

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

***Bellagio Essential Surgery Group Meeting***

***Kampala, Uganda  
July 22-24, 2008***

***Final Report***

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**Summary**

From July 22-24 2008, leaders in surgery and public health from 11 African countries, Europe, and the United States came together in Kampala to develop collaborative strategies to increase access to surgical services across sub-Saharan Africa. The meeting was hosted by the Department of Surgery at the University of Makerere and co-organized by Global Health Sciences at the University of California San Francisco on behalf of the Bellagio Essential Surgery Group.

The meeting drew up an urgent call for national and international action to achieve universal access to essential surgical care to address the crisis in surgical services in sub-Saharan Africa. The group recommends:

- Commissioning a careful analyses of country needs and implementing realistic options and innovations that will help to reduce surgical mortality and morbidity
- Improving the competence and motivation of doctors and other staff in peripheral hospitals and health centers
- Expanding the surgical competency base to other healthcare personnel in order to address the capacity issues, human resource shortages, and increased access
- Encouraging educational reforms that inculcate practical surgical skills training as integral parts of basic medical training
- Investing in improvements and expansion of infrastructure and equipment in order to strengthen healthcare delivery overall

- Implementation of effective strategies to attract and to retain skilled health workers at district levels in order to curb the human resource crisis

## **Background**

This conference follows on the first meeting of the Bellagio Essential Surgery Group which occurred in Bellagio, Italy. The Bellagio conference drew attention to the large proportion of disease burden in sub-Saharan Africa (SSA) due to surgical conditions. It sought to emphasize the rationale for providing surgical services in SSA, define the scope of the problem of surgically-avoidable disease and conditions, and describe methods to address the current surgical workforce crisis.

Based on these arguments, the first Bellagio Conference created the Bellagio Essential Surgery Group to advocate for the changing role of surgery in global health. Over the past year, this group has strongly championed the need for the role of surgeons to be recast as educators, researchers, and policy-makers in order to address the lack of surgical capacity in SSA. The group also initiated a collaborative three-country research study to describe the extent of surgical activities in district hospitals in Mozambique, Uganda, and Tanzania.

Support from the Rockefeller Foundation for the 2007 meeting, in addition to support from the Bill and Melinda Gates Foundation, enabled the BESG to host a second meeting in Africa in July 2008. In preparation for the meeting, the BESG broadened its membership to include representatives from more African countries. In addition, four cross-country teams developed strategies or demonstration projects for increasing access to surgical services to share among the cohort.

## **Goals of the meeting**

The goals of the second meeting were to reunite members of the BESG, expand the BESG network, and develop cross-country strategies and implementation plans to increase access to essential surgical services in sub-Saharan Africa.

In order to achieve this goal, participants were asked to review the progress that has been made in developing surgical services across the participating countries and develop, critique, and adopt model approaches to achieve the following:

1. Strengthen the delivery of trauma care to address the growing prevalence and economic impact of injuries in SSA;
2. Strengthen district level health systems to increase access to surgical services;
3. Address the surgical workforce shortage, identify training programs and make recommendations for resource reallocation and policies required to tackle these challenges; and
4. Obtain evidence to inform these strategies through research.

Furthermore, the BESG planned to discuss the role of networking, advocacy, and international support in broadening international awareness of the issues and expanding support for successful adoption and implementation of possible strategies.

### **Organization of the meeting**

The meeting was organized by the Department of Surgery at Makerere University and Global Health Sciences (GHS) at the University of California, San Francisco (UCSF). The agenda was structured around background papers prepared by the working groups and distributed in advance of the meeting.

The morning of the first day focused on summarizing the challenges to accessing surgical services in sub-Saharan Africa, and recasting the role of surgeons. Presentations, including a case study from Uganda, were given on trauma care needs and challenges to delivering surgical care at district hospitals. The afternoon was spent in working groups, developing strategies to strengthen trauma systems, increase surgical access at the district level and to increase international support for the provision of surgical services in SSA. The second day was devoted to issues surrounding surgical workforce expansion and training needs to address the current workforce crisis. Case studies from Mozambique, Niger, and Malawi were presented. Strategies to increase surgical output through training physicians and non-physician clinicians to perform surgical procedures were discussed. The evolving role of surgeons in surgical education, research, and public health was defined. The afternoon was spent reviewing the research conducted by BESG members since the first Bellagio conference and discussing agency relationships. The final day was devoted to local and international advocacy for surgical care, research and training, translating research into policy, and future steps of the BESG.

The remainder of this report describes the discussions and outcomes of the meeting in respect to its specific objectives.

### **Discussion and outcomes of the meeting: (1) Strengthening the delivery of trauma care**

Injury currently accounts for 12% of all disability-adjusted life years (DALYs) lost worldwide. More than 90% of this burden is borne by low- and middle-income countries. Trauma accounts for a significant proportion of the injury burden in Africa. Africa has the highest road traffic injury mortality rate in the world at 28/100,000 people, and has 50 deaths/10,000 vehicles compared to 1.7 deaths/10,000 vehicles in high-income countries. In sub-Saharan Africa, injury accounts for nearly 10% of all DALYs lost, a figure that is more than several well-known infectious diseases including diarrheal illness (6%) and tuberculosis (3%). While malaria deaths predominate in children under five, for children over five, injury deaths in sub-Saharan Africa outnumber all deaths from HIV, TB, and malaria combined. Unfortunately, the available evidence suggests that this situation will only worsen in the foreseeable future. By the year 2020, initial projections suggested that injury will account for 20% of the global burden of disease, with road traffic injuries representing the third leading cause of lost DALYs.

There are three main barriers to providing trauma care: inadequate human resources; lack of physical resources; and poor organization/administration. The ratio of surgeons per 100,000

people in various settings has been reported. We noted that the ratio is 0.5/100,000 in Africa vs. 50/100,000 in the US. In addition, these surgeons receive minimal trauma training. Regarding physical resources, a study from Ghana reported that four out of 11 hospitals along main roads in the country did not have airway equipment and none had chest tubes for treating chest trauma. Further data from Kumasi indicate that organization structure was poor leading to delays in care (e.g., average time to emergency surgery was 12 hours) and low rates of care (e.g., chest tube use was 0.6% in Ghana vs. 6.3% in the US). There is a need for basic prehospital emergency care services in settings where no formal Emergency Medical Services exist. Ghana, Uganda, Vietnam, and Malawi have successfully implemented effective strategies to address trauma using the WHO's guidelines on prehospital and facility-based trauma care guidelines.

