pooling and purchasing activities for vaccines (which are typically very expensive). This has proven to be an effective mechanism to reduce prices through increasing demand certainty. The creation of a strategic demand forecasting platform and the use of long-term commitments from governments have increased the certainty of demand, enabling manufacturers to plan production more effectively, which in turn reduces the risk of supply shortages and allows GAVI to obtain lower prices.

To encourage competition, GAVI and its partners actively engage in a range of push and pull funding mechanisms to ensure that new suppliers will enter the market in the medium to long-term. To ensure increased transparency, the UNICEF Supply Division, which manages the majority of the vaccine procurement on behalf of GAVI countries, has been publishing historical vaccine price data since 2011.

The significant volume and value of demand from GAVI countries have created sufficient incentives for the pharmaceutical industry to establish a low-pricing tier, allowing GAVI-eligible countries to access the same product at a fraction of the price charged in high-income countries. To improve access to sustainable prices for graduating countries, GAVI has negotiated stable prices for pentavalent, rotavirus, and pneumococcal vaccines. A request for access to pricing for graduating countries is now part of tenders conducted by UNICEF on GAVI’s behalf.
As hoped, GAVI has had a huge impact on child mortality, according to Dr. Abdullah. Approximately 440 million doses of vaccines have been delivered to children, and GAVI has been directly credited with saving six million children from death. The 300 million doses planned for delivery between 2016-2020 will prevent an estimated six million additional deaths.

8.3 UNDERSTANDING THE PUBLIC PRIVATE MIX

Dr. Zafar Zaidi explained that, over the years, the demand for health care has increased in tandem with key drivers of health care costs, such as rapid aging of the population, rising public expectations, advancement in medical technology leading to an increase in the range and number of possible interventions. Many governments are confronted by fiscal constraints that force them to carefully prioritize and restrict public expenditure. All over the world, the public sector faces challenges in health care finance, management, and provision.

Dr. Zaidi defined a public-private partnership (PPP) as a “form of long-term contract between a government and a private entity through which the government and private party jointly invest in the provision of public services.” In recent years, the trend in both developed and developing countries has been toward greater private sector involvement in healthcare provision and financing, according to Dr. Zaidi.

Reasons for this include insufficient government resources, poor performance of the public sector, and bureaucracy in state-run institutions that delays decisions and leads to inappropriate distribution of funds. The debate, according to Dr. Zaidi, is no longer about who should pay or who should provide health care services, but who can do so more efficiently.

8.3.1 Aims and advantages of PPPs

Dr. Zaidi outlined five key objectives that public-private partnerships seek to achieve. The first is cost effectiveness, which reduces the expense of jobs being performed. Second is equity of access; if services are provided only to certain people, it is tantamount to total privatization. Third, ensuring quality of care is a key component of public-private partnerships. Fourth, predictable government health expenditures facilitate easier budgeting, and finally, private sector experience can promote system-wide efficiency gains.

Further advantages to coordinating with the private sector include enhanced service quality as a function of increased expertise and the potential to attract and retain high performing staff and managers at reduced costs. Additionally, the private sector can help to address specific economic challenges with more rapid and substantial investments in infrastructure, new medical technologies, and better risk reduction and allocation.
**Figure 15. The triangle of mistrust**

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<table>
<thead>
<tr>
<th>Current Situation: Triangle of mistrust</th>
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</thead>
<tbody>
<tr>
<td>Government</td>
</tr>
<tr>
<td>Inefficiency</td>
</tr>
<tr>
<td>Trust Deficit</td>
</tr>
<tr>
<td>Large profits, Undue Bureaucratic delays</td>
</tr>
<tr>
<td>Patient</td>
</tr>
<tr>
<td>Cost Fear</td>
</tr>
<tr>
<td>Private Provider</td>
</tr>
</tbody>
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Source: Adapted from Zafar Zaidi’s presentation at March 2016 Global Surgery Symposium, hosted by HMS Center for Global Health Delivery-Dubai.

**Figure 16. The change mechanism**

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<table>
<thead>
<tr>
<th>Change Mechanism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulator: Government</td>
</tr>
<tr>
<td>Empowerment</td>
</tr>
<tr>
<td>Performance Indicators</td>
</tr>
<tr>
<td>Patient</td>
</tr>
<tr>
<td>Trust</td>
</tr>
<tr>
<td>Provider: Private</td>
</tr>
</tbody>
</table>
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Source: Adapted from Zafar Zaidi’s presentation at March 2016 Global Surgery Symposium, hosted by HMS Center for Global Health Delivery-Dubai.
8.3.2 The triangle of mistrust

Addressing the question of why some PPPs do not seem to be functioning as well as they could, Dr. Zaidi characterized the situation as a “triangle of mistrust” (Figure 15).

The first element is mistrust between the government and private sectors. The government sector—in its current role as regulator, implementer, and provider—may presume that the private sector is seeking large profits, while the private sector may feel the government is creating undue bureaucratic delays. The second element is patient’s mistrust of the private sector, rooted in fear of rising costs of private care that the patient will have to bear. The third element is patient’s mistrust of the government due to fears of inefficiencies and inability to provide care.

