**CONFERENCE ON**
**INCREASING ACCESS TO SURGICAL SERVICES IN**
**RESOURCE-CONSTRAINED SETTINGS IN SUB-SAHARAN AFRICA**

## Hosted by the Rockefeller Foundation's Bellagio Conference Center
## June 4 to 8, 2007

# Final Report

## Introduction

This conference was inspired by the publication of the second edition of *Disease Control Priorities in Developing Countries* (DCP2) which suggested, contrary to prevailing opinion, that surgical services can be provided in district hospitals in developing countries, at a cost per disability-adjusted life year (DALY) that is 'at par with other well-accepted preventive procedures, such as immunization for measles and tetanus and home care for lower respiratory infections'.[1] This publication, combined with the establishment of the World Health Organization (WHO) Global Initiative for Emergency and Essential Surgical Care, highlights that surgical services, hitherto neglected, have an important role to play as preventive and life-saving strategies in public health[2].

The conference, hosted by the Rockefeller Foundation's Bellagio Conference Center, brought together leaders in surgery, anesthesia, health policy, epidemiology and health economics from Eritrea, Ghana, Kenya, Malawi, Mozambique, Southern Sudan, Sweden, Tanzania, Uganda, USA, and WHO to examine the necessary steps to increase access to surgical services particularly in rural sub-Saharan Africa. Its goals were:

1. To take stock of what is known about the need to improve access to surgical services in sub-Saharan Africa, the cost-effectiveness of specific interventions and existing national and international efforts to support the delivery of these interventions;

[1] Debas H, Gosselin R, McCord C, Thind A., *Surgery*, in *Disease Control Priorities in Developing Countries*, Jamison D, Editor, World Bank: Washington, DC.
[2] www.who.int/surgery

2. To assess health system and human resource constraints to integrating surgical services at the district level within health systems in sub-Saharan Africa, and identify training programs, resource reallocation and policies required to tackle these challenges; and

3. To prepare a roadmap of activities to improve access to surgical services in sub-Saharan Africa and to engage national and international stakeholders to advocate for and implement this roadmap.

**Organization**

The meeting was organized by Global Health Sciences (GHS) at the University of California, San Francisco (UCSF), the Karolinska Institute, WHO, the World Bank and the Fogarty International Center. His Excellency Dr. Pascoal Mocumbi, former Prime Minister of Mozambique, now High Representative of the European and Developing Countries Clinical Trials Partnership & Good Will Ambassador of WHO Africa Regional Office for Maternal, Newborn and Child Health was a co-organizer.

The agenda was structured around a comprehensive background paper that was prepared by a subset of participants and distributed to all participants (Appendix A) in advance. The four sessions on the first day corresponded to sections of the background paper: a) scale of the problem, b) access to surgical services, c) health systems constraints, and d) human resource challenges. In each session, one participant summarized the major issues and up to four panelists provided their experience and offered challenges and further issues for discussion. The second day was devoted to: a) discussing the experiences and success stories of participants from Eritrea, Kenya, Mozambique, Southern Sudan, Tanzania and Uganda, and b) planning how to raise the profile of surgery on national and international agendas. The final day was devoted to preparing the roadmap for follow-up activities.

**Highlights**

*The Scale of the Problem:* Surgical conditions account for 11% of the world's disability adjusted life years (DALYs). The most common surgical conditions, in order of their

contribution to global DALYs, are injuries, malignancies, obstetrical complications, congenital anomalies, and cataracts and glaucoma. The best estimates for annual costs attributable to surgical patients in district hospitals in sub-Saharan African countries is about US$900,000, which translates to US$33 per DALY. The escalation in the incidence of injuries and of non-communicable diseases is likely to increase the need for surgery. The 2004 Copenhagen Consensus on Health Economics put surgical diseases in the top 6 conditions that would make a difference in the world if it could spend US$40 billion, alongside malaria, HIV/AIDS, tuberculosis and acute heart attacks[3].

