

**Canadian Journal
of Surgery**

**Journal canadien
de chirurgie**

Vol. 57 (3 Suppl 1) June/juin 2014

canjsurg.ca

DOI: 10.1503/cjs.007014

**The 14th Bethune Round Table
Conference on International Surgery**

**Hamilton, Ont.
June 5–8, 2014**

Abstracts

Podium presentations

1. Sustainable partnerships and local capacity building: Ukraine–Canada experience. I. Mogilevskina, F. Klimovytksiy, Y. Prudnikov. From Donetsk National Medical University, Donetsk, Ukraine

Background: Hundreds of international projects are implemented all over the world. Sustainability of such projects is always questioned. The objective of this study was to analyze landmarks of successful collaboration in global surgical issues between Ukrainian and Canadian institutions from 2006 to 2013. **Methods:** We completed a descriptive analyses of 3 international projects. **Results:** In collaboration with Ukrainian obstetrics and gynaecology associations and the Society of Obstetricians and Gynecologists of Canada, an initiative seeking to improve emergency obstetrical care using the Advances in Labour and Risk Management International Program (AIP) was conducted in Ukraine. From 2006 to 2009, 912 providers participated in 18 AIP trainings. Since project termination, 10 AIP training with 435 participants were conducted by a national team. Training is now institutionalized into the Donetsk National Medical University (DNMU) curricula. Since 2010 in collaboration between the University of Toronto, and the DNMU, the Donetsk Telesimulation Satellite Center was established. A telesimulation program has been applied to introduce the Fundamentals of Laparoscopic Surgery course, with the objective to standardize the technical skills of Ukrainian professionals. In total, 137 participants from 11 sites have completed the course. Since 2011, a collaboration between the McGill University and the DNMU to improve disaster management and trauma care has been established. A risk assessment tool geared specifically toward the European Football Championship Euro 2012 was developed. Trauma training has been conducted and the creation of a database of injury epidemiology. **Conclusion:** Sustainable partnerships is important to ensure long-term interest in an initiative either funded or not. Capacity building based on bottom-up approaches with the initiative coming from national professionals to ensure national ownership and leadership with long-term commitment is essential.

2. COSECSA, achievements and challenges in improving global surgery. P.G. Jani. From the University of Nairobi, Kenya, and the College Of Surgeons of East Central and Southern Africa (COSECSA), Arusha, Tanzania

Background: The prime aim of the College Of Surgeons of East Central and Southern Africa (COSECSA) is to provide safer surgery mainly in the rural locations across East, Central and Southern Africa. This aim has been achieved through accreditation of training institutions, trainers and examiners together with organizing various courses, seminars, workshops, e-learning programs and examinations. **Methods:** Details of COSECSA, its hospital accreditation processes, the different courses to facilitate training, including e-learning and the examinations organized will be presented. Gaps and difficulties experienced to effect all the above will be highlighted with the aim of seeking more assistance from international like-minded organizations and individuals so as to achieve the goal of the provision of safer surgery in Africa.

Results: The COSECSA spans 14 different countries across Africa. Over the last 12 years, COSECSA has had 230 candidates take examinations and graduated 147 members (surgical registrars) and 102 fellows (consultants), in 5 specialties. Graduated members of the College perform on average over 200 operations per year covering basic and emergency surgeries, while Fellows perform most other surgical procedures in much needed rural locations. Over 500 training courses have been organized for our members. This includes more than 40 train-the-trainer courses for faculty, and approximately 290 basic surgical skills, basic surgical sciences, trauma and critical care courses for candidate members. Other courses include endoscopy, laparoscopy, leadership, and management and ethics courses to provide safer surgery. Four examination and credentialing seminars have been organized since 2010 with over 70 examiners contributing to improve training, examinations and eventually provision of safer surgery in the region. **Conclusion:** The COSECSA is a unique and incomparable regional surgical accrediting and training college, which aims to improve global outcomes through safer surgery especially in the much needed rural locations of Africa.

3. The VCU international trauma system development program in Central and South America. M. Aboutanos,* S. Jayaraman,* L.V. Mata,* F. Mora,† C.A. Ordóñez,* L.F. Pino,§ M. Quiodettis,¶ C.H. Morales. From the *Virginia Commonwealth University Medical Center, Richmond, Va., †Cinterandes, International Trauma System Development Program, Ecuador, ‡Universidad del Valle, Fundacion Valle del Lili, Cali, Colombia, §Universidad del Valle, Cali, Colombia, ¶Hospital Santo Tomas, Panama City, Panama, and the **Universidad de Antioquia, Hospital Universitario San Vicente de Paul, Medellin, Colombia**

Background: Injury is a major cause of death and disability in low- and middle-income countries (LMICs) where there is a paucity of injury data. We aimed to create information and communication infrastructure to evaluate injury patterns, identify areas for improvement and measure effectiveness of interventions at every level of health care facilities in LMICs. **Methods:** We created an electronic trauma database in 3 languages (English, Spanish and Portuguese) with the ability to link hospital systems at a local, regional and national level. Access is through either a secure online website or software installation where internet is limited. The database consists of 50 essential elements, expandable up to 250 elements, per record, using the ICD-10 system and Injury Severity Scores. It can generate fixed or modifiable reports and import/export data for statistical analysis. We implemented this system in 3 countries as a pilot program for clinicians, administrators and data entry personnel, with specific training in basic injury surveillance, use of a standardized emergency department form and a corresponding electronic trauma registry, periodic auditing and quality improvement. **Results:** A total of 28 698 patients have been entered across 9 sites: 6911 in 5 hospitals of Ecuador; 10 623 at Fundacion Valle Lili and 9501 at Hospital Universitario del Valle in Cali, Colombia; 671 at San Vicente de Paul hospitals in Medellin; and 992 at Santo Tomas Hospital in Panama. **Conclusion:** Governments, especially in LMICs, practise with significant resource constraints. Systematic injury surveillance can help track the burden of injury, identify opportunities

for intervention, and allow monitoring, evaluation and auditing of the quality of trauma care.

4. Establishing a contextually appropriate laparoscopic program in resource restricted environments: experience in Botswana. A.G. Bedada,* M. Hsiao,† B. Bakanisi,*† J. Motsumi,* G. Azzie.† From the *Princess Marina Hospital, Gaborone, Botswana, and the †Division of General and Thoracic Surgery, Hospital for Sick Children, Toronto, Ont.

Background: Differences in opinion still exist as to the feasibility of establishing laparoscopic programs in resource-restricted environments. Even when successfully inaugurated, a program's long-term sustainability is questionable. We review a multifaceted approach that has been the mainstay of this evolving collaborative partnership and highlight those factors that have helped or hindered the program. **Methods:** From 2006 to 2012, a training program consisting of didactic teaching, telesimulation, Fundamentals of Laparoscopic Surgery certification, yearly workshops, and ongoing mentorship was established. We assessed the clinical outcomes of patients who underwent laparoscopic cholecystectomy, and open cholecystectomy in the same study period, and measured the indicators of technical independence and program sustainability. **Results:** Twelve surgeons participated in the training program and performed 270 of 288 laparoscopic cholecystectomies. Ninety-six open cases were performed by these and 5 additional surgeons. Fifteen laparoscopic cases were converted (5.2%). The median postoperative length of hospital stay was significantly shorter in the laparoscopic group compared with the open group (1 v. 7 d, $p < 0.001$). As the training program progressed, the proportion of laparoscopic cases completed without presence of expatriate surgeons increased significantly ($p = 0.001$). **Conclusion:** A contextually appropriate long-term partnership may assist with laparoscopic upskilling of colleagues in low- and middle-income countries. This type of collaboration promotes local ownership and may translate into better patient outcomes. Factors threatening the sustainability of such programs may differ from those in high-income countries and should be identified and addressed as possible.

5. Collaborative care to reduce maternal deaths from postpartum hemorrhage. O. Ajuzieogu,* J. Achi,* A. Amucheazi,* C. Ikeani.† From the *University of Nigeria Teaching Hospital, Enugu, Nigeria, and the †Chukwuasokam Maternity and Hospital, Enugu, Nigeria

Background: Obstetric emergencies are one of the leading causes of maternal deaths in Nigeria. In 2003, it was reported as 1 per 1000 in University of Nigeria Teaching Hospital, Enugu. Postpartum hemorrhage (PPH) has been identified as the single most important cause of these deaths. While there are social and economic issues involved in PPH, emergency surgical care and blood transfusion were noted to be very vital for survival of patients. A collaborative group was thus assembled in our hospital 4 years ago to manage the surgical aspects of PPH. Our primary aim was to reduce avoidable maternal deaths from primary PPH in the perioperative period. An audit of our result is presented. **Methods:** This was an audit study comparing the outcome 18 months before, (period A) and after (period B), the collaboration.

All case notes of patients from the obstetric unit were retrospectively collected and reviewed for response time, interdisciplinary coordination, and outcomes. **Results:** A total of 2948 women presented over the 36-month period. Unavailability of blood in the blood bank and anesthetic delays were documented as causes of avoidable death in the theatre during period A. In period B, anesthesia delay was minimal and the blood bank response time rating increased from 2 out of 10 to 8 out of 10. Mortality in period A was 3.25% (39) and 0.52% (9) in period B. **Conclusion:** While the causes of postpartum hemorrhage are varied and include socioeconomic factors beyond the control of the clinician, the mortality from it can be improved by having appropriate collaboration between departments involved in the care of the patient.