There is a potential change mechanism to address this systematic deficit of trust, according to Dr. Zaidi (Figure 16). Under this model, the government should act as the “regulator,” with the private sector assuming the role of “provider,” with appropriately monitored and measured performance indicators to maintain transparency and accountability between both entities. The provision of proper care will consequently foster trust between patients and private providers, and patients will be empowered to ensure the government performs its regulatory function effectively.

8.3.3 Models of PPPs in health care

Multiple models for PPPs already exist, noted Dr. Zaidi. Governments contract private partners to provide particular services, broader management, construction, maintenance, and equipment.

Some countries use private financing initiatives, in which consortia are often given concessions and financial incentives to build, operate, and sometimes transfer responsibility back to the
BOX 8-3 Indus Hospital’s PPP successes

Indus Hospital in Karachi, Pakistan was established in 2007 to offer high-quality care at no cost to the patient. Hospital funding comes entirely from zakat (almsgiving and religious tax in Islam), donations and philanthropy. Since its founding, the hospital has provided $5.5 million in medical care to 2.7 million patients (including 56,000 surgeries) and has engaged in 17 PPPs.

Most importantly, according to Dr. Zaidi, Indus Hospital has generated enough credibility to be offered management contracts for other hospitals that regional governments are unable to run effectively. By entering PPPs, Indus Hospital streamlines the delivery of surgical services by strengthening infrastructure, workforce development (both medical and management), service delivery, transparency, and paperless information management. Current partner projects include:

- Mohammad Shahbaz Shareef Hospital (60 beds): under contract with Punjab government;
- Children’s Hospital: in negotiations for a 33-year management contract;
- Tayyip Erdogan Hospital (100 beds): 33-year management contract with Punjab government;
- District General Hospital (250 beds): 10-year management contract with Sindh Government; and
- A network of blood banks in Punjab, funded jointly by the German Development Bank and Punjab government.

government. These are usually backed by government guarantees (third party or free standing). Dr. Zaidi explained that there are many health care PPPs currently in operation and offered a sampling of those benefitting not just the PPP, but more importantly the patients as well.

Due to increasing demand for dialysis services and inadequate supply, the government of Romania decided to privatize outpatient dialysis services in 8 public sector hospitals through a public tender. The Ministry of Health (MOH) paid a flat fee of EUR 110 per dialysis patient, thus providing improved patient services at lower costs. The private partner invested 12.4 million EUR while the MOH recouped an annual savings of EUR 4 million as a result of the partnership.

In Germany, the Better IT for Better Health Initiative (biT4health) partnered with the government to introduce an electronic patient card and electronic prescription system. A large investment of EUR 1190 million coupled with operating costs EUR 134 million resulted in annual benefits of EUR 516 million.
In Austria, there were three hospitals that did not provide adequate sterilization services as part of their surgical care. The regional government lacked the funds for improvement, so it outsourced a service contract to a private partner that invested EUR 5.3 million. A cost reduction of EUR 2 million was realized, with savings of EUR 1 million per year.

The private Frontier Medical College in Abbottabad, Pakistan, did not have a hospital and thus was unable to provide medical training. The college partnered with the nearby government-run Mansehra District General Hospital to offer teaching in that location. Frontier Medical College paid a capitalization cost of PKR 50,000 per student to the hospital fund, and the government deregulated the hospital by forming a Board of Governors to allow for decentralized management of the hospital. The funds collected resulted in construction of a new wing with an intensive care unit, coronary care unit, and an operating theatre.

8.3.4 Success of PPP efforts in Pakistan

The current state of the health system in Pakistan is not ideal, explained Dr. Zaidi. Its infrastructure can provide only six hospital beds per 10,000 population. 25 registered personnel include 167,759 doctors and 86,183 nurses, but Dr. Zaidi explained that many of those are not currently practicing or even living in the country. The government’s financial investment in health is inadequate for the need, with a total expenditure on health of just 2.2% of the GDP and 3.3% of the total government expenditure is spent on health. Private expenditure on health accounts for 65.2% of all health expenditure.

Dr. Zaidi attributed Pakistan’s failing healthcare system to several factors, including financial mismanagement. Resources are insufficient, with serious capacity constraints (shortage of beds and operating rooms) and limitations in machinery, medications, and other consumables. The workforce is rapidly decreasing and human resource challenges are exacerbated by a lack of trained staff, doctor absenteeism, and poor incentive structures. However, he noted that this situation does not have to represent an inevitable reality in Pakistani health care. He cited the example of Indus Hospital as a model of success for potential replication throughout the country.

8.3.5 Challenges in implementing PPP

Lack of resources, cumbersome procedures and inability of the public sector to meet local challenges all contribute to a decline in health standards in countries throughout the world. Lack of clarity in contracts can be challenging for PPPs, as can the rapid pace of change in the health sector. Partnerships may encounter resistance from public sector employees. Mistrust must be assessed and mitigated, and flexibility practiced by both parties in regards to regulatory issues.

Dr. Zaidi emphasized that PPPs can nonetheless help address those challenges and improve health system outcomes. The private sector can provide systematic management, improved quality, greater cost effectiveness and more efficient patient care, provided it has the desire to actually deliver care to the public and especially to the marginalized. The public sector can play a regulatory and facilitative role. Successful PPPs require mutually beneficial contracts that clearly detail each partner’s role, commitments and risk sharing, with ways to measure progress through indicators of efficiency, equity and effectiveness.