*Access to Surgical Services:* Access to surgical services was defined as the degree to which individuals are restricted or facilitated in their ability to receive surgical services from the health care system. Access may be determined by socio-economic status, education and culture and by factors such as: availability of and level of confidence in the surgical services provided; health seeking behavior; and capacity and willingness of the individual to obtain or pay for transportation, service, and treatment. Poor communication facilities and lack of transportation limit access to surgical services, as does the relatively high cost that may be borne by the patient. Access should be cast as a human rights issue, and the need for gender equity should be included in all advocacy efforts. Surgery is an important component of the health care system and strengthening surgical services is a critical component of strengthening health systems in general.

*Constraints to Providing Surgical Services in District Hospitals:* The optimal size of a district hospital is probably 100-150 beds. WHO recommends that the district hospital to population ratio should be 1/500,000. An important constraint is that the number of district hospitals available is not only insufficient but they are usually understaffed with grossly inadequate infrastructure lacking, in some instances, basic needs such as running water and electricity. Equipment, essential supplies and drugs required for surgical operations are often in short supply. The underlying cause is inadequate governmental funding for health care, especially for district hospitals. A seriously under-funded health system cannot function unless patients pay a large share out of their own pockets or bear

[3] http://www.copenhagenconsensus.com/Default.aspx?ID=675

the consequences. Such costs may drive poor people into a cycle of poverty from which they cannot recover. Alternative financing mechanisms need to be considered especially in the case of surgery and governments need to be persuaded to include surgery in their sector-wide funding strategies.

*Human Resource Challenges:* There is an estimated shortage of one million healthcare workers in sub-Saharan Africa. This shortage is partly because not enough people are appropriately trained but is compounded by meager salaries, poor working conditions, low morale, inadequate remuneration, few opportunities for continuous professional development, and for those working in rural areas there is professional isolation, inadequate communication with peers and consultants in the cities, and lack of books, equipment and technologies.

Surgeons are in extremely short supply and are in fact decreasing in number partly because young doctors prefer to specialize in an area that could lead to their employment by international agencies. One solution, at least in the short term, is to train non-doctors to provide some surgical services at the district level. The evidence that this strategy can be successfully employed has been demonstrated by Tanzania, Mozambique and Malawi[4, 5, 6] - although supervision, continuing skill development and quality monitoring are essential. However, the surgical profession is not in agreement about delegating to non-physicians or even to physicians. It must also be remembered that surgery is a team effort requiring staff trained in anesthesia and surgical nursing – skills which are also in short supply.

*Kenya's experience:* Kenya has trained 300 surgeons since 1972 but only 120 of them are now in public service. Currently, of its 63 district hospitals, 27 have no qualified surgeons. It also has 8 M.D. anesthesiologists, 100 nurse anesthetists, and 300 registered clinical officer anesthetists. Kenya is reluctant to train non-physicians in surgery as it has

[4] Witty, Caesarian section in Malawi. Lancet, 2003.
[5] Vaz, F., et al., *Training medical assistants for surgery.* Bulletin of the World Health Organization, 1999. 77(8): p. 688-691.
[6] Longombe, A.O., *Surgical training of nurses for rural areas: Necessity of aberration.* 1997. p. 43-48.

trained more doctors than it can afford to hire in the public service. It sees the possibility, therefore, of using doctors with appropriate surgical training to provide rural surgical care. Several hurdles have to be overcome, however, to reach Kenya's goal, for example: doctors go to district hospitals under duress and rarely stay for more than 2 or 3 years and the cost of training and salaries for surgeons are high. Simple calculations indicate that over the long-term providing rural services by surgically-trained doctors is likely to be unsustainable. The option of training non-physicians may become an attractive, cost-effective solution even in Kenya.