6. Building a sustainable collaboration and an interprofessional team in pediatric surgical care: an interim report. A. Nasir,* L. Abdur-Rahman,* O. Oyedepo,* L. Arowona,* D. Alonge,* Z. Rufai,* J. Adeniran,* M. Abraham,† A. Olatinwo.* From the *University of Ilorin Teaching Hospital, Ilorin, Nigeria, and the †Amrita Institute of Medical Sciences, Kochi, India

Background: Access to pediatric surgical care in many sub-Saharan African countries is strongly limited. This is a report of a partnership between Amrita Institute of Medical Sciences, India (AMRITA) and the Paediatric Surgery Division of the Department of Surgery of University of Ilorin Teaching Hospital, Nigeria (UITH), with the goal to improve pediatric surgical standard of care through the formation of an interprofessional team. **Methods:** What started as an informal relationship in 2008 was formalized in 2009 with a memorandum of understanding and consolidated in 2010. Since 2008, a team composed of 2 pediatric surgeons, a pediatric surgical trainee, a pediatric anesthetist, and 3 pediatric perioperative nurses visited AMRITA for training, and 1 pediatric surgeon from AMRITA visited UITH in 2010. Records of the hospital were used to extract relevant data on patients managed by the pediatric surgery team over a 5-year period (2008–2012). Data for the 2008 to 2009 preconsolidated period was compared with the 2011 to 2012 postconsolidated period. **Results:** The interprofessional team and partnership have resulted in an improved working environment, a wider range of care, commencement of laparoscopic practice and co-authorship of 8 journal articles. The total number of patients admitted increased from 408 in 2008 to 668 in 2012 (63.7% increase). The mortality rate dropped from 9.6% in 2008 to 3.4% in 2012. There was a significant increase in the mean number of admissions in the postconsolidated period compared with the preconsolidated period ($p = 0.026$). **Conclusion:** The formations of a local interprofessional team and an international partnership have helped expand our capacity and increase stakeholder collaboration in surgery and perioperative care of children.

7. Women in surgery: factors hindering women from being surgeons in Zimbabwe. F. Muchemwa. From the University of Zimbabwe, Harare, Zimbabwe

Background: There is a disproportionate number of male to female surgeons in Zimbabwe. Factors determining the career choice of female doctors have not been documented. We embarked on this project to determine factors hindering women

in Zimbabwe from choosing surgery as a specialty of choice. **Methods:** A questionnaire was administered anonymously to a convenience sample of 300 doctors and medical students. **Results:** One hundred and fifty-nine questionnaires were assessed, with a slight male predominance. Forty percent of respondents selected surgery as their specialty of choice, of which only 30% were women. Choice of postgraduate specialty was attributed to personal interest; however, respondents selecting other specialties reiterated that their surgical rotations were tough and male dominated, making it an unwelcome environment for women. The lack of female role models was noted to be a deterrent. In addition, female doctors cited that the learning environment in surgery was harsh. Disruption of family life was only cited by few respondents. Women who selected surgery responded that it was dynamic, exciting and a good challenge. However, they believe that other women would not choose it because it was physically demanding. Males selecting surgery encouraged women to join the specialty, however they cited experiencing inconveniences while working with pregnant colleagues. **Conclusion:** Female surgeons comprise 8% of surgeons practising in Zimbabwe. From this study, achieving a gender balance may become a possibility: first, if more female surgeons were recruited to act as role models, second, if surgical training was modified to improve trainer-trainee interactions and third, if working hours were modified.

8. Inadequate Hepatitis B vaccination among surgeons practising in Ethiopia — Are we playing with fire? A cross-sectional study. A. Bekele, A. Tadesse. From Addis Ababa University, Addis Ababa, Ethiopia

Background: Hepatitis B virus (HBV) is a well-recognized but under emphasized occupational health hazard in Ethiopia. The objective was to study the vaccination status against Hepatitis B among surgeons practising in Ethiopia, and the reasons for non-vaccination or poor adherence to vaccinations. **Methods:** A structured questionnaire was developed using the Qualtrics Survey free software tool, and sent to 120 surgeons and surgical residents practising in 8 hospitals. Ninety-eight of the online surveys were completed. The main outcome measures were vaccination status, recent occupational accidents, and reasons for nonvaccination. **Results:** Ninety-four (94%) of the respondents were male. Only 24 (23.4%) of respondents were vaccinated against HBV, with 18 (75%) receiving the whole three doses. The main reasons for non-vaccination are lack of knowledge about the availability of the vaccine in the country, lack of time, and negligence. Differences in age, sex, duration of practice, field of specialty, and respondent's institution between vaccinated and unvaccinated were not significant ($p > 0.05$). Ninety-two (93.8%) believe the HBV vaccination is very useful for the surgeon. A total of 86.4% of the respondents claim they wear double gloves during over 50% their operations, and 76 (77.5%) had sustained a sharps injury over the past year. Thirteen (13.25%) of these had taken antiretroviral treatment prophylaxis in the past. There was a statistically significant association between needle stick injury and the number of gloves worn during procedures ($p = 0.04$). **Conclusion:** Despite a strong belief that HBV vaccine is useful to the surgeon, most surgeons are still not vaccinated. As occupational injuries are very common, HBV vaccination should be a prerequisite for working in the theatre, hence putting the surgeons and surgical patients at reduced risk.

9. Global met need for emergency obstetric care: a meta-analysis. H. Holmer,^{*} R. Gillies,^{*} J.G. Meara,^{*} J. Liljestrand,[†] K. Oyerinde,[‡] L. Hagander,[§] From ^{*}Harvard Medical School, Boston, Mass., [†]URC-BHS, Cambodia, [‡]Columbia University, New York, NY, and [§]Lund University, Lund, Sweden

Background: Of the 287 000 yearly maternal deaths, 99% happen in developing countries and the majority would be treatable with timely access to appropriate emergency obstetric care (EmOC). Met need for EmOC measures the proportion of women with complications of pregnancy or childbirth that actually receive treatment. The purpose of this study was to estimate the global met need for EmOC and to examine the correlation between met need for EmOC, maternal mortality ratio (MMR) and other national indicators. **Methods:** Systematic review was performed and data were extracted from 55 studies representing 49 countries. World Bank data were used for simple and multiple linear regression. **Results:** Global met need for EmOC was 45% (IQR 28%–57%), with significant disparity between low- (21% [12%–31%]), middle- (32% [15%–56%]), and high-income countries (99% [99%–99%]) ($p = 0.041$). This corresponds to 11.4 million (8.8–14.8 million) untreated complications yearly, and 951 million (645–1174 million) women of fertile age without access to EmOC. We found inverse correlation between met need for EmOC and MMR ($R^2 = 0.18$, $r = -0.424$, $p < 0.001$). Met need for EmOC was significantly correlated with the proportion of births attended by skilled birth attendants ($\beta = 0.53$ [95% CI 0.41–0.65], $p < 0.001$) **Conclusion:** The results suggest a considerable inadequacy in global met need for EmOC, with vast disparities between developed and developing countries. Improved access to EmOC was associated with lower MMR and more births attended by skilled staff, supporting previous evidence in favour of a combination of skilled birth attendance and EmOC, including surgery. Met need for EmOC remains a powerful indicator to the response to high MMR.

10. Improving service-based obstetric care to reduce maternal mortalities. R.G. Ddungu,^{*} R. Namuddu,[†] I. Nakonde,[‡] R. Mukasa,[§] From the ^{*}Millennium Health Research Alliance, Uganda, [†]Gressland International Agency, Uganda, [‡]Regional Community Health Support Initiative, Uganda, and [§]Makerere University, Kampala, Uganda

Background: In sub-Saharan Africa, maternal and perinatal mortality and morbidity are major problems. Service availability and quality of care in health facilities are heterogeneous and most often inadequate. This study aimed at exploring and describing health workers' perceptions of service-based maternal death reviews, and to identify barriers to and facilitators of the implementation of this approach in pilot health facilities of Uganda. **Methods:** This study was conducted in key referral hospitals in Uganda with different characteristics. Data was collected from focus group discussions, participant observations, documentation review and key informant interviews. **Results:** Health professionals and service administrators were receptive and adhered relatively well to the process and the results of the audits, although some considered the situation destabilizing or even threatening. The main barriers to the implementation of maternal deaths

reviews were: 1) bad quality of information in medical files; 2) nonparticipation of the head of department in the audit meetings; and 3) lack of feedback to the staff who did not attend the audit meetings. The main facilitators were: 1) high level of professional qualifications or experience of the data collector; 2) involvement of the head of the maternity unit, acting as a moderator during the audit meetings; and 3) participation of managers in the audit session to plan appropriate and realistic actions to prevent other maternal deaths. **Conclusion:** The identification of the barriers to and the facilitators of the implementation of maternal death reviews is an essential step for the future adaptation of this method in countries with few resources.

11. Emergency and Essential Surgical Care capacity-building through skills training: evidence from Meghalaya, India. K.I. Singh, D. Marbaniang. From the Government of Meghalaya, India

Background: Access to life-saving and disability preventing surgical care is limited in low- and middle-income countries, particularly in rural areas. Meghalaya has the lowest number of surgical care specialists among the Indian states. The Government of Meghalaya has taken an initiative to identify and address areas to improve surgical capacity, including obstetrics, trauma, and anesthesia services. **Methods:** The World Health Organization Tool for Situational Analysis to Assess Emergency and Essential Surgical Care (EESC) was used at 21 primary health centres (PHCs), 26 community health centres (CHCs), and 8 tertiary hospitals (district and civil hospitals). The survey provides information on infrastructure, availability of guidelines at point of care, human resources, access to surgical procedures, reasons for referral, and availability of functioning equipment. **Results:** The PHCs have the lowest surgical care capacity in terms of population served, facility infrastructure, and skilled procedures performed. The PHCs surveyed were not expected to have specialists (surgeons, anesthesiologists or obstetricians/gynecologists), therefore they referred due to lack of supplies and drugs. CHCs and tertiary hospitals also referred, mainly due to lack of skills. Most essential equipment and infrastructure were present across all 3 types of health facilities; however, most facilities were deficient in guidelines at the point of care to manage emergencies, anesthesia, surgical care and pain relief. **Conclusion:** The shortage in surgical capacity in Meghalaya derives predominantly from lack of supplies and drugs at PHCs, and lack of skills to perform procedures, particularly at CHCs and even tertiary hospitals. This survey was undertaken to assess gaps in surgical capacities, as well as provide information on how to strengthen district surgical services. Through the establishment of a technical working group on EESC, this survey may assist in evidence-based planning for the next steps to increase training opportunities for health providers of anesthesia and surgical care, particularly general doctors and other nonspecialists.