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28 1096 public sector hospitals, 5527 basic health units, 650 rural centers
9 National surgical planning and implementation: country perspectives

9.1 ZAMBIA

Dr. Lishimpi outlined national surgical planning and implementation in Zambia. The first National Surgical and Anesthesia Plan (NSAP) will be created pursuant to the Zambian Ministry of Health stated mission of providing equitable access to cost effective, convenient, and high quality health services. Dr. Lishimpi explained that this is tantamount to the concept of universal health coverage.

Historically, surgery has been provided in Zambia as part of clinical services. But as Zambia recognized the need to improve surgical services and make them more accessible to the population, the MOH invited partners from the LCoGS and Harvard Medical School to assist Zambia in developing a NSAP. To exemplify Zambia’s commitment to equity in global surgery, Dr. Lishimpi cited Zambia’s essential role in bringing about resolution 68.15, “Strengthening Emergency and Essential Surgical Care and Anesthesia,” passed by the 68th World Health Assembly on 22nd of May 2015.

9.1.1 National Surgical Planning Process in Zambia

Dr. Lishimpi explained that the country recognizes the need for national surgical planning. The 2017-2021 National Health Strategic Plan will facilitate the creation and implementation of the NSAP (Fig. 17). After gaining the interest of clinicians and on-the-ground providers, formal high-level buy-in was sought from the Ministry of Health at an early stage.

In the first phase of the process - strategic planning - the initial step was to assess existing surgical and anesthesia services in Zambia to determine what was available and where it was available. This was important in determining whether the low procedure rate is due to a lack of facilities and providers, poor distribution, or a combination of factors. Analysis of existing data collected over the past five years is being carried out by the Program in Global Surgery and Social Change (PGSSC) team.
Technical Working Groups on Surgery and Anesthesia are focusing on the topics of information management and finance, infrastructure, and workforce to develop Ministry-led, stakeholder-driven, context-appropriate solutions. A Technical Review Panel will critically review draft outputs from the Technical Working Groups.

Phase I also comprises processes of formalization, localization, and financing. Formalization pertains to creating official relationships and memoranda of understanding, setting dates and milestones, and building relationships between primary drivers of the initiative (many of whom have never interacted before). Localization efforts involve returning to clinicians to identify the true champions of global surgery equity among local providers. Funding champions were engaged before the process of national surgical planning even started to ensure that potential funders are already familiar with outputs from the NSAP process when discussing projects in the pipeline.

Zambia is presently at the stage of bringing together stakeholders to start drafting the NSAP. Analysis, strategic planning, and Technical Working Group data will coalesce into the creation of the first draft of the NSAP, which will be incorporated into the National Health Strategic Plan. Dr. Lishimpi explained that the National Health Strategic Plan fits into the five-year development plan for the country (synchronized with the country’s five-year election cycle).

Zambia’s centralized government facilitated a top-down approach to this process. Dr. Lishimpi stated that convening the national surgical forum later in the process allows the structure of the NSAP model to be adjusted as circumstances dictate.

9.1.2 Surgical Indicator Dashboard for Zambia

Dr. Lishimpi noted that POMR data has been collected, but has yet to be sent to the national database. He also emphasized that robust data platforms and collection systems exist, but must be tailored to the surgical indicators. According to 2013 data, Zambia had 1,956 public and private health facilities. In 2015, 64% of rural households were located within 5 km of a health facility. Efforts are underway to achieve the 70% target, which include the construction of 650 Health Posts, 38 district hospitals, 10 mobile hospitals, and the creation of a second-level hospital service.
Figure 18. Catastrophic expense of surgical procedures in Zambia

**Most surgical procedures can be “catastrophic”**
*(even without inclusion of non-medical costs)*

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circumcision</td>
<td>$2.69</td>
</tr>
<tr>
<td>“Simple small surgery”</td>
<td>$20.19</td>
</tr>
<tr>
<td>Delivery</td>
<td>$80.75</td>
</tr>
<tr>
<td>Complicated delivery</td>
<td>$269.18</td>
</tr>
<tr>
<td>“Minor procedure”</td>
<td>$336.48</td>
</tr>
<tr>
<td>ENT procedure</td>
<td>$403.77</td>
</tr>
<tr>
<td>Bellwether Procedure (C-delivery)</td>
<td>$1,413.20</td>
</tr>
<tr>
<td>Neurosurgery</td>
<td>$6,729.50</td>
</tr>
</tbody>
</table>

Source: Adapted from Kennedy Lishimpi’s presentation at March 2016 Global Surgery Symposium, hosted by HMS Center for Global Health Delivery-Dubai.

Zambia’s low surgical workforce density, 156 SAOs26 for a population of 14,100,000 (1.1 SAO/100,000), is well short of the LCoGS target for the workforce indicator of 20-40 SAOs/100,000. However, improvements underway include the MMed program, which provides training for MD-anesthetists, surgeons, and family physicians, as well as clinical officer anesthetist and nurse anesthetist training.

