Implementing Liberia’s Poverty Reduction Strategy

An Assessment of Emergency and Essential Surgical Care

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**Objective:** To document infrastructure, personnel, procedures performed, and supplies and equipment available at all county hospitals in Liberia using the World Health Organization Tool for Situational Analysis of Emergency and Essential Surgical Care.

**Design:** Survey of county hospitals using the World Health Organization Tool for Situational Analysis of Emergency and Essential Surgical Care.

**Setting:** Sixteen county hospitals in Liberia.

**Main Outcome Measures:** Infrastructure, personnel, procedures performed, and supplies and equipment available.

**Results:** Uniformly, gross deficiencies in infrastructure, personnel, and supplies and equipment were identified.

**Conclusions:** The World Health Organization Tool for Situational Analysis of Emergency and Essential Surgical Care was useful in identifying baseline emergency and surgical conditions for evidenced-based planning. To achieve the Poverty Reduction Strategy and delivery of the Basic Package of Health and Social Welfare Services, additional resources and manpower are needed to improve surgical and anesthetic care.


Liberia, a small West African country approximately the size of the US state of Virginia with a population of 3.5 million, is emerging from 14 years of a brutal civil war that completely devastated the economy, infrastructure, and basic services. The health sector was severely degraded, with more than 60% of health care workers resetting in other countries. Peace was reestablished in 2003 and reconstruction is underway. Roads and infrastructure are being rebuilt, health facilities and schools are reopening, and agricultural production is increasing. In an effort to boost recovery, the Poverty Reduction Strategy (PRS) was launched to articulate the government’s vision and strategy for rapid, inclusive, and sustainable development for the period of 2008 to 2011. This period is considered critical in moving beyond postconflict stabilization and progressing toward attainment of the Millennium Development Goals.

One of the main pillars of the government’s PRS is the rehabilitation of infrastructure and delivery of basic services. Prior to the PRS, the Ministry of Health and Social Welfare developed a national health policy and plan that set the agenda for accessible, equitable, affordable, and sustainable health services for all the Liberian people. It is within this framework that the Ministry of Health and Social Welfare instituted the Basic Package of Health and Social Welfare Services, which seeks to improve the health status of an increasing number of citizens on an equal level through expanded access to effective basic health care backed by adequate referral services and resources.

A number of challenges exist in implementing the Basic Package of Health and Social Welfare Services and the PRS pillar of infrastructure and basic services. Among these is the immediate shortage of qualified health care workers. Realizing the immediate shortage of health manpower in Liberia, especially in the area of emergency and essential surgical (including anesthesia, obstetrics, and trauma) care in the peripheral health system, the Ministry of Health and Social Welfare has accepted the World Health Organization (WHO) Integrated Management of Emergency and Essential Surgical Care tool kit as adapted by the WHO Global Initiative for Emergency and Essential Surgical Care.1 The Integrated Management of Emergency and Essential Surgical Care tool kit...
Table 1. Infrastructure of Liberian District Hospitals and Health Centers

<table>
<thead>
<tr>
<th>No. of Hospital Beds</th>
<th>No. of Operating Rooms</th>
<th>Oxygen Cylinder</th>
<th>Running Water</th>
<th>Electricity</th>
<th>Anesthesia Machine</th>
<th>Medical Records</th>
<th>Emergency Department</th>
<th>Recovery Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>101-200</td>
<td>2</td>
<td>I</td>
<td>I</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Y</td>
<td>I</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>81-100</td>
<td>1</td>
<td>Y</td>
<td>I</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>51-80</td>
<td>1</td>
<td>N</td>
<td>I</td>
<td>I</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>21-50</td>
<td>1</td>
<td>Y</td>
<td>I</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>11-20</td>
<td>0</td>
<td>N</td>
<td>I</td>
<td>I</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
</tr>
</tbody>
</table>

Abbreviations: I, intermittent; N, no; Y, yes.

essential Surgical Care tool kit has been successfully introduced in other low-income countries, and for Liberia, it is being used by the medical school and for emergency obstetrics training to prepare general physicians for service in rural health facilities.

Sub-Saharan Africa has the lowest concentration of physicians per population; surgeons and anesthesiologists are rarer still, with most working in the cities.2,3 Surgical conditions account for an estimated 11% of the global burden of disease while reports of surgical output (ie, ratios of operations to the population) are exceedingly low in developing countries.4,5 Despite this, surgical conditions (except emergency obstetric care) are not included as part of the Millennium Development Goals.6 Weiser et al7 estimated that there are 234.2 million major surgical procedures worldwide each year, with the richest 30% of the world’s population receiving 73.6% of these procedures and the poorest third receiving only 3.5%.