12. Evaluation of the trauma quality indicators using trauma registry in low resource settings. J.C.A. Ingabire,* J.C. Byiringiro,* J.F. Calland,‡ R.T. Petrose,‡ S. Jayaraman,† G. Ntakiyiruta.§ From the *University of Rwanda, Surgery Department, Butare, Rwanda, ‡University of Virginia, Charlottesville, Va., †Virginia Commonwealth University Medical Center, Richmond, Va., and the

§University of Rwanda, School of Medicine, Butare, Rwanda

Background: Injury is a major cause of death in limited resource settings. This study aimed to measure the quality of trauma care at the largest referral hospitals in Kigali (UTH-Kigali) and Butare (UTH-Butare) against the international trauma care standards. **Methods:** A retrospective cross-sectional study was conducted using injury registry data from March 2011 to October 2013 at UTH-Kigali and UTH-Butare. Trauma Audit & Research Network (TARN) standards of trauma care and Kampala Trauma Score were used. Trauma quality indicators (TQIs) were for head, cardiothoracic, abdominal, spine and orthopedic injuries. **Results:** Of 6713 injuries received at UTH-Kigali and UTH-Butare, 52.7% were fractures, 35.1% were head injuries, and chest trauma represented 5.6%. For the 2361 head injuries, only 2.79% had a cervical collar. Of the 1426 with a Glasgow Coma Scale score of under 14, only 11% had head computed tomography scans in mean time of 24 hours and the mortality rate was 13.9%. Thirty-six percent of 377 chest traumas had hemo/pneumothorax, but only 50% had a chest drain. The mean time to chest X-ray was 3 hours with a mortality rate of 4.2%. Spine injuries numbered 364, and the mortality rate was 7%. Only 49% of the 233 abdominal trauma injuries were operated within 24 hours. Of the 3539 orthopedic injuries 3.4% were pelvic fractures and only 5 cases were fixed with a mean hospital stay of 36 days. **Conclusion:** Trauma registry data are very useful in evaluation of TQIs. Compared with TARN standards our TQIs are still very low and further improvements are needed in order to decrease morbidity and mortality of trauma patients.

13. Evaluation of prehospital care: Does Bolivia need a trauma first responders course? M. Swaroop,* S. Schuetz,* N. Iss,* M. Laguna,† M. Shapiro,* J.L. Gallardo.‡ From *Northwestern University, Evanston, Ill., †Bomberos Antofagasta, Bolivia, and ‡La Caja, Bolivia

Background: Bolivia's prehospital system, primarily fire-based, is underdeveloped and unorganized. We sought to justify the need to develop and implement a trauma first responder's course (TFRC) in Bolivia by evaluating the burden of trauma and the capacity of the existing system to respond to traumatic events in the department of Potosi. **Methods:** Data describing Potosi's demographics and healthcare capacity was obtained from the Ministry of Health's Diagnostic Evaluation for Potosi. Analysis of indicators of trauma burden was based on national and department-specific firefighter statistics spanning a 16-month period as well as a 1.5-month review of the national newspaper, La Razon. **Results:** The department of Potosi covers 118 218 km² with an estimated population of 788 406; 65% of the population is 10–60 years old. The department has 471 health facilities with approximately 4.26 physicians per 10 000 persons. Twelve firefighters, located in the department's capital city, attended to 1254 prehospital cases, consisting of 738 traumatic accidents, 459 medical emergencies, and 57 unspecified events between January 2012 and April 2013. Nationally, there were 109 reported fatalities and 342 nonfatal injuries due to mass-transit road traffic accidents between Jan. 1 and Feb. 14, 2013. Of these, 28 fatalities and over 85 injuries occurred in Potosi. **Conclusion:** The burden of trauma in Bolivia and the department of Potosi is great, and there

are limited trauma support capabilities. A context-appropriate pre-hospital TFRC targeted at local firefighters and laypersons is essential to augment Bolivia's and Potosi's capacity to provide trauma care. The course will need to be validated and its effectiveness evaluated prospectively.

14. Timing of surgery and functional outcomes in patients presenting with ankle fractures to a teaching hospital in a developing country. J. Ogundele, A. Ifesanya. From the University College Hospital, Ibadan, Nigeria

Background: Operative fixation of ankle fractures is becoming popular in developing countries. The concern however is the outcome of care. We have employed the Association of Osteosynthesis methods of internal fixation in our centre for the last 18 years. The objective was to evaluate the timing of surgery and the functional outcomes of open reduction and internal fixation (ORIF) of fractures of the ankle in our hospital. **Methods:** All ORIF of fractures of the ankle at the University College Hospital, in Ibadan between March 2010 and December 2012 were recruited into the study. The indications for surgery, techniques of fixation, time interval between injury and presentation, as well as outcome measures such as time to union, complications and functional outcomes were evaluated. **Results:** Seventy patients who had ORIF of ankle fractures were studied. Twenty-one (30%) were open fractures while 49 (70%) were closed. Sixty (85.7%) patients presented within the first week of injury, 4 (5.7%) after 4 weeks, 4 (5.7%) after 6 weeks and 2 (2.9%) after 52 weeks. Time to union averaged 12.6 ± 4.1 weeks. Complications included wound infection (14.3%), wound dehiscence with exposed implants (2.9%), malunion (8.6%) and nonunion (5.7%). Good to excellent functional outcomes were achieved in 77.1% of the patients.

Conclusion: Open reduction and internal fixation is a viable option in the treatment of ankle fractures although early presentation and timely surgery is desirable to improve functional outcomes.

15. A 1-year review of surgical complications of diabetes in Soroti Regional Referral Hospital, Uganda. M.M. Ajiko. From the Soroti Regional Referral Hospital (SRRH), Soroti, Uganda

Background Diabetes and its complications are epidemic in Africa. The economic impact and mortality of diabetes will surpass the ravages of HIV and AIDS in the near future. This study describes the impact of diabetes in the Teso region; it describes the surgical complications, and reports on the regional and national efforts to control the diabetes epidemic. **Methods:** A cross-sectional study of 270 consenting adult patients with diabetic foot sepsis. Demographic and clinical data was recorded by doctors and nurses, using a validated questionnaire, before patient discharge. Structured questionnaires complete by 38 doctors, interns and nurses rotating through surgical wards assessed knowledge of diabetic management. Investigation into Ugandan National Policy and guidelines on the management of diabetes was undertaken. **Results:** A total of 2113 patients received treatment from Soroti Regional Referral Hospital. Surgical complications were common among inpatients with gangrene, leading to below-the-knee amputations (18.5%), above-the-knee amputations (20%), disarticulation (25%), and chronic ulcers in (26.5%).

Mortality was 10% among inpatients. Foot complications were the main cause of prolonged hospital stay (average length of stay 14 d). Patients experienced depression and suicidal tendencies following amputation. Patients with limb amputations had various expectations from the government and international partners. Provider interviews revealed a lack of training. Uganda has not created national diabetes management guidelines. **Conclusion:** Surgical complications of diabetes impose a significant clinical load and exact an inordinate toll on patients and families in rural Teso region of Uganda. Many patients require amputations due to gangrene, limiting their future function and lifespan. Providers and families alike have limited knowledge of diabetes. Improved community education on preventive measures and foot care is required. National Best Practice Treatment Guidelines are urgently needed. A national strategy to improve care and build capacity will need support and funding through development partnerships.

16. Effect of surgical safety checklist implementation on culture of patient safety in Rwanda. C. Bush,* E. Riviello,† J. Irakiza,‡ J.P. Mvukiyehe,‡ R. Maine,* W.C. Kim,† F. Manirakiza,§ S. Reshamwalla,¶ T. Mwumvaneza, P. Kyamanaywa,§ G. Ntakiyiruta,§ W. Kiviri,** S. Finlayson,† W. Berry,†† T. Twagirumugabe,§ From the *Program in Global Surgery and Social Change, Harvard Medical School, Boston, Mass., †Harvard Medical School, Boston, Mass., ‡National University of Rwanda, Butare, Rwanda, §University of Rwanda, School of Medicine, Butare, Rwanda, ¶Lifebox, UK, **Centre Hospitalier Universitaire de Kigali, Kigali, Rwanda, and the ††Harvard School of Public Health, Boston, Mass.**

Background: Studies have documented the effects a surgical safety checklist has on surgical patient care in developing countries. One such checklist was implemented at Rwanda Military Hospital and Kibagabaga District Hospital in Kigali, Rwanda, between December 2012 and December 2013. Operating theatre staff was surveyed before and after checklist implementation to gauge the effect the checklist has on perceptions of patient safety. The study aims to show that a surgical safety checklist improves patient safety culture in developing countries. **Method:** Nurses, anesthetists, and surgeons were given surveys consisting of 17 previously validated Likert Scale patient safety culture questions before and after implementation of the surgical safety checklist. Answers were transcribed into Microsoft Excel. Responses were analyzed for percent change in overall mean score. **Results:** A total of 51 preimplementation surveys and 77 postimplementation surveys were completed. Among all respondents there was a 13.03% increase in the mean score, which correlates with safer practices. The largest increase in mean score was among the anesthetists, who increased by 17.34%. The item with the largest increase in positive response was "I would feel safe being treated here as a patient," which increased by 19.17%. No survey item showed a decreased mean response. **Conclusion:** Implementation of a surgical safety checklist can positively affect perception of patient safety culture. In limited resource settings it is important to find low-cost interventions that have widespread effects on patient care. A surgical safety checklist has potential not only to decrease complications and reduce errors, but to improve the culture of patient safety as well.