In terms of volume of surgical services, there is a substantial unmet need of 74% (637,306 total; 4528/100,000). Many district hospitals lack surgeons and anesthetists, so patients must frequently be transferred to secondary or tertiary level facilities for surgical care. According to Dr. Lishimpi, the multifactorial etiology for low surgical volume includes: infrastructure challenges; lack of available equipment, medicines and supplies; workforce challenges, including nurses, anesthesia, and supporting staff; and the lack of rural patients’ financial capacity to pay.

Dr. Lishimpi explained that for most of the Zambian population, the cost of surgical procedures can be “catastrophic” (Fig. 18). Data show that 56% of people in Zambia incur catastrophic expense from surgery and 94% become impoverished from the expense of a C-section delivery. Dr. Lishimpi emphasized that if the provision of surgical services in Zambia is not streamlined, the country will potentially approach a 1.8% loss in GDP per annum due to surgical disease by 2030.

**9.2 CABO VERDE**

Dr. Evandro Monteiro, a general surgeon in Fogo Island Hospital, Cabo Verde, reported on surgical health care in Cabo Verde, a small country of 10 islands located in Western Africa.

Cabo Verde’s hospital network comprises two central hospitals and four regional hospitals providing general surgery, obstetrics, pediatrics, anesthesiology, blood bank services, laboratory services and radiography. Altogether, the network has around 800 beds and 20 operating rooms, staffed by around 500 physicians, 600 nurses, and 1000 technicians.

Health indicators reveal that the main cause of mortality in Cabo Verde is cardiovascular disease, which could be mitigated by strengthening the surgical system.

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26 Surgeons: 97; anesthesiologists: 13; obstetricians: 46
In 2013, 7,354 surgeries were performed in the Cabo Verde hospital system. In the same year, the system treated more than 250,000 urgent cases and performed more than 9,000 deliveries (1,993 [22.1%] of which were C-sections). Monteiro noted that data are not currently available for the unmet need for surgery. He attributed low surgical volume to factors including the insufficient workforce, geographic challenges as an island nation, and the country’s lack of financial capacity.

Dr. Monteiro provided an overview of the plan to address issues in surgical care in Cabo Verde going forward. With the support of the LCoGS, the country will develop a national surgical plan to include defined quality indicators for the surgical system. Key components include capacity building, technological innovation, and promoting research to improve access and equity with respect to surgery among the people of Cabo Verde.

### 9.2.2 National Surgical Planning Process in Cabo Verde

Reporting from the country-specific working group, Dr. Samad provided an overview of the national surgical planning progress to date in Cabo Verde. The process began when the LCoGS connected with in-country surgeon Dr. Danielson Veiga to discuss the possibility of developing a national surgical plan and improving data collection. The first hospital
the group approached directed the effort to the Ministry of Health for the appropriate permissions to share and exchange data with outside parties. Thus, high-level ministerial buy in came at a very early stage, which served to accelerate the planning process. The Minister of Health reviewed the cost implications and realized that the initial focus was on data collection rather than immediate implementation, and decided to allow data collection and analysis as a first step. Dr. Samad emphasized that early referral to the Ethics Committee by the MOH was a vital step in developing a national surgical plan.

After ministerial approval, the National Health Director became involved and provided direction to clinicians and directors in the hospital. Focal point teams were designated in each hospital (including surgeons, anesthetists, obstetricians/gynecologists, and data teams) and asked to forward health data to the MOH, where a dedicated director collates the data and presents it to the Minister.

During the data collection and analysis phase, existing data sources were reviewed and relevant data collected by data technicians. A national registry at the Ministry of Health was already collecting surgical volume and surgical workforce data directly. POMR was not being directly recorded but can be derived from existing records. 2-hour access was easily calculated due to the structure of the island. Information is presented on a monthly or quarterly basis to colleagues, then to the National Health Director, and finally to the Minister.

A wide range of stakeholders are or will be engaged in the national surgical planning process in Cabo Verde. A surgeon or clinical director serves as the focal person in each hospital. Dr. Guest suggested that the point person be linked to a position and not a specific individual, so that if the person in the position transfers or leaves, the entire process is not derailed. All SAOs in a given facility form a working group to meet with data people from that center.

Representatives from the medical school will be involved once it is established, and representatives from the welfare department will work to promote the best interests of the community.

The group also suggested that community representatives be involved from a very early stage, particularly because some indicators require collecting community-based information. Having the community act as a driving force could put additional pressure on the Ministry to stay focused on the task of improving surgical care delivery. Cabo Verde has a social “council” (separate from elected political representation) with elected representatives who assume the roles of “natural” leaders in communities. The group posited that physicians may be more comfortable and find more success going to a natural leader to garner community support, rather than to the political representatives. Ultimately, the national surgical planning process could enhance the influence of these natural leaders going forward.

The forum at this stage has the flexibility to meet different priorities as needed; sometimes it may comprise only SAOs, sometimes all of the medical community, sometimes more community members, and sometimes focal persons meeting centrally. The group suggested a two-tier structure for the forum: a central forum27 and a facility forum. Deliberations could be carried out through teleconferencing (the islands are already linked electronically), with central meetings in person as necessary. The group concurred that putting a timeline on the process of developing the NSP is not advisable, because the process of developing the plan should be flexible and inclusive. Ultimately, buy-in from key players early in the process is likely to facilitate easier implementation.