To determine the deficiencies in the delivery of emergency and essential surgical care, the WHO Situational Analysis Tool for Access to Emergency and Essential Surgical Care has successfully been used in other low-income countries and the results from Sierra Leone were recently published.8 The goal of this study was to provide a snapshot of the infrastructure, personnel, procedures performed, and supplies and equipment necessary for lifesaving and disability preventive emergency and essential surgical and anesthetic interventions at county (district)-level health facilities in Liberia.

**METHODS**

Because no data exist on the deficiencies in infrastructure, personnel, surgical and anesthetic equipment, or the capacity to deliver selected emergency and essential surgical and anesthetic services at county hospitals in Liberia, a decision was made in June 2008 to undertake a countrywide survey. Ministry of Health and Social Welfare leadership in cooperation with local surgeons, WHO, and Global Initiative for Emergency and Essential Surgical Care members conducted the survey using the WHO Situational Analysis tool. This tool was developed by the Global Initiative for Emergency and Essential Surgical Care Research Group in 2007 and has been used in other low-income countries.8 The survey consists of 256 data points covering infrastructure, personnel, procedures performed, and supplies. To date the survey has been used to evaluate emergency and essential surgical capacity in more than 200 hospitals in 30 countries. County health officers, medical officers in charge, and local health administrators were informed of the necessity, methods, and relevance of the study to identify deficiencies for delivering emergency and essential surgical care. The questionnaire was then distributed throughout the country to government county hospitals and health centers.

Questionnaires were completed by local staff, and one of us (L.S.) either confirmed the data by on-site inspection or by telephone interview of key hospital personnel during the period of September 2008 to October 2008. The main county hospitals along with facilities with at least 10 beds were included in this analysis. Data from the completed questionnaires were entered in the WHO DataCol database and analyzed by the Global Initiative for Emergency and Essential Surgical Care Research Group.

Results were collected and analyzed based on infrastructure, personnel, procedures performed, type of anesthesia, supplies and equipment, and absence or presence of guidelines.

**RESULTS**

HOSPITALS AND INFRASTRUCTURE

A total of 16 county hospitals and health centers (district and subdistrict level) were assessed between September and October 2008 (Table 1). These facilities represent all of the major health facilities outside of the capital city, Monrovia. Of the 16 health facilities, 7 hospitals had
between 51 and 80 beds, 4 hospitals had between 21 and 50 beds, and 2 each had between 101 and 200 beds and 81 to 100 beds, respectively; 1 health center had 11 to 20 beds. Of these facilities, 8 (56.3%) had a single functioning operating room, 4 (25%) had 2 functioning operating rooms, 3 (18.8%) had no functioning operating room, and 1 (6.3%) had 3 operating rooms (Table 1).

Infrastructure was determined to be inadequate for most facilities, with only 5 (31.3%) and 4 (25%) facilities having full-time oxygen cylinders and electricity, respectively. Only 3 facilities (18.8%) had running water, a functioning anesthesia machine, and a designated postoperative recovery room. Ten facilities (62.5%) had a dedicated emergency/trauma room, and all but 1 facility (93.8%) kept medical records (Table 2).

PERSONNEL

A total of 3 qualified Liberian surgeons and 2 obstetrician/gynecologists currently work in Liberia. There are no Liberian physician-anesthesiologists. Twenty-one physicians currently do the majority of the surgery, with the assistance of 5 paramedical staff and 83 midwives to assist with obstetrics. Anesthesia is administered by 19 nurse-anesthetists and 1 nonspecialist physician (Table 3).

PROCEDURES

Results from the assessment for procedures performed were divided into 2 categories: basic procedure routinely performed and basic procedures less frequently performed. For the first category, all sixteen facilities (100%) reported performing incision and drainage of abscesses, suturing, dilatation and curettage, and male circumcision. Fifteen facilities (93.8%) were able to resuscitate a patient, care for burns, and debride wounds. Appendectomies, hernia repairs, and laparotomies were undertaken in 13 facilities (81.3%) (Table 4).