However, clearly international guidelines need to be evaluated closely and tailored to each setting based on relevance. Researchers should conduct needs assessments before introducing changes, and interventions should build on existing emergency care systems. The importance of human resource constraints is often understated. Who is doing the trauma procedures, with what frequency, and with what resources is unclear. One member of the audience stated that creating a trauma system requires "10% funding and 90% political commitment."

#### Trauma Demonstration Project Case Study from Uganda

The BESG trauma sub-group has developed a demonstration project since the first Bellagio meeting. This project is to develop a trauma system structured around an existing regional referral hospital (RRH) in Masaka, Uganda which is generally staffed by specialists, takes referrals from several district hospitals, and serves a population of 1-2 million people.

Masaka hospital is located 130 km from Kampala and is on a major highway. Current staffing includes an orthopedic surgeon, two general surgeons, and an anesthesiologist. The estimated "catchment area" is 2 million. Seven District Hospitals are present in the area: Kitovu, Villa-Maria, Kalisizo, Lyantonde, Rakai, Kakuto, and Nkozi Hospitals, several of which are private hospitals with specialist services. The group proposed to establish a National Trauma Council as a semi-autonomous body independent of the Ministry of Health, hospitals, etc. with participation from all relevant stakeholders including representatives from the Ministry of Health, Makerere University, Ministry of Works and Transport, WHO, development partners, UTODA, police, petroleum companies, Injury Control Center-Uganda, Uganda Red Cross Society, Uganda Road Safety Council, professional bodies, and health personnel. The Council would be overseen by a Board of Directors.

The working group proposed to consider several issues in this model:

- Needs Assessment: examining existing surveillance mechanisms to understand the region's injury epidemiology, use of the WHO's Essential Trauma Care Guidelines to conduct needs assessments at the health facilities within the region, understanding referral and monitoring mechanisms in place.
- Prehospital care: training of first and second level responders, creating an ambulance system, ensuring basic life support classes at training institutions in the area.
- Hospital Care: ensuring certified trauma training for health care workers and certified trauma programs at healthcare facilities, establishing staffing norms related to trauma,

creating incentives for providing trauma care, ensuring appropriate channels for obtaining essential resources and sending referrals between the RRH and District hospitals, integrating trauma care into primary health care.

- Rehabilitation: assuring adequate physical and psychosocial rehabilitation services for injured patients at RRH level (and at the national level).
- Prevention: reviewing existing prevention programs within this region and their effectiveness and cost-effectiveness, such as enforcement of laws on seat belts use, helmets, etc. and establishing a timeline for implementation of this proposal with periodic progress reports and monitoring.
- Advocacy: community awareness programs through mass media, churches, local councils, mandatory first aid courses in schools, and direct accountability of the National Trauma Council to the public for implementing this project through periodic public meetings.

Post-meeting follow-up. The Trauma Working Group will:

1. Review the model trauma system proposed at this meeting and will develop a consensus on the standards that are needed for an organized trauma system to be established.
2. Develop a needs assessment tool that can be implemented across a sample of countries to determine the scope of the emergency services currently available in these SSA countries.
3. Conduct a brief needs assessment across a few volunteer countries.
4. Seek funding to conduct a more extensive needs assessment, based on the results of the brief needs assessment.

### **Discussion and outcomes of the meeting: (2) Strengthening district level health systems to increase access to surgical services**

Surgical care in sub-Saharan Africa is often concentrated in specialist referral hospitals located in big cities. Most first referral facilities in rural sub-Saharan Africa cannot provide basic surgery despite the growing national and international concern regarding surgical capacity, especially with regards to the MDGs on maternal mortality. Most patients with surgically-treatable diseases from rural areas are referred to far away regional hospitals for appropriate surgical care. Thus, regional hospitals get overloaded with high demand and at the same time, they face enormous infrastructural and human resource limitations that hinder their ability to provide care. Meanwhile, patients and families face multiple delays in obtaining surgical services due to this referral system. Additional costs such as that of long-distance transportation to tertiary facilities and loss of income due to days off of work contribute to the barriers of accessing surgical services. Due to these issues, many who enter the system may simply drop out of it without receiving proper treatment. This leads to complications of untreated ailments such as death or chronic disability. The unmet need for surgical care results in loss of productivity, dependency on family, and further economic and social burden. Furthermore, these issues cause severe consequences such as provision of poor quality health care, burden of high costs on patients and the system, loss of confidence in the system because of its inefficiencies, and low utilization of services because of costs, perceived lack of quality, and barriers to access.

Thus, there is a need for an effective alternative approach to delivering surgical care to rural sub-Saharan populations that is people-centered, decentralized, integrated, flexible, and has a focus on access to appropriate surgical services in fully functional district hospitals. This approach should focus on providing appropriate surgical care when it is needed in rural settings, and implies that a district hospital with adequately functioning surgical services should be integrated into the health care system. This may be achieved by:

- Considering surgery as an integral part of the district health care system.
- Focusing on the district hospital / first referral facility and addressing accessibility and efficiency.
- Defining stronger supportive functions for the tertiary hospital.
- Providing for a more enhanced role of first-line health services (diagnosis, pre-hospital, injury prevention).
- Consolidating the decentralized surgical care system.

The challenges to this model are inadequate surgical workforce and poor basic working conditions. The human resource issue has many complexities. First, there is resistance to developing innovative solutions to address the workforce shortages. Alternatives such as training of mid-level health providers may be useful depending on the setting, and the surgical community needs to have a strategy to address the resistance against this approach. The community also needs to work with policy-makers to attract and retain surgical workers in rural areas by offering incentive schemes. In addition, current training strategies may need to be redefined. Upgrading skills of existing staff, updating medical curricula to match the health care needs and training non-specialists are other methods of addressing the surgical workforce shortage. Backup by specialists and combining specialist and non-specialist training may be additional mechanisms to facilitate changes in training. The end goal is to bring together people with complementary skills in sufficient numbers (physicians with surgical skills, anesthetic technicians, specialized nurses, support personnel, lab technicians, etc.) in order to provide appropriate surgical care. Changes in permanent basic working conditions are also needed to ensure an effective surgical delivery system. This will include the existence of appropriate facilities, equipment and supplies, a 24 hour service organization, a functioning referral system, and appropriate management of the system.