9.3 MADAGASCAR

Madagascar is an island nation with a population of nearly 24 million (area 587,047 km²), 42.4% of whom are under the age of 15 years. The country is in the process of recovering from political crisis that occurred between 2009 and 2013. Currently, 81% of the population live in

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27 The group recognized that this level of integration may be much easier in smaller countries with fewer facilities/persons (there are 42 surgeons in Cabo Verde) than in a larger country like India.
poverty. In terms of leadership and governance, the Ministry of Health has suffered the consequences of institutional crisis and lack of international recognition caused by political unrest. Political instability, insecurity, failure to respect the law, and economic crisis have all contributed to the withdrawal of partners and has had negative effects on the government’s ability to ensure the proper functioning of the health sector.

The health care system in Madagascar comprises four levels. At the community level are 2956 CSB1/CSB2 facilities, and at the district level are 41 CHR2D facilities and 47 CHR1D facilities. The regional level has 21 specialized facilities (CHRR, CRMM, CNCT) and the national level has 22 teaching hospitals. Surgical services are available at the national, regional, and some district-level provincial hospitals. The year of 2015 saw improvements at the district level, with the renovation and transformation of 11 district surgical centers and the construction of a new district surgical hospital.

In accordance with the Bamako Initiative, when people in Madagascar need to access a healthcare facility they must pay for their own drugs (at CSB), the cost of care, and accommodation in the hospital. These direct costs pose a major barrier to access, forcing people to choose between health care and financial catastrophe.

Madagascar’s National Development Plan aims to fight against poverty, vulnerability, and insecurity and to widen access to social services. Thus, the Health Sector Development Plan of 2015 - 2019 (PDSS) declared universal health coverage a national priority, striving to make high quality, affordable health care accessible to all strata of society.

According to the Minister of Health, the Honorable Lalatiana Andriamanarivo, Madagascar needs support in strengthening the health care and surgical system across all domains. Key infrastructural needs include the establishment of standards for each level of health care system and the provision of specialized equipment to teaching hospitals.

Basic electricity, water, and energy services are extremely costly, with limited availability. The creation of a national blood plan is also a priority. The workforce is constrained by insufficient numbers of trained and professional staff. Financing will require partnerships and improved support for those living in poverty. In terms of information management, hospital websites, patient data collection, and internet services all require improvement.

9.3.1 National Surgical Planning in Madagascar

The Hon. Dr. Andriamanarivo explained that the government is willing to move forward with a national surgical plan - the first time that surgery has ever been highlighted in the country. This is a shared vision, originating from the MOH but owned by all stakeholders, to improve the future of surgical care for the benefit of the country. The country-specific working group explored the top-down process of national surgical planning in Madagascar. Discussion focused on front-loading the process to establish a preliminary structure, with the guiding principle that the planning stage should be as critical as the outcomes. Madagascar’s national surgical planning initiative will be an effort driven by the MOH, with continued involvement of the Minister and chiefs of staff.

The group identified a set of key stakeholders in the national surgical planning process, noting that they may differ in the planning and implementation stages. Key staff include surgeons, anesthetists, and OB/GYNs. Particular stakeholders with vested interests in the MOH will be engaged, as well as representatives from the Ministries of Health, Finance, Transportation, and Interior/Decentralization. Stakeholders from medical schools and associations also play important roles (e.g., the incoming Dean of the Medical School and influential professors). From the diplomatic community, stakeholders include

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28 Madagascar is 151/187 countries in United Nations Health Development Index; it is 4th worst in world for chronic under nutrition but has the lowest prevalence of HIV in all of sub-Saharan Africa.
Figure 19. 2015 renovation of district surgical centers

Source: Adapted from Lalatiana Andriamanarivo’s presentation at March 2016 Global Surgery Symposium, hosted by HMS Center for Global Health Delivery-Dubai.

representation from USAID, the U.S. Embassy, and the French Embassy. International organizations29 and NGOs30 will be involved as stakeholders, as will representatives from industry and private sectors.31 Ideally, stakeholders will also include community leaders and traditional healers; the latter relationship remains delicate, so involvement remains to be seen.

With respect to data collection and analysis, the data collected recently in a joint effort by Mercy Ships and the LCoGS have been deemed sufficient to move onto the initial preliminary national surgical planning. Deliberation and further planning will take place in meetings and working groups on the topics of infrastructure, workforce, and financing.

9.3.2 Surgical Indicators for Madagascar

The Hon. Dr. Andriamanarivo noted that the surgical access indicator target is very difficult to achieve, because 35%-40% of population live in rural areas that are more than 10km (a 2-hour walk) from any community based health facility; 65% of population live more than 5 km away (a 1 hour walk). Only 30% of the population attends any sort of community based health facility as an outpatient. This is compounded by the fact that 31,000 km of 37,000 total km of road are unpaved, rendering many places inaccessible during the rainy season. The country’s climate also limits access, due to droughts in the Southern regions and floods in multiple regions.