Other basic procedures less commonly performed included cricothyroidotomy (18.8%), chest tube insertion (68.8%), foreign body removal (58.8%), congenital hernia repair (62.5%), contracture release (31.3%), closed fracture repair (43.8%), open fracture repair (6.3%), management of osteomyelitis (31.3%), amputation (62.5%), biopsy (37.5%), and tubal ligation (75.0%); 81.3% and 100% of facilities performed cesarean sections and dilatation and curettage, respectively (Table 5).

ANESTHESIA

The majority of facilities reported being capable of providing spinal or ketamine anesthesia (13; 81.2%). Only 4 (25%) facilities were capable of providing general anesthesia and only 2 (12.5%) provided regional blocks (Table 6).

SUPPLIES AND EQUIPMENT

Basic supplies and equipment are severely limited. Although in the 16 hospitals, blood pressure cuffs were available 87.5% of the time, bag valve masks, sterile gloves, sutures, and aprons were only always available in 10 facilities. Eye protection was available in 9 (56.3%) and nasogastric tubes in 8 (50%) hospitals. Only 6 facilities (37.5%) reported always having sufficient artery forceps (hemostats) and needle holders (Table 7).
GUIDELINES

Guidelines for emergency care, surgery, and anesthesia were only available at 1 facility and no pain guidelines were available in the entire country.

COMMENT

As Liberia embarks on an ambitious plan for postconflict recovery using the PRS, emergency and essential surgical and anesthetic care was recognized as an essential component for the Ministry of Health and Social Welfare's impressive Basic Package of Health and Social Welfare Services. Given the growing evidence that surgical care is a neglected yet cost-effective component of basic health care, a detailed assessment of the conditions at county-level hospitals was essential before identifying deficiencies, setting priorities, and implementing programs. The results, though not surprising to anyone who has worked in these types of facilities, highlight the enormous needs.

With the scarcity of Liberian specialists (only 3 trained general surgeons, 1 orthopedic surgeon, 2 obstetrician/gynecologists, and no anesthesiologists), there is an urgent need to strengthen capacities to deliver lifesaving and disability-preventive emergency and essential surgical and anesthesia services. Part of the efforts may need to focus on retraining (task shifting) available health care workers to undertake responsibilities that may not have historically been their duty while at the same time identifying Liberian medical students to specialize in surgery, anesthesia, and obstetrics.

The government's effort to strengthen the medical and paramedical institutions from its national budget as well as with assistance from foreign governments and other multilateral organizations is a laudable action. Reestablishment of the Rural Health Workers Institute in the central region of the country will go a long way in providing urgently needed health manpower to fill the gaps in essential paramedical personnel. The need for specialists in varying disciplines of medicine is glaring and should be emphasized for the proper implementation of any proposed health delivery packages. Because there is currently no postgraduate surgical and anesthesia training in Liberia, the future of surgical care in the country appears bleak. Currently, most surgical care is provided by general physicians with basic training in emergency and essential surgery. The road to success may be to tailor training to the needs and priority of the country. As such, the prospect of using the Mozambican model (of training midlevel health workers to provide essential and emergency surgical care at the district level) seems an attractive option for the short-term.

The civil crisis that lasted more than 14 years devastated not only the infrastructure of the country but also led to the loss of essential manpower for health. Even after the acquisition of peace, there are severe shortages of manpower in the public sector, a situation compounded by low incentives paid by the government as compared with nongovernmental organizations. This process has led to an internal brain drain, a situation highlighted by McCoy et al.14

The profound shortage (Table 1) of essential equipment and supplies, namely availability of oxygen and anesthesia in only 29% and 17% of health facilities, respectively, is one of the problems identified by this study. This situation can only be remedied through appropriate budgetary allocations and ensuring regular deliveries of these supplies to prevent shortages.

The overall infrastructure for county hospitals in Liberia was shown to be inadequate and in some instances absent. Government hospitals supported by missions tend to have better infrastructure and available resources than those funded solely by the government. Basic amenities, such as running water and electricity, are more regular and an oxygen source and/or plant are available in these mission-sponsored centers.

This study represents the first instance that emergency and surgical and anesthesia services were identified for all county-level hospitals in Liberia and will be useful in planning future interventions to meet the Millennium Development Goals 4, 5, 6, and even 1. There are limitations to the survey in that it only provides a snapshot of the conditions, some of which are liable to change. However, in terms of infrastructure, personnel, and procedures performed, it provides a good overview of the problem and highlights the utility of a standard, the WHO Situational Analysis tool.