17. Reducing critical incidents in neonatal anesthesia in a low resource setting. *O. Ajuzieogu, A. Amucheazi, J. Achi, H. Ezike. From the University of Nigeria Teaching Hospital, Enugu, Nigeria*

Background: Neonatal anesthesia in Enugu, Nigeria is considered high-risk procedure. This is due to shortage of manpower and infrastructure. Most hospitals are equipped for adult surgery and anesthesia. The result is that neonates are frequently not well monitored and the outcome is often less than desirable. It was on this premise that we sought to modify and adapt available infrastructure to suit our neonatal needs for anesthesia. **Methods:** This was a prospective audit study of critical incidents reported when adult monitors and equipment were used for neonates in the previous 6 month period (group A), compared with incidents when monitors and equipment modified for the neonate only were used 6 months after (group B). The monitors studied were pulse oximeter probe, noninvasive blood pressure cuff, warmer, intubating stylet, and breathing circuit. Data was collected for incidence of failed intubation, monitoring errors and outcome defined as satisfactory immediate postoperative state. **Results:** Two hundred and forty neonatal anesthetics were administered over the 6-month period, 110 in group A and 130 in group B. Group A recorded 16.36% (18) incidence of failed intubation as against 6.15% (8) in group B. The monitoring errors were 82 (74.55%) and 201 (5.39%), respectively. The anesthetic outcome was satisfactory in 73 (66.36%) of group A and 112 (86.15%) in group B. **Conclusion:** The use of adult equipment and monitors for neonatal anesthesia is associated with increased incidence of critical incidents. In a low resource setting, effort should be made to adapt available resources and modify them for neonates to improve outcome.

18. Ultrasound guided regional anesthesia — a multicentre feasibility trial for use in low resource settings. *K.L. Malemo,^{*} M. Salmon,[†] C. Salmon,[‡] M.M. Mutendi,[§] T. Reynolds.^{†§} From the *HEAL Hospital, Goma, Democratic Republic of Congo, †University of California San Francisco, San Francisco, Calif., ‡Western New England University, Springfield, Mass., and the §Muhimbili National Hospital, Dar es Salaam, Tanzania*

Background: Ultrasound-guided regional anesthesia (USRA) is a safe and simple tool used to provide site-specific, pain relief for injuries. Despite having been shown to be both feasible and with perceived positive utility in a conflict area USRA remains in limited usage in low resource settings, where 80% of injuries receive inadequate or no pain treatment. **Methods:** This multicentre study evaluated a USRA course in sub-Saharan Africa. A total of 41 physicians or orthopedic officers from: HEAL Hospital (HEAL), Goma, Democratic Republic of Congo (DRC); Black Lion Hospital (BLH), Addis Ababa, Ethiopia; and General Hospital Ministere de la Sante (KIN), Kindu, DRC participated. The course included 3 didactic sessions, each with lecture, procedure simulation, live model scanning and clinical scanning with course faculty. Post-training evaluation measured participant satisfaction and ability to perform USRA. We evaluated each USRA block performed in posttraining clinical practice recording: (A) indications and type of blocks; (B) possible alternate analgesia strategy had a block not been available; and (C) change in patients' self-

reported pain level. **Results:** Thirty-two of 41 course participants were "very satisfied"; 9 of 41 were "satisfied" with the course. Thirty-seven of 41 successfully perform blocks post-training; 3 physicians in Kindu were unable to utilize USRA due to insufficient patient participation. A total of 1160 USRA were completed (929 HEAL, 214 BLH and 19 KIN); 452 were popliteal, 374 femoral and, 380 forearm on 807 patients. Indications included digit and limb amputations, wounds, fractures, tendon rupture, fasciotomy, gunshot wounds, and dressing changes. No complications have been reported at any site. The average change in patients' reported pain score was 7.4 on a 0–10 scale. **Conclusion:** Physicians and orthopedic officers in low-resource settings are able to successfully perform USRA after a short training course. Course satisfaction scored well. Patients experienced reductions in pain level with USRA. Ultrasound guided regional anesthesiaUSRA as a feasible and effective method of emergent pain relief in a low-resource setting.

19. Understanding the burden of surgical congenital anomalies in Kenya: a mixed-methods approach. *J. Pemberton, C. Frankfurter, B.H. Cameron, D. Poenaru. From the McMaster Pediatric Surgery Research Collaborative, Department of Surgery, McMaster University, Hamilton, Ont.*

Background: Surgical congenital anomalies (SCAs) are significant contributors to pediatric disability. The multidimensional burden of SCAs is a major public health problem that is not appreciably addressed by current health systems. This study aims to examine perceptions of caregivers and health professionals toward SCAs in Kenya to inform social policy and public health program development. **Methods:** A cross-sectional mixed methods triangulation study of neurologic, craniofacial, urological and gastrointestinal surgical conditions was conducted in a community and hospital setting in Nairobi and Kijabe, Kenya in 2012. Qualitative focus groups were held with health care professionals ($n = 46$) and community caregivers ($n = 32$). Quantitative data was collected through a 5-point Likert survey (5 = strongly agree) across 6 disability domains. All data was descriptively analyzed. **Results:** Quantitative results indicated that neurologic conditions were the highest stigmatized condition (mean 4.3 [1.1]), and gastrointestinal defects highly impacted socialization and ability to go to school (mean 4.4 [1.0] and 4.1 [1.3]). Kenyan children's experience of disability included stigmatizing perceptions impairing community integration, low self-esteem, and limited schooling and employment opportunities. Caregivers reported abandonment by community and exclusion from social services as the significant barriers affecting their quality of life. **Conclusion:** The social determinants of SCA burden, particularly community stigma and discrimination significantly contribute to the disability of SCAs. This study suggests a need for rural and urban health systems to link knowledge of social and cultural influences to the delivery of local health services and public health program planning.

20. Pediatric surgery outcomes in low- and middle-income African countries: a scoping review of the recent literature. *M. Livingston,^{*} J. D'Cruz,[†] J. Pemberton,[†] D. Ozgediz,[‡] D. Poenaru.[†] From *Clinician Investigator Program, McMaster University, Hamilton, Ont., †McMaster Pediatric*

Surgery Research Collaborative, McMaster University, Hamilton, Ont., and the †Yale-New Haven Children's Hospital, New Haven, Conn.

Background: The quality of surgical care for children in low- and middle-income countries (LMICs) in Africa is uncertain. The purpose of this study was to describe the recent pediatric surgery literature from Africa and recommend areas for future research. **Methods:** We completed a scoping review of databases, grey literature, and conference proceedings. We included all studies that were conducted in African LMICs that reported outcomes following major surgical procedures, included conditions within the domain of pediatric general surgery, and were published between 2007 and 2012. Title and abstract screening and data abstraction were completed independently in duplicate. Differences were resolved by a third investigator with international surgery experience. **Results:** Out of 2085 titles and abstracts, 292 were selected for textual review and 109 were included in the final analysis. Fifty-eight percent of these studies were conducted in either Nigeria (47%) or Egypt (11%). Only 15 of the 44 (34%) African LMICs reported at least 1 study during the 5-year period. The most common conditions studied were anorectal malformations (12%), Hirschsprung's disease (10%), typhoid ileal perforation (9%), and hydrocephalus (9%). The most common outcomes reported were mortality (62%), and wound infection (32%). Two of the studies (2%) were randomized controlled trials but the remainder were observational. **Conclusion:** The majority of African studies in pediatric surgery have been conducted in larger and relatively affluent countries. There is a paucity of experimental research and future efforts should be focused on establishing clinical trials, using comprehensive outcome measures, and studying other prevalent and morbid surgical conditions.

**21. Providing more than health care: the dynamics of humanitarian surgery efforts on the local microeconomy.
E. Nagengast,* E. Caterson,† W. Magee,‡ K. Hatcher,‡ M. Ramos,* A. Campbell.‡ From the *Program in Global Surgery and Social Change, Harvard Medical School, Boston, Mass., †Brigham and Women's Hospital, Boston, Mass., and ‡Operation Smile, Norfolk, Va.**

Background: Humanitarian cleft surgery has long been provided by provider teams from resource-rich countries travelling for short-term missions to resource-poor countries. After identifying an area of durable unmet need through surgical missions, Operation Smile constructed a permanent centre for cleft care in Northeast India. The Operation Smile Guwahati Comprehensive Cleft Care Center (GCCCC) utilizes a high volume, subspecialized institution to provide safe, quality, comprehensive, and cost-effective cleft care to a highly vulnerable patient population in Assam, India. The purpose of this study was to profile the expenses of several cleft missions carried out in Assam and to compare these to the expenditures with the permanent cleft care centre. **Methods:** We reviewed financial data from 4 Operation Smile missions in Assam between December 2009 and February 2011 and from the GCCCC for the 2012 to 2013 fiscal year. Expenses from the 2 models were categorized and compared. **Results:** In the studied period, 33% of the mission expenses were spent locally compared with 94% of those of the centre.