The key strategy to drive these changes is to generate and sustain strong political commitment. This can be done using focal events, mobilizing political entrepreneurs, presenting clear and simple indicators to decision makers, and proposing feasible alternatives to existing problems. To strengthen surgical service provision at the district level, surgery should be seen as part of the health system and not just as a technical profession.

However, it is not adequate to address local and regional health care systems. The district surgical capacity needs to be seen in the context of a wider national referral system with:

- Well-defined levels of care according to complexity.
- Allocation of skills according to places of care delivery.
- Flexible rules of access.

- Establishing or reinforcing links with existing surgically-related national prevention programs where they exist (family planning, circumcision as HIV transmission prevention, injury prevention).
- Seeking and nurturing active involvement of all stakeholders at all levels and across all relevant sectors.

Providing surgical care is a moral and human rights issue. However, there is no one solution for all countries. Surgery should be put in a systemic context (i.e., "the bigger picture") and the mechanisms by which a country's health can be improved through increasing access to surgical care should be examined. Goals such as the MDGs could be used to link the argument for improving surgery to improvements in overall health. To address inadequacies in surgical capacity, systemic issues such as financial resources, infrastructure, capacities of training institutions, and human resources should be explored. Sending specialist surgeons to district hospitals is one strategy that has not been successful. The major barriers to improving surgical capacity at the district level are workforce, lack of resources, socio-economic limits, transportation between district and referral hospitals, and a mistrust of district hospitals. Surgical research on existing and new interventions at the district hospital is also critical.

*Developing a District Hospital Model: A Tanzanian Case Study*

The BESS District Hospital Working Group presented a demonstration model of a district hospital surgery system based in Tanzania. In Tanzania, the recommended staffing at a district hospital includes two MDs, five Assistant Medical Officers, and 13 Medical Assistants/Clinical Officers. Since the first Bellagio meeting, the BESS conducted a multi-country study in which the staffing at two Tanzanian Hospitals was evaluated. One of the two hospitals which did not meet the recommended staffing level was developed as a case study to address barriers to providing surgical services at that level. Kasulu Hospital is located in a remote, rural area, approximately 1500 km from DSM and has a catchment of >600,000 people. It has one MD graduate, 13 AMOs, and 11 Medical Assistants. Annually, 85% of its surgical volume and 21% of its anesthetic care is performed by AMOs (2007 figures).

To increase Kasulu's surgical capacity, human resource constraints must be addressed. Innovative ways to recruit more doctors, nurses, anesthetic AMOs/nurses and other supportive staff are required. Plans to retain such staff once they are employed will have to include monetary and non-monetary incentives. Staff housing could be a potential starting point to improve retention rates. A continuing medical education program should be developed with the help of either visitor surgeons or staff being sent to tertiary facilities. Physical resource infrastructure, such as the functional capacity of the operating room, blood transfusion services, drug supply, equipment maintenance, and health information systems should be improved. The hospital would benefit from better organizational management which includes a surgical audit, establishment of quality assurance systems, and improved trauma management and referral systems.

Building surgical capacity will be a complex undertaking, therefore a detailed situational analysis and needs assessment should be conducted before interventions are implemented. Financial implications of any intended intervention, including cost-benefit analysis, should also be considered. In addition, ensuring sustainability of the intervention measures will be critical.

Post-meeting follow-up: The District Hospital Working Group will:

1. Develop an action plan for drafting a proposal and gaining support for investment in surgical services and infrastructure at the district level through advocacy and networking.
2. Begin networking with other BESG subgroups to integrate activities into a proposal that will influence the strengthening of surgery at the district hospital level.
3. Develop a proposal(s) to improve surgical capacity, infrastructure and workforce at district level hospitals.
4. Network with political stakeholders, especially ministries of health, throughout member countries to receive buy-in.
5. Submit proposals for pilot projects for funding through the BESG.

### **Discussion and outcomes of the meeting: (3) Addressing the surgical workforce shortage**

There is a critical surgical workforce shortage in sub-Saharan Africa. Levels of unmet need for surgical services are unclear making it difficult to estimate the actual numbers of staff needed in this setting. An absolute shortage in surgical staff, inequitable distribution of staff, and problems with recruitment and retention due to lack of incentives and support have been identified as the main challenges. Surgeons at the Kampala meeting were challenged to “recast” their roles to raise the profile of surgeons across the health system, engage in broader system-wide issues such as workforce shortages, and redefine the importance of surgical care as a critical component of any health care system. Historically, many innovative ideas have been developed by surgeons in each country to improve access to surgical services among the rural, underserved population despite the shortage of trained professionals. The surgical camp and specialist outreach models are good examples of these local solutions, and in some countries surgeons have taken leadership in working with non-surgeons to address the surgical workforce crisis. Through this workforce crisis, new training programs have been developed to allow medical doctors, nurses, and other clinicians to be trained in specific surgical fields.

However, a one-size-fits-all model of addressing the inadequate surgical workforce in sub-Saharan Africa may not be ideal. Careful thought should be given to local priorities and concerns. Discussions among stakeholders from the Ministry of Health, various academic and professional bodies, and clinical staff within each country will also be crucial to tailor solutions to fit locally-identified needs.

#### "Recasting" the Role of Surgeons in Increasing Access to Surgical Services in SSA

Surgeons are critical to addressing the problems of access to surgical services in sub-Saharan Africa, and that this requires a 'recasting' of their roles. The philosophy that has governed surgical workforce production over many generations has not been effective and a new model is needed. Surgeons should not just be "next-perts" – an expert who sees the next person in line – but should take on the responsibility to supervise, manage, train, and influence the health system. Surgeons should blend clinical viewpoints with a public health perspective to ensure that a population-wide lens is used to address these new challenges. Necessary skills for surgeons include leadership and management, teaching and training, and an understanding of health economics and policy. Using these new skills, surgeons can influence curriculum development for training medical students,

post-graduates and midlevel health professionals. They can advocate for policy changes at academic institutions, within facilities in the larger health system and at the Ministry of Health.