29 Examples include: United Nations Population Fund (UNFPA), UNICEF, WHO, and PT
30 Examples include: Freedom from Fistula Foundation; Operation Smile; Japanese International Cooperation Agency; International Red Cross; Doctors for Africa (Australia); Doctors for Madagascar; Mercy Ships (until June 2016); Handicap International.
31 Examples include: J&J, Lions International, Rotary International, FIVPAMA
In terms of the general healthcare workforce, Madagascar has one physician per 7,000–8,000 people. This physician density is one of the best in Africa, but more than 72% of those physicians work in the city. Therefore, rural areas have severe staff shortages (e.g., one nurse per 5,000 people).

The Hon. Dr. Andriamanarivo explained that when the health system changed in 2015 and decentralized the medical education system, the Ministry of Health moved 28 associate professors of all specialties to the teaching hospitals in the five provinces (allocating three to four surgeons per province), and moved 90 additional specialists to teaching hospitals and regional hospitals.

He elaborated that the two year training for district hospital surgeons is focused on task shifting for different types of surgery. Since 2015, Mercy Ships has been an important partner in training doctors and nurses and improving the quality and safety of surgeries performed through WHO checklist training in regional hospitals. The government plans to further encourage collaboration with surgeons working in the private sector as well as increasing the number of surgeon trainees. At the district level, the plan involves recruiting candidates from within the district in the hopes that they will continue to work in that district upon completion of training.

The Hon. Dr. Andriamanarivo reported that the monthly total for regional perioperative deaths is between 8–30, with a regional POMR rate of 1%–2.3%. Impoverishing and catastrophic expenditures are a critical issue in Madagascar, where people must pay for surgical procedures entirely. The annual average income is $440 USD while the costs of a C-section, for example, are between $104 USD and $450 USD. This means that if a person needs surgery, his or her family may be obliged to sell what they have: rice, the main Malagasy food; zebu/beef, the symbol of wealth; or land, the attachment to tradition.
9.4 INDIA

The situation in India is unique, with a population of more than 1.2 billion people and thousands of hospitals. The federal and state governments have a shared role in health financing and delivery, but the private sector is dominant. Dr. Roy described national surgical planning in India, a process focused on engaging key champions – primarily the Association of Rural Surgeons of India (ARSI), a grassroots organization focused on advocacy, research, and policy – from the bottom up. He noted some of the benefits of working with the LCoGS in this process. Firstly, he commended the LCoGS’s focus on data-driven policy. Secondly, he noted that working with the LCoGS facilitates an ability to bring groups to the table (Central Government, International Organizations, Indian Academia and Professional Societies, International Academia, NGOs, Private Hospitals, Media, Industry, and Funding Agencies).

9.4.1 NATIONAL SURGICAL PLANNING PROCESS IN INDIA

The country-specific working group on India’s national surgical planning process reiterated that the process is bottom-up rather than being led by the Ministry of Health, although the Ministry will be a stakeholder in the national surgical forum. Only about 20% of care in India is delivered in the public sector, so it was decided that an approach driven by care providers spanning the public, private, and NGO sectors would be the best vehicle for driving the process. The planned process includes three phases: planning, the national surgical forum, and implementation.

Phase one began after the LCoGS report was released. It consisted of front-line engagement and deliberations with ARSI over the course of multiple meetings to generate a consensus document that outlined a set of tangible, low-cost policy changes to improve surgical care. The policy changes fall into three categories: innovation/infrastructure; workforce; and blood.

The joint Lancet / ARSI consensus statement sought to address key problems with respect to surgical care in India, including:
- Severe shortage of workforce
- Inadequate rural training programs
- Lack of coordinated accreditation bodies with irrelevant accreditation standards
- Lack of affordable equipment
- Poor uptake of innovation
- Severe shortage of banked blood with safe alternatives (UDBT) that are not legal

Dr. Roy noted that over the coming months, LCoGS and ARSI will work to finalize the consensus statement and achieve even broader partnerships with the many professional groups and societies that dominate the healthcare landscape in India.

Phase two of the process will focus on national-level engagement. The strategy involves holding a series of surgical forums starting in 2016 to inform national policy on a more granular level. The consensus statement will form the terms of reference for the first National Surgical Forum (March 2016). Stakeholders include government, academia, industry, professional societies, and clinicians from the public and private sectors. Each stakeholder will be assigned specific responsibilities pursuant to moving the process forward.

Phases two and three will include prospective data collection and preliminary intervention. The forum will help generate a timeline and set targets for further work. Another major component of implementation will be a focus on broader structures for advancing work in the years ahead (e.g., a grant has been obtained to fund fellows to advance the work in the coming years).
BOX 9-2 Discussion highlight: regional, national, and international planning

Dr. Lapena shared advice regarding the LCoGS procedural focus on the national level, calling for a shift to a regional focus. He noted that the emphasis on Ministries of Health is useful in certain locations, but may not be the best option in other places. He commented that there are many other institutions, groups, and individuals to work with to gather data and serve as advocates for national surgical planning. He remarked that while it is important to have indicators, the process must be sensitive in seeking for best practices that already exist in countries and regions: great plans specific to settings may already exist. Further, he suggested that the focus on national surgical plans should extend to international regions. In terms of equity, he finds it unreasonable to expect a single country to be self-sufficient. The strengths of one country should fill in the gaps of others (e.g., by exchanging health providers across a region).