The largest expenses in the mission model were air travel (48.8%) and hotel expenses (21.6%) for the team, whereas salaries (46.3%) and infrastructure costs (19.8%) made up the largest fractions of expenses in the centre model. **Conclusion:** The evolution from mission-based care to a specialty hospital model in Guwahati incorporated a transition from vertical inputs to investments in infrastructure and human capital to create a sustainable, local care delivery system.

22. Low-fidelity simulation to teach anaesthetists' non-technical skills (ANTS) in Rwanda. T. Skelton,* I. Nshimiyumuremyi,† P. Livingston,‡ L. Zolpys,‡ C. Mukwesi,† B. Uwineza.† From the *University of Toronto, Toronto, Ont., †National University of Rwanda, Butare, Rwanda and ‡Dalhousie University, Halifax, NS

Background: This pilot study investigates whether low-fidelity instructor-driven simulation can provide effective teaching of anaesthetists' nontechnical skills (ANTS) in a developing world context. Anaesthesia is difficult to practise safely in the developing world where there are severe shortages of personnel, drugs, equipment and training. Nontechnical skills are critical in an environment with major clinical demands, few mentors, and scarce resources. Fostering communication skills among health care professionals is critical for patient safety. **Methods:** Study participants were anesthesia technicians and residents working at Centre Hospitalier Universitaire, Kigali hospital, a tertiary referral and teaching hospital in Rwanda. The study took place between July 2012 and January 2013. Baseline observations were made of 20 anesthesia providers during cesarean sections to assess nontechnical skills using the established ANTS framework. After the first observation participants were randomized to either the control or intervention group. The intervention group underwent training of ANTS using low-fidelity instructor-driven simulation with debriefing. All 20 participants were then observed again. **Results:** The primary outcome was the overall ANTS score out of 16. Median ANTS score of the simulation group was 13.5 (range 11, 16) and that of the control group 8 (range 8, 9) and was statistically significant at $p = 0.0016$. Simulation participants showed statistically significant improvement in both subcategories and in the overall ANTS score compared with ANTS score before simulation exposure. **Conclusion:** Rwandan anesthesia providers show an improvement in their non-technical skills in the operating room environment with as little as 1 teaching session using low-fidelity instructor-driven simulation with debriefing.

23. Pulse oximeter distribution, a journey to anesthesia safety in the developing world: case of Rwanda. E. Nsereko,* F. Evans.† From the *University of Rwanda, Butare, Rwanda, and †Boston Children's Hospital, Boston, Mass.

Background: A pulse oximeter is only the size of a mobile phone, yet it has become an invaluable medical device in the operating room. This small piece of equipment contributes to safer anesthesia and surgery by noninvasively measuring a patient's oxygen level in the bloodstream and alerting the anesthesia provider when this level is decreasing to concerning levels. Unfortunately, it has been estimated that 70 000 of the

world's operating rooms are not equipped with this simple device. Situation in Rwanda: Prior to the Lifebox project, 14 out of 44 district hospitals in Rwanda reported a shortage or not having a single pulse oximeter. Seventy percent of operating rooms in Rwanda were not equipped with this critical piece of equipment. **Methods:** Through the generous efforts of the Canadian Anesthesiologists' Society, 250 Lifebox pulse oximeters (Lifebox Foundation, UK) were donated to Rwanda in an attempt to fill the pulse oximeter gap. The final challenge was not only delivering the Lifebox pulse oximeters to the 45 district hospitals, but also providing education in the proper use of this device. **Results:** The first phase of Lifebox pulse oximeter distribution to 20 of the 46 district hospitals was accomplished in January 2013 during the SAFE Obstetrical Anesthesia Course. A small team of "Lifebox stewards" accomplished the second phase of distribution to the remaining 26 district hospitals over the last 6 months of 2013. In addition to providing training for the anesthesia providers on the correct use of pulse oximeter, the stewards also introduced the WHO Surgical Safety Checklist. **Conclusion:** Operating rooms in Rwanda, like many sub-Saharan African countries, face limited equipment. The lack of proper monitoring, for patients undergoing surgical procedures, contributes to surgical and anesthesia mortality; Now that all operating rooms in Rwanda are equipped with a Lifebox pulse oximeter, it is our hope that we will see significant improvements in monitoring patients undergoing surgical care.

24. Evidence based best practice in medical disaster response? *T. Razek, C. Marquis, C. Linois-Davidson. From the McGill University Health Centre, Montréal, Que.*

Background: As communication and awareness of major disaster events increases in efficiency and reach, the global engagement in the medical and surgical response to such events has become more accessible to more response teams. Standardization of the medical response and the establishment of minimal acceptable standards of practice in this field of work are increasingly important as is their critical assessment. We describe the practices of emergency response units (ERUs) of the Canadian Red Cross (CRC) in their recent deployments. **Methods:** A detailed descriptive analysis of the standardized training and procedures (equipment, medications, training and infrastructure) for the medical ERU teams of the CRC in global disaster management deployments between 2011 and 2013. **Results:** The ERU medical teams of the CRC deployed to 10 different disaster events in 10 countries between 2011 and 2013. Professionals representing more than 6 different medical specialties and allied health experts were deployed. The list of competencies and the training programs designed to teach them are described. The comprehensive list of technical equipment and logistic infrastructure are also described. **Conclusion:** Establishing peer reviewed, evidence based standards of best practice in medical and surgical disaster response is essential to better address global disasters. We describe here the approach of the CRC ERU teams based on their experience in this field to initiate discussion and a critical evaluation of these practices.

25. Measuring and comparing the cost-effectiveness of surgical care delivery in low-resource settings: cleft lip

and palate as a model. *B. Hackenberg,* M. Ramos,* A. Campbell,† S. Resch,‡ S. Finlayson,¶ H. Howaldt,§ E. Caterson.** From the *Center for Surgery and Public Health, Brigham and Women's Hospital, Boston, Mass., †Operation Smile, Norfolk, Va., ‡Center for Health Decision Science, Harvard School of Public Health, Boston, Mass., §Uniklinikum Giessen, Giessen, Germany, and the ¶University of Utah School of Medicine, Salt Lake City, Utah

Background: Basic surgical care is confronted with critics deeming it to be ineffective and costly. This study aims to show that surgical care can be delivered cost-effectively in low-resource settings. Two models of delivering cleft lip and palate (CLP) care are taken as examples and will be compared based on their cost and disability-adjusted life years (DALYs) averted from the health care provider's perspective. **Methods:** Electronic medical records for 17 medical missions conducted by Operation Smile, a humanitarian surgical nongovernmental organization, in India during 2006 and 2012 as well as records from the Comprehensive Cleft Care Center in Guwahati, India, were evaluated from 2011 through 2013. Age, sex, diagnosis and procedures were extracted and DALYs calculated. The recently released disability weights for CLP from the Global Burden of Disease update 2010 were used as the reference case. No discounting and no age-weighting were applied. Costs were calculated as incurred by the health care provider. **Results:** The medical missions treated 3503 patients and averted 5.996 DALYs per patient with a cost-effectiveness of \$247.42 USD/DALY (range \$192.09–\$534.44 USD/DALY). The Care Center cohort included 2778 patients receiving CLP care and treated them with a mean of 5.964 DALYs/patient and a cost-effectiveness of \$189.81 USD/DALY (range \$119.39–\$407.74 USD/DALY). **Conclusion:** The Care Center provides cleft care with a higher cost-effectiveness even though both models are considered highly cost-effective in low-resource settings. The Care Center provides a sustainable and continuous care while the Medical Mission is more independent from a country's infrastructure and can be adapted to many different geopolitical settings.

26. Prospective data collection at a district hospital in Rwanda. *T. Twagirumugabe,* J. Irakiza,† J.P. Mvukiyehe,† R. Maine,‡ C. Bush,§ E. Rivello,‡ W.C. Kim,‡ F. Manirakiza,* S. Reshamwalla,¶ T. Mwumvaneza,** P. Kyamanaywa,* G. Ntakiyiruta,* W. Kiviri,** S. Finlayson,* W. Berry,††* From the *University of Rwanda, School of Medicine, Butare, Rwanda, †National University of Rwanda, Butare, Rwanda, ‡Harvard Medical School, Boston, Mass., §Program in Global Surgery and Social Change, Harvard Medical School, Boston, Mass., ¶Lifebox, London, UK, **Centre Hospitalier Universitaire de Kigali, Kigali, Rwanda, and the ††Harvard School of Public Health, Boston, Mass.

Background: Kibagabaga Hospital in Kigali, Rwanda is a district hospital staffed primarily by general practitioners who provide surgical care for a catchment area of a population of 500 000. In December 2012, the hospital initiated prospective surgical outcomes monitoring as an adjunct to the implementation of the

WHO surgical safety checklist. Global surgeons need more empiric, outcomes-based research to support quality improvement. This study aims to describe surgical outcomes at Kibagabaga District Hospital. **Methods:** During surgical procedures, the anesthetists recorded key information (age, procedure, sex, American Society of Anesthesiologists' [ASA] class) on a log sheet that was taken to the wards twice a week. The ward nurses completed the logs by documenting patient complications including surgical site infection (SSIs), reoperation, transfer, death, or readmission within 30 days. We uploaded the forms to a RedCAP database. We performed descriptive statistics and exploratory regression analysis. **Results:** A total of 1414 procedures were performed. Most were obstetric/gynaecological (1261; 89.2%); with C-section being the most common with 1133 cases (80.1%). Hernia repair was the most common nongynecologic procedure (45; 3.2%). The combined complication rate was 3.3% ($n = 49$), including 21 readmissions, 10 SSIs and 2 deaths. In multivariate logistic regression controlling for age, procedure type and urgency, male sex was associated with an increased risk of complications (odds ratio 11.4, $p = 0.003$). Only 57 (3.9%) patient's outcomes were incomplete. **Conclusion:** This study demonstrates the feasibility of prospective, ward-based data collected in a resource limited district hospital. Interestingly in this population previously identified risk factors like ASA and age were not significant predictors of complications, while gender was.