### The Role of General Medical Doctors in Increasing Access to Surgical Services in SSA

These training programs should aim to produce clinicians with surgical skills while refraining from training them to the level of a fully-qualified surgeon. Several models are in existence today: in Ghana (a two-week skills camp with options for upgrading), Niger (a one-year program) and Kenya (a three-year bond with the university). There are many mechanisms to ensure that medical doctors receive adequate surgical training. More surgical skills should be incorporated into existing medical school curriculum possibly through adding a year to the curriculum. An additional year of solely surgical training after medical school could be developed based on competencies. Clearly, the challenges of designing a training program for doctors will be different across countries and local and transcontinental stakeholders may need to be key participants in developing such programs. Issues such as credentialing, supervision, incentives (salary, housing), involvement of surgical societies and networking will need to be closely evaluated.

### *Training General Medical Doctors to do Surgery: a Case Study from Niger*

In 2003, in Niger, there was one doctor for every 50,000 inhabitants, and of the 257 doctors in the country only 23 were surgeons. Almost half of these surgeons were located in the capital city of Niamey, where only 6% of the population resides. The distribution of these resources showed a breakdown of only 9 out of the country's 36 district hospitals (serving from 100,000 to 640,000 people), could provide only the minimum level of surgical services outside the capital. A survey of the unmet need, conducted by Niger's Ministry of Health, indicated that 82% of obstetrical needs (major surgeries) were not being met in rural areas compared to 25% in the urban areas.

Niger has attempted various strategies to address these issues. Travelling surgical camps, which were funded by the WHO, addressed hernias and hydroceles from 1974 to 1992. Nurses who received specific training in surgical care through this program performed the surgery. The first training program in rural surgery for physicians was initiated in 1995. This program, financed by the World Bank, provided one year long training in basic surgery to physicians and was conducted at third level hospitals. Creation of a specialized training in surgery did not start until 1998. Through the five year training (with one overseas training year), an average of 5 general surgeons were being produced per year. Specialized training in gynecology and obstetrics was created based on this general surgery model and was implemented in 1999 with similar results.

Stemming from these unsuccessful initiatives, in 2005, a second training program in rural surgery for physicians was initiated. Government doctors were recruited to participate and were trained over 12 months (3 months at a third level hospital and 9 months in regional hospitals). They were certified as having "Capacity in District Surgery" (CDS). In 2006, a 52% drop in the number of transfers for surgical causes from district to referral hospitals was noted with a similar trend noted in 2007. Transfers for orthopedic causes have remained unchanged.

The provision of district level surgical care in Niger has been impacted by various problems with facilities, supplies, and human resources. Of the 34 district hospitals in the country only 22 have operation rooms. Supplies to perform surgery are limited and equipment is not functioning well because of maintenance problems. It has been challenging to manage and motivate medical staff

to stay in the district hospitals. In addition, the referral system is not ideal. Patients and families face large distances between health facilities and bear significant costs for improved care.

### *The Role of Midlevel Health Professionals in Increasing Access to Surgical Services in SSA*

There is a need for Midlevel Health Professionals who are trained in surgery, particularly in the rural areas of Africa. However, at this time, there are several issues that must be addressed before such training programs can be implemented: coordination of the training programs; support from relevant local stakeholders; appropriate support/supervision of trained workers; and design of the training programs based on service needs and opportunities for professional development.

Most Midlevel Health Professionals training programs are coordinated by the MOH and not the universities, resulting in a lack of support and recognition by the professional bodies. There has been resistance from the surgical community, but this could be addressed through bodies such as COSECSA. In addition, there is a lack of structured supervision by doctors and this may be linked to the medical community's resistance to this idea. Thus, continued dialogue around the roles of doctors and MLHP is critical to minimize overlap and misunderstanding.

In addition, the variation in training programs across countries causes confusion and misunderstanding. For example, there is large variation in the labeling and terminology of the different cadres entering the surgical specialization program. The length and scope of training is another key difference across countries. In general, those entering have some form of mid-level training (between nurse and MD) but the length of training of the cadres varies significantly. In many programs, the length of training is between 8-9 years, which includes basic training before surgical specialization; however, this may be too long to address current workforce shortages. There is a generic curriculum for AMOs available, but a list of procedural competencies needs to be created to complement this curriculum. Universities and professional associations would significantly influence curriculum development if they were engaged by the surgical community. In addition to increasing the number of quality professionals performing surgery, human resources are needed to train and supervise staff.

There is also little continued education and options for career progression for these providers. In some countries, there is no clear professional status of general medical doctors who have undergone extra surgical training within the surgical community. Creating appropriate certification, recertification, continuing medical education, and professional development opportunities are other challenges to using non-surgeons to provide surgical care. Further research into the structure and effectiveness of current programs could help policy-makers across the continent learn from these experiences.

### *Training midlevel Health Professionals: a Case Study from Malawi*

Malawi faced a major shortage in doctors after Independence in 1964. The doctor to patient ratio was 1:65,000 with almost no surgical specialists remaining. Clinical officers who had 4 years of medical training but no surgical experience provided the majority of care.

In 2005, a pilot project began to train Clinical Officers (COs) in surgery. Training was on-the-job so that shortages in human resources were not further reduced. Surgical and gynecological knowledge and skills were upgraded. Safe practice of common procedures, care of trauma

patients, and stabilization of seriously wounded patients before transport to the Central Hospital was taught. Similar protocols were put into place at all hospitals with the influence of short term surgical specialist visits. The COs were supervised for at least 2 days every 4 weeks by visiting specialists. They also attended attachment weeks at the central hospital which included teaching and practicing of specific skills in general surgery, orthopedics, anesthesia, gynecology, dermatology, ENT, and pathology. The goals of this pilot project were to: improve surgery, obstetric, and gynecology skills; improve patient care; increase local treatment provision; decrease transfers to Central Hospitals; decrease costs to the patient; and implement similar surgical protocols in all hospitals (similar availability of suture materials, antibiotics, pre-op skin preparation, etc). Visiting surgical specialists supervised on the wards during rounds, in theaters, and in outpatient clinics. They conducted teaching sessions and made frequent reports to the District Health Officer to provide updates on the conditions at each hospital.