Dr. Smith stressed the importance of regional consultation across countries: for example, workforce strengthening should happen within regions, not within individual countries. He noted that the South African strategic document was primarily aimed at the African Union to ensure their cooperation and buy-in to the process by inculcating a higher-level accountability to ensure that governments are responsive. Dr. Magee suggested that any NSP template offered to countries could have a qualifier that urges each country to consider adding a regional component to the ir plan.

Roy outlined a set of strategies for driving the process:

- Increase coordination and collaboration
- Create a rural surgery database to demonstrate the group’s value (isolation is a key problem among surgeons in India)
- ARSI-coordinated group procurements
- Coordinate surgical volunteerism with ARSI and international colleges of surgery
- Coordinate research on surgical innovations
- Coordinate research on blood deficits and actions

Harvard initiatives that will further support the process include the Indian National Surgical Initiative (INSI) Fellow Awards to champion future leaders and the LCoGS Leadership Training Program to establish and advance managerial and research skills. The equipment procurement program will provide administrative support, and a low-cost innovation resource hub will spur the development of new drugs, diagnostics, and technologies. A web-based surgical quality program will facilitate an open-source data platform, tele-consultation, and tele-grand rounds.

9.5 SOUTH AFRICA

9.5.1 National Surgical Planning Process in South Africa

South Africa’s national surgical planning process is also employing a bottom-up approach, according to Dr. Smith. The national initiative grew out of a regional process, he explained. During the consultation around the LCoGS, the Pan African Association of Surgeons (representing three major colleges) recognized the need to develop a region-specific plan to improve surgical care. The Association hosted strategic meetings and developed a high-level strategic document.
that spoke to the responsibilities of colleges and how surgeons could engage with governments and policymakers to strengthen global surgery moving forward. The document was ratified by the colleges and became a driving document.

In December 2015, South Africa hosted its first national forum on global surgery, seen as the beginning of the conversation rather than a culmination event as adopted in other areas. The aim was to identify and gather stakeholders to envision and plan South Africa’s journey toward a national surgical plan. The meeting assembled surgical care providers from all disciplines, including: nurses, public health specialists; family physicians; rural surgeons; and government representatives. Major professional organizations were present, as well as biomedical industry representatives.

The two-day meeting included debates and breakaway groups focusing on health systems strengthening, workforce, and research. The group ultimately voiced the need to involve more surgical care providers, as they were not represented strongly enough in the meeting.

Dr. Smith described elements of progress that arose from the meeting. A research group is now defining the questions to be asked and developing appropriate research methodology to measure key indicators. The government is engaged in examining the issue of packages of care at district hospitals. However, he emphasized that the process is still in its beginning stages. The forum primarily served as an avenue to inform relevant stakeholders about the LCoGS and process associated with national surgical plans. He stressed the importance of listening to the voices of surgeons and surgical care providers from the very beginning.

The next stage of the process in South Africa is to develop a research agenda and promote engagement with the government; Dr. Smith noted that there is still much work to do within the Department of Health to drive the process forward.

9.6 TOWARD A ROADMAP FOR IMPLEMENTATION

9.6.1 The role of the LCoGS in national surgical planning?

Dr. Leather noted that the LCoGS’s role is not one of implementation, but suggested that it could serve as a leader and facilitator. Dr. Samad characterized the LCoGS as a place where thought and research agenda begin; as such it might play a role in setting a research agenda. She suggested maintaining an open discussion on research priorities through an email forum, webinar forum, or quarterly update on research directions. Dr. Makasa recommended that the LCoGS should maintain a high level of involvement, but would like them to approach it in a more regional way. He noted that regional meetings are easier for key delegates to attend, and the similarity among regions means that fewer issues need to be addressed in the meetings. Further there is an added element of “peer pressure” in regional settings to incite countries toward national surgical planning. Dr. Abdullah agreed about the value of regional meetings in spurring and gaining momentum. Dr. Raykar reported that the consensus from the meeting in Bellagio is that the LCoGS would not be the direct implementer, but the chief supporter. Efforts are underway to begin the process of providing technical support and guidance, determining what data needs to be collected, and developing analytics that will allow data to be used in useful ways by Ministries of Health. Monthly global implementation meetings are in place to maintain the momentum gathered during deliberations and meetings and monitor progress.

9.6.2 Post-symposium reflections

After the symposium, the organizers asked participants to reflect on the most salient points that they learned about the national surgical planning process. A few key themes emerged and a selection of their responses, arranged thematically, are as follows:

32 Deputy Minister of Health, Director of Treasury on financing health; senior technocrat from Department of Health looking after hospital services.
Data collection

1. Identify simple and achievable indicators.

2. National surgical planning needs to be data driven, but not to the point that specifics on the data become paralyzing to the broader process.

Financing

1. It is important to integrate national surgical planning as a national budget line.

2. Funding mechanisms are still in early days for both infrastructure and for patient-related expenditures.

Structuring the National Surgical Planning Process

1. Identify whether you can achieve your goals through a top-down or bottom-up approach to national surgical planning, and identify the key players accordingly.