27. Evidence based surgery in low resource settings: the missed opportunity in graduate dissertations at Makerere University. A. Elobu. From the Mulago Hospital, Kampala, Uganda

Background: Africa has a huge and unmet surgical disease burden. Improvements in mortality, morbidity and disability among the global poor will require locally driven collaborative research and translation of these findings to policy and practice. However, the research output in surgery in Africa stays low. Therefore the little research that is done must be widely disseminated and directed toward evidence based surgery. Dissertations based on original research are mandatory for the award of Masters of Medicine of Makerere University College of Health Sciences (MakCHS). They should generate evidence to inform surgical practice. This article examines the current trends in the conduct and dissemination of dissertations at MakCHS. **Methods:** Surgery graduates from 2000 to 2011 were interviewed on phone as part of a departmental dissertations audit. Questionnaires were filled regarding the theme, study design and dissemination of the dissertation. Online searches were done for those graduates who were unreachable. **Results:** Of the 56 graduates in the period, 35 (63%) were interviewed. 56 dissertations had been carried out, 50% of which were in breast and categorical general surgery. 63% were cross sectional studies and 45% had been published while only 24% were presented at a conference. The commonest (71%) reason for publishing was personal motivation. **Conclusion:** The dissertations at MakCHS are largely of low level evidence, do not get adequately disseminated and are therefore a missed opportunity for informing surgical practice. More efforts are required to harness the potential of graduate dissertations to impact on evidence based surgery in low resource settings.

Poster presentations

P1. Anesthetic audit of WHO surgical safety checklist implementation in a rural community to reduce maternal and child mortality. O. Ajuzieogu,* A. Amucheazi,* J. Achi,* C. Ikeani.[†] From the *University of Nigeria Teaching Hospital, Enugu and the [†]Chukwuaokam Maternity and Hospital, Enugu, Nigeria

Background: In Nigeria, 40% of pregnant Nigerian women experience cesarean section related complication with an average maternal mortality ratio of 800–900 per 100 000 live births. The goal of this study was to evaluate the effect of applying the WHO surgical safety checklist and basic anesthesia care in a rural community on reducing maternal mortality or morbidity. **Methods:** This was a prospective study to audit the impact of anesthesia and introduction of the WHO Surgical Safety Checklist in 2 remote rural maternity units over a 6-month period. We provided baseline monitors (pulse oximeters and noninvasive blood pressure monitoring) as well as trained anesthetists over a 6-month period for the conduct of cesarean sections to ensure that the WHO checklist was implemented. After an initial training and routine implementation of the checklist, we collected data on morbidity and mortality within 30 days of cesarean section. **Results:** A total of 350 patients were involved in this study. The rate of maternal complications dropped from 30.0% before, to 5.0% after, introduction of the checklist ($p < 0.001$); the total mortality dropped from 3.0% to 0.5% ($p = 0.001$). The rate of surgical-site infection also declined significantly ($p < 0.001$). Length of hospital stay and cost of per patient care were also reduced. **Conclusion:** The checklist and basic anesthetic care has reduced maternal mortality, morbidity and cost in the 2 maternity units studied. This result will be presented to the health ministry for implementation in the state.

P2. Epidemiology, management and outcome of malignancies surgically treated at a rural referral hospital in Butare, Rwanda. J. C. Allen Ingabire,* R. Ssebufu,* P. Kyamanywa,[†] J. Bayisenga,* J. Bikoroti,* D. Mazimpaka.* From the *University of Rwanda, Surgery Department, Butare, Rwanda and the [†]University of Rwanda, Faculty of Medicine, Butare, Rwanda

Background: In 2008, the International Agency for Research on Cancer reported 715 000 new cancer cases and 542 000 cancer deaths occurred in Africa. With increasing development and life expectancy in Africa, that number will double by 2030. In countries where radiotherapy is not available and access to chemotherapy and cancer care is limited, understanding the available care and costs of surgical treatment for different cancers is essential for planning. **Methods:** Retrospective cross-sectional study of surgically treated malignancies at University Teaching Hospital-Butare in Rwanda from January 2011 to August 2013. We analyzed operating records, corresponding pathology and financial department records. **Results:** Of 3009 operations performed during the period reviewed, 208 (7%) were for malignancies. Patients were predominantly male (59.6%), with a mean age of 51 years (2–91 yr). 54.8% had symptoms for more than 1 year

before surgery, 52.4% first sought treatment from traditional healers. Gastrointestinal malignancies comprised 37% of all cancer diagnosis, half of them were emergent presentations, for obstruction or peritonitis. Other cancers included intra-abdominal tumours (9.6%), soft tissue sarcomas (8.6%), osteosarcoma (8.2%), melanoma (7.7%), penile cancers (7.7%), breast cancers (6.2%) and others (15%). Metastatic disease was present in 44.2% of patients. Surgical care was palliative for 52.9%. Only 7.7% received chemotherapy. The in-hospital mortality rate was 26.4%. Mean hospital stay was 25 days. Total medical costs were estimated at \$140 000 (\$673/patient), most (63%) from hospital stay. **Conclusion:** The low number of cancer procedures, high rate of metastatic disease, and high percentage of emergency surgeries suggest that earlier diagnosis, treatment and access to chemotherapy in Rwanda is needed to avoid complications and high medical costs.

P3. Importance and impact of surgical camp — ECSA 2013 Swaziland experience. *W. Wandwi,* U. Mpoki,* S. Muleshe,[†] S. Zwane.[‡] From the *Muhimbili National Hospital, Tanzania, †The East, Central and Southern Africa Health Community (ECSA), Kenya and the ‡Ministry of Health, Swaziland*

Background: Surgical camps are not new in Africa. Surgeons from the developed world have often performed complex surgeries at remote areas on patients in need, who could not access such care due to lack of expert surgeons or financial constraint. It is assumed due to culture, social and professional lifestyle a surgeon from Tanzania will be more comfortable working in Lesotho compared with a similar specialist from Great Britain. Africa needs to innovate service modality in delivery of specialized surgical and medical care by opening doors and utilize local expertise across its borders to provide the needed specialized care. We reported the observed outcome of the second surgical medical camp in Swaziland organized by The East, Central and Southern Africa Health Community (ECSA). **Methods:** Specialist physicians in anesthesiology, obstetrics/gynecology, orthopedic/spinal, maxillofacial, cardiothoracic/vascular, radiology, urology, dermatology and specialized theatre and critical care nurses from Tanzania, Uganda, Kenya, Lesotho, Zambia and Zimbabwe totaling 20 people participated in the camp in Swaziland from Oct. 20–30, 2013. Selected patients from a Phalala list (referral abroad) attended at Mankayane, Mbabane and Raleigh Fitkin Memorial hospitals. **Results:** A total of 519 patients consulted the team. A total of 262 (50.5%) consulted a radiologist (72) and/or dermatologist (190). A total of 257 (49.5%) had surgical consultations, of which 184 (71.6%) had following surgeries. Thirty-nine orthopedic operations included hip (17) and knee replacement (8). There were 79 urology operations. Thirty-two cardiovascular operations included arterial venous fistulas (31) and a thoracotomy (1). Others included gynecology/general surgery (17), and maxillofacial (17). **Conclusion:** The surgical camp effectively offered surgery to 72% of patients waiting for treatment abroad. This is an effective way to utilize surgical skills in the region and reduce health delivery costs with patients in their environment.

P4. Disease burden of intimate partner violence in Rwanda and US trauma centres: identifying surgical

need using DALYs. *O. Mwizerwa,* J.F. Calland,[†] J.C. Byiringiro,[‡] G. Ntakiyiruta,[§] From the *Rwinkwavu Hospital, Rwanda, †University of Virginia, Charlottesville, Va., ‡University of Rwanda, Surgery Department, and the §University of Rwanda, Butare, Rwanda*

Background: Although the 2010 Rwanda Demographic and Health Survey reports intimate partner violence (IPV) as the most common form of violence for women aged 15–49 years, there is limited data on the disease burden of IPV resulting in death and/or disability. We aimed to quantify the burden of disease for IPV in Rwanda by applying the metric of disability adjusted life years (DALYs) to hospital trauma registry data, and to identify potential disparities in surgical need through comparative analysis with US trauma data. **Methods:** Retrospective case series analyses were conducted using data abstracted from trauma registries for 678 female patients presenting May 2012 until June 2013 from 2 referral trauma centres in Rwanda, and for 53 860 female patients presenting in 2008 from the 100 US trauma centres sampled in the National Trauma Data Bank National Sample Program. Standard age weighted and discounted DALY calculations were made. **Results:** Incidence of confirmed IPV for patients in Rwanda was 15 per 1000 female hospital trauma visits, comprising 0.37% of total trauma admissions. Mean age was 46.6 years. The DALYs lost per patient ranged from 0.01–4.69 years, with a mean of 1.79 years. No mortality due to IPV was recorded. Significantly more years lived with disability (26.33 v. 2.54 yr; $p = 0.010$) and DALYs (26.33 v. 3.39 yr; $p = 0.012$) were lost per 1000 female hospital trauma admissions in Rwanda than in the US. In contrast, no statistical difference was found between mean DALYs lost per patient in the 2 countries. **Conclusion:** Our DALY estimates indicate that IPV is a significant contributor to morbidity in Rwanda, and that higher prevalence, rather than greater severity, of injury accounts for the discrepancy in disease burden. Further evaluation of the surgical and societal cost of IPV-related injuries may be a valuable aid to planning and priority setting in the health sector.