The effectiveness of this pilot project was limited by dropouts because there was no long-term career option involved in this training program aside from a certificate of attendance from the MOH. There was also no additional salary support for acquiring additional skills. This was a disincentive and decreased the effectiveness of this pilot program. To address these issues, a Bachelors program is being developed for COs which will involve two years of on-the-job training at the district level with opportunities to learn about the most common surgical conditions, followed by a two year advanced course at the Central Hospital level which will include three blocks of eight months covering surgery, gynecology, and orthopedics/trauma. COs will be complete a mid-term exam after on-the-job training and the most competent COs will be selected to advance. This will help them learn the most acute conditions and more complicated cases under adequate leadership. The training will be carried out by surgeons/ gynecologists from one Central Hospital and 3-4 District Hospitals. A total of three Central Hospitals and 11 District Hospitals will participate with two COs per district hospital. Every two years, the 18 most competent COs will continue on for training at Central Hospitals. While this new program seems necessary, it has been challenging to get support from relevant stakeholders for its implementation.

Post-meeting follow-up. The Training Working Group will:

1. Establish two different subcommittees to produce reports on the different approaches to training of surgical workforce that exist in SSA (physician vs. middle level health professional training).
2. Examine for each:
  - a) Existing training programs – the entry requirements, course structure, and content
  - b) Strengths and deficiencies of the programs
  - c) Types of certification in place and how to improve them
  - d) Continuing education and re-certification
  - e) Career prospects and progression of products

## **Discussion and outcomes of the meeting: (4) Research on Surgical Care at the District Hospital in SSA**

Very little substantive data exist regarding the surgical care that is provided at the district hospital level, the staffing needed to provide such care, and the contribution of the district hospital to the overall health system. To address these issues, the Bellagio Essential Surgery Group developed a multi-country study to compile and analyze data from eight hospitals in Tanzania, Uganda, and Mozambique. The study collected data on: the demographics of the patient population; hospital inputs such as beds, human resources, etc; annual outputs such as admissions, outpatient visits, etc; diagnoses of hospital inpatients; monthly volume of surgical and obstetric procedures; individual level surgical diagnoses and procedures; and annual recurrent expenditures. The preliminary results from this analysis were presented at the Kampala meeting. Some of the key points are listed below:

- Districts varied in population size, number of sub-district facilities, and number of other hospitals.
- All except one district hospital in this study did not have a surgeon.
- Admissions ranged from 6,000-10,000 per hospital per year.
- Surgical volume ranged from 100-800 cases per hospital per year, including many obstetric cases.
- The top three surgical diagnoses for inpatients were appendicitis, burns and cataract.
- The top three surgical procedures performed were open reduction of fracture, hernia repair and hydroceles repair.
- Recurrent expenditure for surgical care ranged from 6-13% across the eight hospitals.

Post-meeting follow-up. The Research Working Group will:

1. Develop three manuscripts on the following topics for publication:
  - a) Volume of surgical care- contribution of the district hospital to meeting surgical needs, frequency of surgery, gaps in coverage of essential surgical services, the burden of surgical disease/unmet need.
  - b) Human resources – who provides surgical care? What care is provided? What are the human resource gaps and what are possible solutions?
  - c) Costs – What are the overall operating costs? What percentage of these costs is due to provision of surgical services? How can the provision of surgical care be optimized within these resources?
2. Make plans for the following projects:
  - a) A pilot project will be developed using instruments of surgical indicators and will be implemented through the Demographic Surveillance Sites in Uganda to assess the unmet need for key surgical conditions.
  - b) A facility level analysis will be considered to determine the outpatient burden of surgical conditions.
3. Prepare a future research agenda, to answer some of the following questions:
  - a) What is the burden of surgical disease in SSA? What is the unmet need?

- b) What is currently happening in terms of provision of surgical services? By whom is it currently being provided?
- c) What is the cost-effectiveness of surgical intervention?
- d) What is the safety and quality of currently provided surgery?
- e) What is the most efficient organization of health services?

### **Discussion and outcomes of the meeting: (5) Advocacy and networking**

Two areas are critical to advocacy and networking: the development of health-related knowledge and its dissemination to various users of health knowledge. Creating health-related knowledge is important because it contributes to improving the health system, health itself, and economic, social and political development. In the developing country setting, it is particularly necessary because of the "90-10" gap which represents the gross inequities in health research. Ninety-percent of the world's research is spent addressing the health problems of the developed countries. Thus, it is critical to build health research capacity in developing countries to answer locally-relevant questions. Capacity can be defined as the "process of strengthening the abilities of individuals, organizations, and societies to make effective use of resources, in order to achieve their own goals on a sustainable basis." Health research capacity needs to be developed at different levels including individual, institutional, research system, socio-economic, and political as well as developing international collaboration and linkages. Various interventions such as capacity building, capacity strengthening, and performance enhancement are necessary for each level to maximize effective development of research capacity.

An essential complement to building research capacity is the ability to communicate research findings from the researchers to the policy-makers. This so called know-do gap needs to be bridged effectively for knowledge to be translated into policy. In addition to translation of research and dissemination of findings, stakeholders must use this knowledge to strategically advocate for change and improvement in access to surgical services. Strategies need to identify influential stakeholders, including policy makers and donors, and disseminate results in a way that has the greatest impact. Understanding and effectively using these strategies will be critical to strengthening the argument for improving surgical services and implementing the products of health research.

In order to translate knowledge, information must be produced, managed, utilized, and disseminated effectively and creatively. An imperative step to increase communication between stakeholders is to create an open pathway for dialogue. In order to have impact, knowledge should be shared through a variety of targeted mediums (policy briefs, media, journal articles, etc.) and demonstrate how investments in the area of surgery have significant health system and economic impacts.