*Uganda's experience*: Uganda has 2 national hospitals, 12 regional hospitals, and 105 district hospitals. The top four conditions requiring surgical treatment in Uganda are trauma, non-trauma surgical emergencies, non-acute surgical conditions, and obstetrical emergencies. Access to surgical care is constrained by several factors including shortage of human resources, and inadequate infrastructure. Geographical and communication challenges, cultural and behavioral attitudes, costs, and governance and management issues compound the situation. Uganda has had some success stories with the development of 10 traveling surgical camps since 1998, and surgery outreach programs. Uganda is considering training clinical officers in surgical skills but prefers to study its unmet need before choosing a strategy to create an adequate surgical workforce for its rural areas.

*Mozambique's experience*: Mozambique has 800 doctors, of whom 24 are qualified surgeons and 36 as orthopedic specialists, and 4,500 nurses. In 1984, because of the shortage of doctors and the high rate of maternal and child mortality in the rural districts, Mozambique instituted a novel program to train non-physician surgeons – the "tecnicos de chirurgia". It has trained a total of 61 "tecnicos", whose training consists of 3 years leading to a bachelor's degree after successfully passing an examination. To be licensed to practice, they must spend two more years in supervised work in a major teaching institution. The strategy has proven to be highly successful and Mozambique plans to scale-up the program.

*Tanzania's experience:* Tanzania has only 80 trained surgeons for a population of 30 million. Assistant medical officer (AMO) training started in 1946 and was revived in 1963. AMOs may be specialized for example in general practice, ophthalmology or ENT. The general practice AMO is trained to provide several clinical services, including emergency general surgical and obstetric surgery. The AMOs in district hospitals provide 90% of the clinical services that would have otherwise been provided by doctors. A perceived need exists for better training and quality control and certification of the AMO program which has not yet been fully accepted by the medical profession.

*Eritrea's experience:* Eritrea has few trained surgeons and currently depends on specialist skills from outside the country. Its preference is to train non-physicians as a 10-year interim strategy until it has trained sufficient doctors and surgeons. It prefers to train midwives to provide both emergency obstetric and general surgical services. Eritrea gained unique experience during its long war with Ethiopia when the Eritrean People's Liberation Front trained nurses to become surgeons and anesthetists to deal with war trauma victims and obstetric complications. There is much to learn from this model.

*Southern Sudan's experience:* Southern Sudan is just emerging from a brutal 20-year civil war during which its health care services have been largely destroyed. It has a critical need to establish surgical services quickly and sees the need to train clinical officers and nurses to perform emergency obstetric and general surgical services as soon as possible.

**Outcome of the meeting**

Participants concluded that:

1. A significant burden of disease is attributable to surgical conditions in sub-Saharan Africa but that much more evidence needs to be generated in order to better target interventions;

2. A major proportion of these conditions can be treated or prevented cost-

effectively at the first referral level but that this will require investments in facility infrastructure and in the training of non-surgeons to perform basic life saving general and obstetrical surgery;

3. Preventive and curative programs to address basic surgical conditions could strengthen health systems in resource-constrained settings and every effort should be made to develop these programs in a horizontal manner;

4. Preventive and curative surgical interventions need to be integrated into the primary health care effort and more effort is required to raise the profile of surgery on national and international agendas; and

5. Planning should begin to develop models of rural surgical services appropriate to each country and to create networking among countries.

Participants prioritized the surgical conditions (Appendix B) that may be addressed at the district level using the following criteria: the severity of morbidity and mortality they cause without treatment; that they are common; that they can be easily and cost effectively treated by surgery at a district hospital; and that the treatment averts further disability or morbidity (by being preventive or curative) and helps restore people's capacity to live and work. Participants emphasized the role of surgery in early detection and prevention of some of the critical conditions. Further, they agreed that, while the major strategic focus needs to be at the district hospital level, it is important to address the whole range of services that can be provided to prevent, treat, and refer patients in the health system.

Recognizing the need for an informal body to lobby for surgery, participants organized themselves as the *Bellagio Essential Surgery Group* and agreed a program of follow-up action in the form of a roadmap.