P5. Improved pediatric surgical service outcome in resource limited practice — strategies and challenges. *L.O. Abdur-Rahman, A.A. Nasir, J.O. Adeniran, K.T. Bamigbola. From the University of Ilorin Teaching Hospital, Ilorin, Nigeria*

Background: Paediatric surgical interventions in our locality are often repelled or delayed due to local taboos, ignorance, poverty and lack of expertise. Our pediatric surgery unit pursued a program to increase acceptance, accessibility, affordability and expansion of optimal pediatric surgical services. **Methods:** We introduced measures including: intensive education and training and counselling for parents and staff; overseas fellowship clinical attachment and attendance of workshops for staff; establishment of joint academic seminars between nursing staff (in-patient and perioperative) and doctors (trainee and trainers); increased outpatient services and elective operation suite lists; deferment of out-of-pocket payments to expedite emergency surgical intervention; enhancement of day case and short stay surgical service; collaboration with other specialists in the hospital including anaesthetists, pediatric gastroenterologists/nutritionists, nephrologists, cardiologists, neonatologists and pathologists; implementation of

adapted surgical safety checklist and weekly unit audit; and the establishment of a pediatric enterostoma care team and first-ever laparoendoscopic general and urologic pediatric surgical service. **Results:** Between 2005 and 2013, we established a designated pediatric surgical ward with pediatric trained nurses, increased outpatient clinics from 1 to 3 per week, and increased elective operation list from 1 to 3 per week. Surgical volume improved from 180 to over 700 cases annually with reduced waiting list time. Time to emergency surgery was reduced from 18 hours to 6 hours with reduction in morbidity and mortality from 40% to less than 5% annually. Parental defaults were reduced and definitive surgery completion rate increased. **Conclusion:** Through interprofessional collaboration and expansion of our work force we now provide informed and standard pediatric surgical service to the population that we serve. This has improved clinical outcomes in our patients in spite of the lack pediatric facilities at our centre.

P6. Overcrowding of accident and emergency units: Is it a growing concern in Nigeria? J.G. Makama,* P. Irrighbogbe,[†] E. Ameh.[‡] From the *Ahmadu Bello University Teaching Hospital, Shika-Zaria, Nigeria, †University of Benin Teaching Hospital, Benin City, Nigeria, and the [‡]Division of Paediatric Surgery, Ahmadu Bello University Teaching Hospital, Zaria, Nigeria

Background: Recent concerns over the ability of the Nigeria's accident and emergency departments (AED) to meet current demands are growing among the public and health care professionals. The data supporting perceptions of inadequate capacity are sparse. **Methods:** This was a cross sectional descriptive study carried out among AED staff of 3 referral teaching hospitals in Nigeria, using a pretested and validated structured questionnaire. **Results:** The analysis of the 267 revealed an age range of 20–56 years (mean 36.40). One hundred and twenty-eight (47.9%) were male, 139 (52.1%) female. Two hundred and fifty-nine (97%) agreed that an AED should have a bed capacity of 21–30. Agreement to AED overcrowding in Nigeria was highly significant. The frequency of AED overcrowding per week was 4–7 times. The average bed occupancy level was 3.25. Common causes of prolonged AED admissions were agreed to be high volume of critically ill patients, Delay transfer of patients to the wards, theatre delays, radiological delays and very high volume of patients requiring admission in AED. Also, long prereview waiting time and haematological delays were additional causes. The average waiting time for victims to be seen was 29.7 minutes. **Conclusion:** There are many causes of AED overcrowding in our environment. However, improving AED bed management, better organized and active discharge planning, and reducing access block should be priority to reduce AED overcrowding.

P7. Building local capacity for improved surgical safety in a resource poor setting. S. Ademola,* O. Olawoye,[†] A. Iyun,[‡] A. Micheal,[‡] O. Oluwatosin.* From the *College of Medicine, University of Ibadan, Nigeria, †Olabisi Onabanjo University Teaching Hospital Sagamu, Nigeria, and the [‡]University College Hospital, Ibadan, Nigeria

Background: High burden of deformities resulting from trauma, congenital anomalies, necrotizing infections and cancers in Africa

calls for training of surgeons that can treat these deformities safely and effectively. Flap transfer course in Nigeria was designed for this purpose. This paper reviews impact of the course on surgical capacity building. **Methods:** The biennial course started in 1995 and has trained specialists across West Africa. It features lectures, video demonstrations, hands-on cadaveric and microsurgical training sessions; and live, large animal dissection under anesthesia. A self-administered questionnaire is completed by participants at the end of each course. A retrospective review of the questionnaires for successive years was undertaken and narrative of course history included. Descriptive analysis with SPSS version 20 computer software was done and means were compared using *t* test. **Results:** Questionnaire responses from 106 participants were analyzed. Sixty-one percent were plastic surgeons; 9% each were maxillofacial, orthopaedic and general surgeons; 8% were otorhinolaryngologists, while the remaining 3% were general practitioners and veterinary doctors. Majority (93%) of trainees, rated structure and level of instruction at the course very highly and 85% found the course materials helpful. Seventy percent were confident they would be able to apply skills acquired from the course in their practice and this reflected in improved mean scores between pre- and posttest. Majority of the trainees suggested improvement in the course; their suggestions showing an interesting trend from year to year. **Conclusion:** The course has contributed local capacity toward global safe surgery in a resource poor setting.

P8. Tertiary Trauma Survey: How much are we missing in the evaluation of our patients? J. Ogundele. From the University College Hospital, Ibadan, Nigeria

Background: The gold standard in the care of the multiply injured is the prompt identification of all life-threatening and associated injuries by using the Advanced Trauma Life Support protocol. However, events during resuscitation such as multiple casualties, emergent operations and excessive hemorrhage may interfere with this process. **Methods:** An initial evaluation of our trauma registry data for missed injuries in a 90% population of trauma victims yielded an incidence of 12%. However, to determine the true incidence of missed injuries, a prospective tertiary trauma survey was performed on all injured patients admitted during a 6-month period. After the primary and secondary surveys, all injuries and treatments were documented in the patients' trauma medical records. They were then re-examined immediately by the investigator and/or the postgraduate doctors in our unit. All missed injuries were identified and documented. Patients scheduled for follow-up were also re-examined at the initial visit to the surgical outpatient department. **Results:** Fifty-two missed injuries were found in 46 patients (10.5%) out of 438. These include fractures of the clavicle, scapular etc. Others are shoulder dislocation, brachial plexus and transverse colonic injuries. Reasons for missed injuries include hemodynamic instability necessitating early surgery 3 (0.7%), head injury 17 (3.9%), low index of suspicion 5 (1.1%), lack of symptoms 6 (1.4%) and technical problems 12 (2.7%). One patient died without any missed injuries. **Conclusion:** There is a need to reappraise our trauma care practice to reduce the incidence of missed injuries.

P9. Development of an enterostoma care team at the University of Ilorin Teaching Hospital, Ilorin, Nigeria.

L. Abdur-Rahman,* R. Adebayo,[†] N. Abdulraheem,[‡] A. Nasir,* J. Adeniran.* From the *University of Ilorin Teaching Hospital, †University of Ilorin Nursing services and the ‡University of Ilorin, Department of Surgery, Ilorin, Nigeria

Background: Provision of comprehensive stoma care by trained staff is lacking in virtually all institutions in our subregion. This has led to poor outcome of care of both adult and pediatric patients and the relations have often been disappointed. There is need for stoma care team to provide information, education and robust care of patients with stoma in the in-service, clinics and invariably home care. **Methods:** A selective project (July 2012–December 2012) of the International Interprofessional Wound Care Course was used to establish an enterostoma care team. Pretest and posttraining test were done to evaluate the awareness, knowledge and practice of stoma care and the role of stoma care therapists. A workshop to train the new team members and focused group discussion were conducted among parents and the new enterostoma care team. Supervised performance and assessment of the caregivers were also done. **Results:** Six member Enterostoma care team was formed. Forty-two pediatric patients with enterostoma were enrolled and cared for. There was appreciable impact on knowledge and practice after training. There was elimination of reluctance among staff in caring for patients and reduction in morbidity and improvement of quality of life among patients with enterostoma. Management of the institution also requested for expansion of the team so that hospital can serve as training centre for the region. **Conclusion:** Provision of education and facilitation of learning in the right environment encourages better output. The motivation of the parents and relations who have the joy of being informed and assisted in provision of care for their wards is a strong point for this project. De-emphasizing incentives (monetary) as a pivot to motivation worked for this team. This reproducible and can be extended to other centres.

P10. Assessing knowledge dissemination from the annual Bethune Round Table on International Surgery Conference. E. Lymburner, B.H. Cameron. From the International Surgery Desk, McMaster University, Hamilton, Ont.