As surgical research and capacity building efforts increase, the community should develop mechanisms to use these efforts as currency to advocate for greater provision of surgical services to the sub-Saharan African population and in particular the impoverished rural communities. One such mechanism may be to establish an advocacy group based in Africa that can effectively engage with local stakeholders.

*Post-meeting follow-up.* Participants concluded that the Bellagio Essential Surgery Group will be coordinated through a Secretariat in Uganda to represent the Anglophone/Lusophone countries and Niger to represent the Francophone countries. The BESG and Secretariat will form a platform for:

1. Advocacy: to include surgical services in the priorities of departments of health in Africa (including budget), and to make essential surgical services an accepted part of primary health care.
2. Field support: advocate for health systems strengthening through surgical services development, have temporary support for under-served districts (i.e. 'replacements'), help provide appropriate workforce, and help improve infrastructure, supplies, equipment.
3. Develop a platform for collaboration: create a website (interactive, functioning, and utilized), conduct annual meetings (well attended; creative, multi-disciplinary), and provide an effective secretariat.
4. Spur & promote innovations: develop demonstration projects (e.g. trauma system for Uganda; new delivery strategies for providing surgical care; and training mid-level health professionals).
5. Coordinate research: compile quality data on surgical burden of disease, care, services, unmet need, etc; and help develop at least one key surgical research group.
6. Support for training: advocate for long-term academic capacity building and development of curriculum for mid-level workers.
7. Networking: form international links, link surgical societies in Africa, collaborate with other key specialties.

### **Consensus Statement and the Way Forward**

1. Participants drafted a consensus statement and agreed to disseminate its messages to international agencies, regional organizations, and national governments.
2. BESG Member countries will continue to work together to raise funds and to develop and implement projects that will increase access to surgery. Funding to support the Secretariat will be actively pursued.

### **Acknowledgement**

The Bellagio Essential Surgery Group is grateful to the Bill & Melinda Gates Foundation for providing financial support for this meeting.

## Appendix A: Relevant reading material

1. Atelier: Les strategies d'amelioration de la couverture et de la qualite des soins medicochirurgicaux essentiels et d'urgence. 2004, République du Niger, Ministère de la Santé Publique et de la Lutte Contre les Endémies et Coopération Technique Belge.
2. Atelier:, Les strategies d'amelioration de la couverture et de la qualite des soins medicochirurgicaux essentiels et d'urgence., M.d.I.S.P.e.d.I.L.C.I.E. République du Niger, et Coopération Technique Belge., Editor. 2004.
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17. WHO Guidelines for Safe Surgery, in *World Alliance for Patient Safety*. 2008, World Health Organization: Geneva.

## **Appendix B: List of Participants**

Dr. Ndakengerwa Alphonse, Senior Consultant, General and Trauma surgeon, King Faysal Hospital, Rwanda

Dr. Nameoua Babadi, Expert National Chirurgien CTB, Attaché au Centre Hospitalier Régional de Dosso, Niger

Ms. Evelyn Bakengesa, Publication and Information Center, Faculty of Medicine, Makerere University, Uganda

Dr. Paul Bossyns, Public health specialist, Health expert for the Belgian Technical Cooperation

Dr. Meena Nathan Cherian, Professor, Christian Medical College, India, Medical Officer, Emergency and Essential Surgical Care Project, Clinical Procedures Unit, Dept of Essential Health Technologies, Health Systems & Services, WHO

Tec. Ilda Maria da Conceicao, Tecnica de Cirurgia, Hospital Rural de Catandica, Mozambique

Dr. Haile T. Debas, Professor of Surgery, Executive Director, Global Health Sciences, University of California, San Francisco, USA

Dr. Ernest Denerville, Research Fellow, Quality and Human Resources Unit, Institute of Tropical Medicine, Antwerp (ITM-A), Belgium

Professor Peter Donkor, College of Health Sciences, Kwame Nkrumah University of Science and Technology College Of Health Sciences, Ghana

Dr. Delanyo Dovlo, Health Systems Adviser, Organization & Management of Health Services(OMH), Department for Health System Governance & Service Delivery (HDS), WHO

Dr. Moses Galukande, Surgeon, Faculty of Medicine, Makerere University, Uganda

Dr. Renee Hsia, Clinical Instructor, San Francisco General Hospital, UCSF, USA

Dr. Patrick Hoekman, Trauma surgeon- project manager, Belgian Technical Cooperation, Niger

Dr. Elhaji Maman Issiaka, Deputy of Secretary General, Ministry of Health, Niger

Professor Carel IJsselmuiden, MD, MPH, Director, Council on Health Research for Development, Switzerland

Ms. Nasreen Jessani, Programme Officer, International Development Research Centre, Kenya

Dr. Sudha Jayaraman, Resident Physician, Department of Surgery, Fellow, Global Health Sciences, University of California, San Francisco USA

Dr. Peter Jiskoot, Surgeon, Project Manager, Clinical Officer Training in Malawi

Dr. Jane Kabutu Gatumbu, President Kenyan Society of Anesthesia, Kenya

Dr. Sam Kaggwa, Head of Surgery Department, Faculty of Medicine, Makerere University,

Professor Ignatius Kakande, Head of Department of Surgery, Faculty of Medicine, National University of Rwanda

Dr. Olive C. Kobusingye, Regional Advisor, Violence & Injury Prevention, Rehabilitation WHO Regional Office, Zimbabwe

Dr. Margaret E. Kruk, Assistant Professor, Health Management and Policy, University of Michigan School of Public Health, USA

Dr. Adam L. Kushner, Surgeon/Director, NY Society of International Humanitarian Surgeons

Dr. Mandiaye Loume, Coordinator of CAS/PNDS (Planning Unit of the Ministry of Health), Ministry of Health, Senegal

Ms. Lindsey Lubbock, Program Analyst, Global Health Sciences, USA

Prof. Reverend Sam Luboga, Professor of Anatomy, Faculty of Medicine, Makerere University

Dr. Douglas Lungu, Hospital Director, Daeyang Luke Hospital and honorary lecturer College of Medicine, Surgical Dept, Malawi.