The Liberian Ministry of Health and Social Welfare National Health Plan is in tandem with the government PRS, which aims to improve the plight of Liberians and thereby achieve the Millennium Development Goals. However, many more resources will be needed to achieve these ambitious plans, and the provision of emergency and essential surgical care has been recognized as a vital component.

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Table 6. Types of Anesthesia Used

<table>
<thead>
<tr>
<th>Type of Anesthesia</th>
<th>No. of Hospitals (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional block</td>
<td>2 (12.5)</td>
</tr>
<tr>
<td>Spinal</td>
<td>13 (81.2)</td>
</tr>
<tr>
<td>Ketamine</td>
<td>13 (81.2)</td>
</tr>
<tr>
<td>General anesthesia</td>
<td>4 (25)</td>
</tr>
</tbody>
</table>

Table 7. Hospitals Where Select Equipment and Supplies Are Always Available

<table>
<thead>
<tr>
<th>Equipment</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bag valve masks</td>
<td>10 (62.5)</td>
</tr>
<tr>
<td>Blood pressure cuffs</td>
<td>14 (87.5)</td>
</tr>
<tr>
<td>Artery forceps (hemostat)</td>
<td>6 (37.5)</td>
</tr>
<tr>
<td>Needle holders</td>
<td>6 (37.5)</td>
</tr>
<tr>
<td>Nasogastric tubes</td>
<td>8 (50.0)</td>
</tr>
<tr>
<td>Gloves (sterile)</td>
<td>10 (62.5)</td>
</tr>
<tr>
<td>Sutures</td>
<td>10 (62.5)</td>
</tr>
<tr>
<td>Eye protection</td>
<td>9 (56.3)</td>
</tr>
<tr>
<td>Aprons</td>
<td>10 (62.5)</td>
</tr>
</tbody>
</table>
Author Contributions: Drs Sherman, Cherian, and Kushner had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. Study concept and design: Sherman, Cherian, Noel, and Kushner. Acquisition of data: Sherman, Clement, Cherian, Ndayimirije, Noel, Dahn, and Gwenigale. Analysis and interpretation of data: Kushner. Drafting of the manuscript: Sherman, Clement, Cherian, Noel, Dahn, and Kushner. Critical revision of the manuscript for important intellectual content: Clement, Cherian, Ndayimirije, Noel, Dahn, Gwenigale, and Kushner. Statistical analysis: Kushner. Administrative, technical, and material support: Sherman, Clement, Cherian, Ndayimirije, Noel, Dahn, Gwenigale, and Kushner. Study supervision: Cherian, Noel, and Kushner.

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REFERENCES


Beware of the Sleeping Panther

he appalling lack of infrastructure, surgical equipment, and trained personnel documented in the Sherman et al article are not unique to Liberia. They must be viewed in the larger context of Africa, the home of 1 billion people and a continent plagued by war, vicious ethnic violence, and unimaginable poverty.1

Political instability, corruption, and devastation of the working adult population by human immunodeficiency virus/AIDS,2 tuberculosis,3 and malaria4 discourage a competitive market economy and foreign investment. Proliferation of desert regions and a rapidly growing population have resulted in mass starvation. Quite simply, arid Africa can no longer feed itself.5

What is to be done? The WHO Integrated Management of Emergency and Essential Surgical Care tool kit6 is a laudatory step but can be compared with a Band-Aid placed on a leaking aneurysm. Wealthy, industrialized nations must make thoughtful long-term investment in infrastructure and economic development. Clean water,7 an adequate food supply, and jobs are prerequisites to health.8 Cultural change is a slow and difficult but necessary process. Education, particularly the education of women, is essential to lower the birth rate, improve the financial stability of families, and raise the standard of health. Without the abolition of female circumcision9 and child marriage,10,11 a significant reduction in the morbidity and mortality of pregnancy will be difficult.

The brain drain is another serious problem. Educated professionals gravitate toward cities, are recruited by nongovernmental organizations, or, at worst, leave the continent to pursue more lucrative opportunities. A functioning middle class cannot exist without a functioning economy.

Surgery has a critical and cost-effective role to play in improving access to health care and reducing the burden of surgical disease.11 However, it must be part of an integrated program of investment and economic development funded by the wealthy industrialized nations. Failure to act will exacerbate the humanitarian crisis and awaken the sleeping panther of insurrection in Africa and beyond.

William P. Schecter, MD