## The roadmap

Participants committed to work individually and institutionally to raise funds and to promote and implement projects to increase access to surgery for under-served communities by promoting an agenda that includes: advocacy and dissemination, demonstration projects, and evidence building. UCSF-GHS, on behalf of the *Bellagio Essential Surgery Group*, has been invited to apply for a conference grant from the Bill and Melinda Gates Foundation to support some of these follow-up activities. Further funding is being actively sought.

*Advocacy and dissemination*

Participants agreed to raise the profile of surgery by working with international agencies, regional organizations and national governments. They decided to develop the following products as tools to support this work:

1. A *paper* for submission to the Lancet by December 2007 that presents the case for surgery and summarizes the recommendations of the meeting.

2. A *handbook* to be published with WHO by December 2007 for wide distribution to national and international organizations consisting of: a) an introduction based on the Bellagio background paper and the meeting's recommendations; and b) downloads[7] of five chapters from DCP2 and c) the Global Initiative for Emergency and Essential Surgical Care report.

3. A *brochure/flyer* to promote surgery for distribution at major meetings, for example, upcoming regional meetings in Africa, and global meetings such as the Global Forum on Health Research meeting in Beijing, and the Global Ministerial Forum on Research for Health in Bamako in 2008.

4. A *policy brief* will be developed to indicate how surgical services can become part of a country's primary health care strategy.

[7] These chapters are freely downloadable from the Web to be used for other publications without copyright restrictions.

5. The *Bellagio Essential Surgery Group Website* to disseminate the meeting's recommendations, generate debate, develop projects and gather new evidence.

*Demonstration projects*

Country representatives agreed to develop demonstration training programs, subject to funding:

1. Southern Sudan and Eritrea (both of whom were represented at the meeting by senior policy makers) will develop training programs in surgical techniques for non-physicians[8].

2. Mozambique, Tanzania and Malawi will scale-up and continue to evaluate their ongoing training programs for Clinical Officers, Assistant Medical Officers and Técnicos de Cirurgia, respectively. These countries agreed to cooperate to adopt common terminologies, training requirements and certification procedures.

3. Kenya and Uganda will conduct studies of met and unmet needs to develop strategies to train rural surgical workforces appropriate for these countries.

4. Mozambique, Malawi, Tanzania, Eritrea, and Southern Sudan will develop a network to share experiences on non-physician training and practice issues (curricula, sharing trainers, mentoring, monitoring, quality assurance, certification).

*Evidence building*

Participants agreed to conduct literature reviews, secondary data analyses and some in-country hospital data collection and analysis according an agreed cross-country format. WHO will work with the *Bellagio Essential Surgery Group* to conduct studies of access

[8] Since the meeting, the Government of Southern Sudan held its first National Health assembly (on June 22, 2007). Two Bellagio participants presented the case for surgery and there was unanimous endorsement to train clinical officers and nurses in basic surgery.

to emergency and essential surgical care through the country activities of the Global Initiative for Emergency and Essential Surgical Care. These analyses will also form the evidence base for the demonstration projects that are being developed in the follow-up to the meeting and will be published as a series of four research articles on:

1. The magnitude of unmet need for surgical services in sub-Saharan Africa;

2. Human resources for surgical services--policy options (different country experiences, perceptions of professional organizations);

3. Resource requirements for scaling up surgical services in sub-Saharan Africa;

4. Equity in surgical services: access and financial protection.

The group agreed to meet again in Africa in 2008. In the meantime, they asked UCSF-GHS to serve as the secretariat for the group and to apply for grants on their behalf to further this agenda.

**Acknowledgement**

The Group is grateful to the Rockefeller Foundation for hosting the meeting at its Bellagio Conference Center.