Dr. Jackie Mabweijano, Head of Casualty and Lead of Accident and Emergency Unit Mulago National Referral Hospital, Uganda

Professor Sarah Macfarlane, Associate Professor, Director, Program Development and Planning, University of California, San Francisco, Global Health Sciences, USA

Dr. Jana B.A. MacLeod, Assistant Professor of Surgery, Emory University, Emory University School of Medicine/Grady Memorial Hospital, USA

Professor Naboth Mbembati, Associate Professor of Surgery, Muhimbili University of Health and Allied Sciences, Tanzania

Dr. Colin McCord, Retired Associate Professor of Surgery, Columbia University, USA

Dr. Cephas Mijumbi, Anaesthesia Department, Faculty of Medicine, Makerere University

Dr. Helder de Miranda, General Surgeon and Professor at the Catholic University, School of Medicine, Beira, Mozambique

Dr. Charles Mkony, Professor of Surgery, Dean, School of Medicine, Muhimbili University of Health and Allied Sciences. Tanzania

Dr. Charles Mock, Health Advisor, Violence and Injury Prevention and Disability, WHO

Dr. Dominique Mugenzi, Orthopaedic Surgeon, University Teaching Hospital of Kigali, Rwanda

Dr. Antonio Mujovo, General Surgeon, Central Hospital of Maputo, Mozambique

Professor Peter Mwanza, Vice Chancellor, Mzuzu University, Malawi

Dr. Jean Bosco Ndhokubwayo, Regional Advisor, Clinical Technologies Unit  
Division of Health Systems and Services Development, WHO/AFRO

Dr. Gebreamlak Ogbaslassie, Fellow of the Royal College of OBS/GYN (FRCOG), UK  
Senior Technical Adviser, RH, Eritrea

Dr. Evariste Lodi Okitombahe, Technical assistant BTC project of Regional Health System  
Development in Kaolack and Fatick, Senegal

Dr. Ngueumachi Pierre, Head of surgery, Leer Hospital, Sudan South, Lecturer, Medical School,  
Universite des Montagnes, Cameroon, Medecins Sans Frontieres-Holland

Dr. Sani Rachid, General and digestive surgeon, Coordinator of training in district surgery,  
University of Niamey, Niger

Dr. Asad Jamil Raja, The Mohammed Bhai Professor & Chairman, Department of Surgery, Aga  
Khan University Hospital & Aga Khan University East Africa, Kenya

Mr. Tawfik Rushdy, Programme Manager, Royal College of Surgeons in Ireland

Dr. Patrick Sekimpi, Orthopaedic Surgeon, Faculty of Medicine, Makerere University, Uganda

Dr. Fred Sengooba, School of Public Health, Makerere University, Uganda

Professor Cheikh Tidiane Toure, Chief Department of General Surgery, University Cheikh Anta  
DIOP, Chief Dept of General Surgery at University Hospital Aristide Le DANTEC, Senegal

Dr. Johan von Schreeb, Surgeon and Health Emergency Analyst, Karolinska Institute, Sweden

Dr. Andreas Wladis, Consultant Surgeon, Dep't of Surgery, Karolinska Institute, Sweden

Dr. Ahmed Nuhu Zakariah, Director, National Ambulance Service, Ministry of Health, Ghana

## Appendix C: Meeting Agenda

### Strategies to increase access to surgical services in resource-constrained settings in sub-Saharan Africa Bellagio Essential Surgery group

July 22<sup>nd</sup> – 24<sup>th</sup>, 2008

Hotel Africana, Kampala, Uganda

#### Programme

**Monday 21<sup>st</sup> July 2008**

Arrival of Participants, Hotel Check-In

**Tuesday 22<sup>nd</sup> July 2008**

#### **MORNING SESSION**

**8:00-8:30am Registration of Participants**

**8:30-9:45am Welcome and Introduction of Participants**

Sam Luboga, Professor of Surgery, Faculty of Medicine, Makerere University, Uganda

Sarah Macfarlane, Associate Professor, Director, Program Development and Planning, Global Health Sciences, University of California San Francisco

Meena Cherian, Professor, Department of Anaesthesia, Christian Medical College & Hospital, India and Medical Officer Department of Essential Health Technologies, World Health Organization, Geneva

**9:45-10:45am Plenary Session: Challenges**

Chair: Sarah Macfarlane, Associate Professor, Director, Program Development and Planning, Global Health Sciences, University of California San Francisco

Context for the Meeting

Haile Debas, Professor of Surgery, Executive Director, Global Health Sciences, University of California San Francisco, USA

Recasting the role of the surgeon: Sam Luboga, Professor of Surgery, Faculty of Medicine, Makerere University, Uganda

**10:45-11:15am TEA BREAK**

**11:15am-12:15pm Plenary Session: Strategies to strengthen the delivery of trauma care**

Chair: Olive Kobusingye, Regional Advisor, Violence & Injury Prevention, Rehabilitation, WHO Regional Office for Africa, Brazzaville

Challenges of trauma care in Africa: Charles Mock, Health Advisor, Violence and Injury Prevention and Disability, World Health Organization, Geneva

Developing Model trauma care systems: Patrick Sekimpi, Orthopaedic Surgeon, Faculty of Medicine, Makerere University, Uganda

Discussion

## Tuesday 22<sup>nd</sup> July 2008

**12:15-1:15pm**

**Plenary Session: Strategies to strengthen access to surgery at the district level**

Chair:

Meena Cherian, Professor, Department of Anaesthesia, Christian Medical College & Hospital, India and Medical Officer Department of Essential Health Technologies, World Health Organization, Geneva

*Challenges in delivering surgery at the district hospital:* Ernest Denerville, Research Fellow, Quality and Human Resources Unit, Institute of Tropical Medicine, Antwerp

*Models of strengthening surgical care at the district hospital:* Naboth Mbembati, Associate Professor of Surgery, Muhimbili University of Health and Allied Sciences, Tanzania

Discussion

**1:15-2:15pm**

**LUNCH**

### AFTERNOON SESSION

**2:15-4:15pm**

**Parallel Working Group Sessions**

*Working group 1: Strategies to strengthen trauma systems in Africa*

Moderator: Ahmed Zakariah, Director, National Ambulance Service, Ghana

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

*Working group 2: Strategies to increase access to surgery at the district hospital*