2. National surgical planning must be cyclic rather than linear - the iterative process cannot simply flow from Planning to Forum to Implementation. For example, planning should occur before initial implementation, but planning and evaluation should also take place after initial Implementation. Multiple surgical fora may be necessary, and research should run throughout the cycle.

3. Sustainability can be enhanced by linking implementation to an office via an officer.

4. Local champions are needed to push the agenda.

5. Having a champion inside the Ministry of Health is critical, as evidenced by the Zambian experience.

Ensuring Appropriateness

1. In order to be truly global, national surgical planning must be local, considering the unique context of each individual country or state.

2. National surgical planning must also be regional, considering the commonalities shared by countries or states in a region and matching the strengths of one with the weaknesses of another.

3. National surgical planning needs to be locally owned; each country will have a different starting point, so a one size-fits-all approach will not work.

4. National surgical planning is a process with many stakeholders that will have some common themes, but also many unique elements by country and region.
10 Conclusion and next steps

The symposium “Global Surgery: Towards Equitable Surgical Systems” brought together 49 participants from 19 countries at the Harvard Medical School Center for Global Health Delivery - Dubai. During the two day symposium, this diverse set of participants had the opportunity to discuss the movement towards building accessible, affordable and equitable surgical systems world-wide. Participants were able to share ideas across political, geographic, and economic borders to ensure that the pathways for surgical system strengthening discussed were globally applicable and locally relevant. The conversations, held in small groups and in plenaries, all pertained to the need to take national surgical planning from an academic exercise to an actionable process. Specifically, participants worked to develop guidelines by which current and new partners can embark on national surgical planning processes in their home countries.

While there were areas of contention, the participants were able to identify core considerations for the process of national surgical planning as they apply to five key domains: infrastructure, workforce, financing, information management, and service delivery – these have been highlighted at the end of chapters 3-7. There was also broad agreement on the use of six core surgical indicators, previously identified in the Lancet Commission on Global Surgery, with an understanding that additional, more specific indicators may be appropriate in particular settings. Finally, the participants acknowledged the wide variety of partners that would be necessary in the ongoing pursuit of equity in surgical care. These actors include advocacy groups such as the G4 Alliance, academia, Ministries of Health, industry partners, and Non-Governmental Organizations.

The symposium’s final exercise led participants to contextualize the meeting’s discussions in cases where National Surgical Planning is already ongoing: India, Zambia, Cape Verde, South Africa and Madagascar. These real-life case studies led our participants to identify two broad models for implementation: one in which the Ministry of Health has strong control over the healthcare system and a high-degree of buy-in on national surgical planning (a top-down approach) versus one in which a platform for change is constructed by a wide and heterogeneous set of actors (a bottom-up approach). Future work will be needed to delineate these approaches in greater detail and test their effectiveness across different health systems.

The symposium also served to newly engage countries in this emerging movement. A representative from Madagascar wrote:

“We were very happy to discuss with the attendees, to share our experiences and to have the support of Lancet Commission members. It will be a big challenge for our country, because if noticeable progress has been made fighting against communicable and non-communicable disease, it’s [now] time to work [on] our surgical system. [This will] be an important area for Universal Health Coverage that we have to launch this year.”

Another participant described the value of this cross-regional forum, noting:

”[As] much as we would want to see regions working as separate entities, interaction between regions will be necessary to keep the momentum going.”

Finally, the symposium brought increased attention to the global surgery movement through social media. In a first for global surgery, Periscope was used to live-broadcast portions of the meeting and Snapchat stories were used to showcase the days’ events. Additionally, through Twitter, #SurgEquityDubai, the symposium’s short-form moniker, was mentioned by 22 unique users. The Lancet Commission on Global Surgery’s Twitter handle (@GSCommission) increased its impressions by 180% from the previous month and gained 130 new followers. The social media outreach was able to further

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33 Quotation edited for clarity
internationalize the content of the meeting and helped foster an environment of transparency that is fundamental to this movement.

The symposium and the publication of these proceedings is an early step in the movement towards equity in surgical care. Delegates from India, Cape Verde, Zambia, Madagascar and South Africa have already embarked on national surgical planning processes that seek to bring surgical care to the communities that need it most. These countries also serve as examples that will draw new regions into the global surgery movement. The reader of these proceedings can understand the key issues at stake in embarking on this process and derive a strategic path forward based on the experiences of others. The symposium in Dubai will no doubt inform the progress that lies ahead.

There is little contention that equity in care will only be achieved through collaboration that crosses political borders and involves all sectors of healthcare delivery. The voices in these proceedings reflect the opinions of a diverse cast that includes policy-makers, leaders in industry and non-profit, clinicians, and government officials. Despite the diversity of their experiences, the participants are united in the shared vision of achieving universal access to safe, affordable, and timely surgical and anesthesia care – a vision that is only achieved when surgical care reaches the world’s most vulnerable. We thank the reader for their attention to these proceedings and for joining us in working towards this vision.
# Appendix A. Symposium Participants

<table>
<thead>
<tr>
<th>NAME</th>
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