**APPENDIX A: List of participants**

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## Bellagio Conference Center
## June 4 to June 8, 2007

## Participants

1 **Arop, Monywiir:** Director, Human Resource Development, Ministry of Health, South Sudan

2 **Bergström, Staffan:** Chair, International Health, Karolinska Institute, Sweden

3 **Cherian, Meena:** Emergency & Essential Surgical Care project**,** Clinical Procedures Unit (CPR), Department of Essential Health Technologies, WHO, Geneva

4 **de Miranda, Helder:** General Surgeon and Professor at the Catholic University, School of Medicine, Beira, Moçambique

5 **Debas, Haile:** Professor of Surgery, Executive Director, Global Health Sciences, UCSF, USA

6 **Dovlo, Delanyo:** Health Systems Adviser, Health Policy, Development and Services, WHO, Geneva

7 **Gebrekidan, Abrehet:** Faculty of Health Sciences, University of Asmara, Eritrea

8 **Jamison, Dean:** Editor, Disease Control Priorities, Professor of Health Economics, UCSF, USA

9 **Jiskoot, Peter:** Surgeon, Project Manager, Clinical Officer training in Malawi

10 **Kabutu, Jane:** President, Kenyan Society of Anesthesia, Nairobi, Kenya

11 **Kruk, Margaret**: Lecturer, Health Management and Policy, Michigan University, USA

12 **Luboga, Sam:** Professor of Surgery, Vice Dean for Education, Makerere University, Uganda

**Lugor, Obadia**: General Surgeon, Yambio Hospital, Southern Sudan

**Mabweijano, Jackie:** Head of Casualty, Mulago Hospital, Uganda

**Macfarlane, Sarah:** Director of Program Development and Planning, Global Health Sciences, UCSF, USA

**Mbembati, Naboth**: Head of Surgery, Muhimbili College of Health Sciences, Dar es Salaam, Tanzania

**McCord, Colin:** Retired Associate Professor of Surgery, Columbia University, USA

**Meky, Saleh**: Minister of Health, Eritrea

**Mocumbi, Pascoal:** Ambassador, European and Developing Countries Clinical Trials Partnership, The Netherlands

**Muheki Zikusooka, Charlotte:** Consultant Health Economist, Uganda

**Vaz, Fernando:** Director of the Training of Técnicos de Cirurgias, Higher Institute of Health Sciences, Maputo, Moçambique

**von Schreeb, Johan:** Surgeon and Health Emergency Analyst, Karolinska Institute, Sweden

**Wasunna, Ambrose:** Professor of Surgery, Kenyatta Memorial Hospital, Nairobi, Kenya

**Wilson, Charles:** Chair, Global AIDS Interfaith Alliance, Professor and Chair Emeritus, Neurosurgery, UCSF, USA

**APPENDIX B: Agreed list of surgical conditions that can be treated at a district hospital**

| | Condition |
|---|---|
| **Obstetrical complications** | Abundant postpartum haemorrhage |
| | Prolonged labor |
| | Obstructed labor |
| | Eclampsia |
| | Prolapsed cord |
| | Labor with a scarred uterus |
| | Foetal distress |
| | Tubal pregnancy |
| | Postabortion endometritis-myometritis/sepsis |
| | Postpartum endometritis-myometritis/sepsis |
| | Intrauterine fetal death |
| **Trauma and violence** | Major limb fracture/injury |
| | Burns |
| | Joint dislocation |
| | Major soft tissue injury |
| | Pneumo/hemothorax |
| | Ruptured spleen |
| | Injury to the eye |
| **Acute surgical emergencies** | Strangulated hernia |
| | Intestinal obstruction |
| | Intestinal perforation |
| | Appendicitis |
| | Liver abscess |
| | Major wound infection |
| | Osteomyelitis/septic arthritis |
| **Non-acute surgical conditions** | Congenital Hernia |
| | Hernia |
| | Breast cancer |
| | Chronic osteomyelitis |
| | Hydrocele |
| | Urethral stricture |
| | Prostate enlargement |
| | Cataract |
| | Preventive circumcision |