Moderator: Asad Raja, The Mohammed Bhai Professor & Chairman, Department of Surgery, Aga Khan University, Kenya

Rapporteur: Ndakengerwa Alphonse, Senior Consultant, General and Trauma surgeon, King Faysal Hospital, Kigali, Rwanda

*Working group 3: Strategies to increase international support to increase access to surgery in Africa*

Moderator: Jean Bosco Ndiokubwayo, Health Advisor, Essential Health

Technologies Unit, DSD Division, WHO Regional Office for Africa, Brazzaville

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

**4:15-4:45pm**

**TEA BREAK**

**4:45-5:45pm**

**Plenary Session: *Feedback from the working groups***

Chair:

Delanyo Dovlo, Health Systems Advisor, World Health Organization, Geneva

### EVENING SESSION

**6:30-7:30pm**

**Opening Ceremony and Cocktails**

**7:30-9:00pm**

**Dinner**

## Wednesday 23<sup>rd</sup> July 2008

### MORNING SESSION

**8:00-9:15am**

Chair:

**Plenary Session: Training strategies to increase access to surgery**

Peter Donkor, Professor, College of Health Sciences, Kwame Nkrumah University of Science and Technology, Ghana

*Training to increase access to surgery: The Niger Experience*

Assistant Secretary General, Ministry of Health, Niger

*Training to increase access to surgery: The Malawi Experience*

Peter Mwanza, Professor and Vice Chancellor, Mzuzu University, Malawi

Peter Jiskoot, Surgeon, Project Manager, Clinical Officer Training, Malawi  
Discussion

**9:15-11:00am**

**Parallel Working Group Sessions**

*Working group 4: Strategies to train physicians to perform surgical procedures*

Moderator: Cheikh Tidiane Toure, Chief of Department of General Surgery, Faculty of Medicine, of Pharmacy and Odonto-Stomatology of University Cheikh Anta DIOP and University Hospital Aristide Le DANTEC, Sénégal

*Working group 5: Strategies to train non-physicians to perform surgical procedures*

Moderator: Douglas Lungu, Hospital Director, Daeyang Luke Hospital, Malawi

Rapporteur: Gebreamlak T. Ogbaselassie, Senior Technical Adviser, Reproductive Health, Eritrea

*Working group 6: Training strategies to recast the role of surgeons*

Moderator: Charles Mkony, Dean, School of Medicine, Muhimbili University of Health and Allied Sciences, Tanzania

Rapporteur: Antonio Mujovo, General Surgeon, Central Hospital of Maputo, Mozambique

**11:00-11:30am**

**TEA BREAK**

**11:30am-12:45pm**

Chair:

**Plenary Session: *Feedback from the working groups***

Sam Kaggwa, Head of Surgery Department, Faculty of Medicine, Makerere University, Uganda

**12:45-1:45pm**

**LUNCH**

## Wednesday 23<sup>rd</sup> July 2008

### AFTERNOON SESSION

**1:45-3:15pm**

***BESG Cross Country District Hospital Research***

Chair:

Margaret Kruk, Assistant Professor, Health Management and Policy  
University of Michigan School of Public Health, USA

Panel:

Helder de Miranda, General Surgeon and Professor at the Catholic University,  
School of Medicine, Mozambique  
Naboth Mbembati, Associate Professor of Surgery, Muhimbili University of  
Health and Allied Sciences, Tanzania  
Moses Galukande, Surgeon, Faculty of Medicine, Makerere University, Uganda

**3:15-3:45pm**

**TEA BREAK**

**3:45-4:30pm**

**Parallel Working Group Sessions: *Agency support and feedback***

*Working group 7*

Moderator: Professor Ignatius Kakande, Head of Department of Surgery, Faculty  
of Medicine, National University of Rwanda

Rapporteur: Mr. Tawfik Rushdy, Programme Manager, Royal College of  
Surgeons Ireland

*Working group 8*

Moderator: Dr. Evariste LODI Okitombahe, Technical assistant, BTC project of  
Regional Health System Development in Kaolack and Fatick, Senegal

Rapporteur: Dr. Ngueumachi Pierre, Head of Surgery, Leer Hospital, South  
Sudan

**4:30-5:15pm**

**Plenary Session: *Feedback from the working groups***

Chair:

Haile Debas, Professor of Surgery, Executive Director, Global Health Sciences,  
University of California San Francisco, USA

**5:15-6:15pm**

***Next steps and Thursday's agenda***

Sam Luboga, Professor of Surgery, Faculty of Medicine, Makerere University,  
Uganda

Haile Debas, Professor of Surgery, Executive Director, Global Health Sciences,  
University of California San Francisco, USA

Meena Cherian, Professor, Department of Anaesthesia, Christian Medical  
College & Hospital, India and Medical Officer Department of Essential Health  
Technologies, World Health Organization, Geneva

**Thursday 24<sup>th</sup> July 2008**

**Networking: Research, Training and Advocacy Workshop**

**MORNING SESSION**

**8:30-9:00am**                    **Objectives of the day**  
Chair: Sarah Macfarlane, Associate Professor, Director, Program Development and Planning, Global Health Sciences, University of California San Francisco, USA

**9:00-10:00am**                **Plenary Session: *Advocacy, research and training***  
Panel: Paul Bossyns, Health Expert, Belgian Technical Cooperation, Belgium  
Carel IJsselmuiden, Professor, Director, Council on Health Research for Development, Switzerland  
Nasreen Jessani, Programme Officer, International Development Research Centre, Kenya

**10:00-10:30am**                **TEA BREAK**

**10:30-12:00pm**                **Parallel Working Group Sessions: *Advocacy, research and training***

**12:00-1:00pm**                 **LUNCH**

**AFTERNOON SESSION**

**1:00-2:15pm**                    **Plenary Session *Presentation of group work and networking ideas***

**2:15-3:15pm**                    ***Next steps and closing remarks***  
Sam Luboga, Professor of Surgery, Faculty of Medicine, Makerere University, Uganda  
Haile Debas, Professor of Surgery, Executive Director, Global Health Sciences, University of California San Francisco, USA  
Sarah Macfarlane, Associate Professor, Director, Program Development and Planning, Global Health Sciences, University of California San Francisco, USA