Background: Although surgical conditions account for 11% of the global burden of disease, surgical research has lagged behind other global health priorities. The annual Bethune Round Table on International Surgery (BRT) is a unique Canadian international conference focused on surgical care in low-resource settings. This project reviewed the 13 years of BRT programs to determine whether the research knowledge generated has been disseminated through open access. **Methods:** Abstracts were reviewed and categorized by topic, country of focus Human Development Index (HDI), speaker's home country, institutional affiliations and North-south partnership. Related publications by the same author were sought for 2 years before and after the conference. The primary outcome was the current online availability of the research abstract or publication. **Results:** The BRT presentation topics have included surgical education, healthcare systems, ethics and technical aspects of global surgery. Over 12 years, 312 of the 414 (75%) speakers from anesthesia, obstetrics and

gynecology, and the range of surgical specialties were first-time presenters. 38% of speakers were from low HDI countries and 55% were from very high HDI countries, with 82% of papers including collaborative authorship and 38% reporting North-South partnerships. Program abstracts are available online for 5 recent years, and only 61 of 350 (17.4%) relevant presentations have been published — 20 of 350 (5.7%) in open access journals. **Conclusion:** The BRT conferences have provided a valuable forum for surgical researchers in low-resource settings. Further efforts should be made to ensure that research findings are more widely disseminated and available through online access.

P11. Photovoice: engaging youth in rural Uganda in articulating health priorities through participatory section research. D. Esau,* P.T. Ho,* G. Blair,* D. Duffy,* N. O'Hara,* M. Ajiko,[†] V. Kapoor.[‡] From the *BC Children's Hospital, Office of Pediatric Surgical Evaluation and Innovation, †Soroti Regional Referral Hospital, and the ‡UBC Faculty of Medicine, Vancouver, BC

Background: Uganda is a country where many rural patients have significant challenges accessing health care. While 80% of the population lives in a rural community, only 27% of the health services available are provided rurally. The goal of this study was to gain greater understanding of the health need as articulated by youth in a rural Ugandan community. **Methods:** Photovoice is a novel community-based research methodology which encouraged the participants of this study to answer prepared questions using photography as a medium of expression. Photos were assigned one or more themes based on how the student presented the photo during an individual interview. These themes were then analyzed to determine trends in health concerns. Individual comments made during the interview were also used to draw Conclusion regarding the health determinants of the study population.

Results: Thirty-two students between the ages of 13 and 17 were recruited from 4 schools within the Soroti region. A total of 499 developed photos were acquired from the students. The most common themes represented by the photographs were "hygiene" ($n = 73$, 15%), "nutrition" ($n = 69$, 14%) and "water" ($n = 45$, 9%). Students from different schools tended to have different emphases on various health themes (e.g., toilets), which was postulated to be due in part to the school's overall state of hygiene and cleanliness. **Conclusion:** Insight was gained into the differences in health determinants between sexes, ages, and schools. Suggestions which could be used to address these health issues were created. Students in Soroti are eager to learn about health and energetically participated in this study.

P12. Burn care in Nepal: a retrospective review. C. Bos,* J. Westerholm.[†] From the *Michael G. DeGroote School of Medicine, McMaster University, Hamilton, Ont., and the †Tansen Mission Hospital, Nepal

Background: According to the WHO, burns are the second most common cause of injury in Nepal. Despite the burden of injury, there are limited data on the status of care and the need to improve care. United Mission Hospital (UMN) provides multidisciplinary burn care for 9 districts of Western Nepal, a population of 1 million. This study aimed to explore the standard of care for burn patients at UMN with the objective of serving as a historical

control for future study. **Methods:** Retrospective chart review was performed. All patients admitted with a primary diagnosis of burns between July 2011 and May 2013 were included. Demographic data, and metrics regarding care and outcomes were collected and analyzed using excel software. **Results:** Between July 2011 and May 2013, 283 charts were identified with primary diagnosis of burns (146 male [51.6%]). Mean age was 20.9 years (range < 1–90). The number of patients with burns over 15% body surface area (BSA) was 45 (15.9%). Overall mortality was 12.4%, and mortality in patients with over 15% BSA was 33.3%. The number of skin grafts performed was 40 (14.1%). Data regarding mechanism of burn was missing in 97% of charts. **Conclusion:** This study describes the patient population, care practices, and outcomes of burn patients admitted to UMN between July 2011 and May 2013. This data will serve as historical control for an interventional study aiming to assess the impact of a more standardized protocol using a daily care checklist on patient outcomes.

P13. Burn care checklist in Nepal: a pilot study. *C. Bos,* J. Westerholm.[†] From the *Michael G. DeGroote School of Medicine, McMaster University, Hamilton, Ont., and the †Tansen Mission Hospital, Tansen, Nepal*

Background: Several studies have demonstrated the usefulness of medical checklists to improve quality of care in surgery and intensive care unit; however, few studies address their use in ward rounds. The feasibility of the use of a patient care checklist for burn ward rounds in a rural hospital setting in Nepal was evaluated. **Methods:** A checklist was designed and implemented daily for all inpatients in the burn care unit. Feasibility was determined by number of inpatient days the checklist was completed per patient (completion rate), the number of staff using checklist who would prefer to continue using it (staff acceptance rate), and qualitative comments from staff on perceived benefits and barriers. **Results:** The checklist was administered to 44 patients over 4 months, with a total of 530 inpatient days. Mean percentage of in-patient days per patient in which the checklist was completed was 88.4%. All staff indicated a preference to continue using the checklist. Perceived benefits to using checklist were ease of organization of rounds and patient data, as well as ability to assess overall patient status at a glance. Time and manpower constraints were the main concerns of the staff. **Conclusion:** This abstract describes the design and feasibility of implementation of a burn care checklist for an inpatient setting in rural Nepal. The implementation of the checklist was considered feasible based on our criteria. Next steps include a prospective study to assess the impact of this checklist on patient care outcomes.

P14. Pediatric surgical care in conflict zones: the Médecins Sans Frontières experience in 2012. *D. Rothstein,* E. Baron,[†] P. Herard,[‡] X. Lassalle,[‡] C. Teicher.^{†‡} From * Médecins Sans Frontières, USA, †Epicentre, and the ‡ Médecins Sans Frontières, France*

Background: Little is known about the provision of surgical care to children by major nongovernmental organizations (NGOs) in specialized settings and conflict zones. This paper examines the 2012 worldwide pediatric surgical experience of Médecins sans Frontières, Operational Centre Paris (OCP) to better define pediatric surgery needs. **Methods:** Interventions in the 2012

OCP database were categorized by indication and type of operation, and crude perioperative mortality rates (CMR) were derived. Interventions were stratified by age group to qualify the distribution of cases. **Results:** A total of 29 438 surgical interventions were performed in dedicated trauma, obstetric and reconstructive centres. 8743 (29.7%) were pediatric (< 13 yr) and 2061 (7.0%), youth (13–17 yr). In the pediatric group, the CMR was 0.06%, the most frequent indications for operation were accidental injuries (66.1%) and infection (23.8%), and the most common interventions were wound care (48.2%) and minor surgery (37.7%). In the youth group, the CMR was 0.11%, most frequent indications were accidental (34.6%) and violence-related (21.3%) injuries, and the most frequent interventions were minor surgery (32.6%) and wound care (22.7%). **Conclusion:** This study provides a crude picture of pediatric surgical interventions by a major NGO working in specialized settings. Accidental injuries and infection comprised the bulk of indications in the pediatric age group, while interventions in the youth age group were principally injury-related. Further work is needed to examine both disease- and population-specific needs for specialized surgical care as well as the outcomes of surgical interventions in the resource-limited settings that typify conflict zones.

P15. Gluteal fibrosis: a case series in eastern Uganda. Could our malarial treatment be causing long-term disability? *S. Nikolaou,* J. Maraka,[†] E. Asige,[‡] F. Owori,^{*} R. Obaikol.[‡] From the *Kent and Canterbury Hospital, Canterbury, Kent, UK, †International Collaboration for Essential Surgery, UK, and the ‡Kumi Hospital, Uganda*

Background: In gluteal fibrosis (GF) the gluteus maximus muscle is replaced by fibrous tissue and the hips cannot be fully flexed in internal rotation and adduction so the child cannot sit or crouch without marked abduction and external rotation of the hips. The use of intramuscular (IM) quinine injections for prehospital treatment of malaria has increased since resistance developed to chloroquine; coinciding with an increasing incidence of GF in Uganda. The purpose was to qualitatively describe the disability experienced in children with GF, investigate the association of IM quinine injections and GF, and determine the immediate and short-term outcomes of surgery. **Methods:** All children identified with GF in outreach clinics in Eastern Uganda over one month were invited to participate. Demographic data, preoperative function, history of presenting complaint, intraoperative findings and 2-week progress were recorded. **Results:** There were 67 patients (4–14 yr). Most could not run (97%), use the toilet (88%), or eat while sitting down (85%). All had gluteal IM injections of only quinine and had IM quadriceps and deltoid injections of DTP and BCG, respectively, yet had fibrosis of the gluteal region only. All underwent surgical release and had normal hip adduction at follow up. **Conclusion:** Gluteal fibrosis is a severely disabling disease. This may be due to intramuscular quinine use. More studies are required to determine causality. Rectal artesunate may offer a suitable alternative. Surgical release and 2 weeks of postoperative physiotherapy provide return to adequate function. Local and/or national policy should be urgently reviewed to prevent further cases of this disabling condition.

P16. The bacterial pathogens and possible sources contributing to infection and mortality in the Burn Care Unit,

Georgetown Public Hospital Corporation, Guyana.
S. Rajkumar. From the Georgetown Public Hospital Corporation, Georgetown, Guyana

Background: Burn mortality at our institution is high; leading causes are pulmonary embolism and infection. We aimed to determine causative agents in burn infections and identify carriers of these agents. Decolonization of carriers was done and rescreened to determine the success rate. **Methods:** Post-mortems of burn deaths between Jan. 1, 2012 and June 30, 2013 were reviewed and the septic related deaths were correlated with blood culture results to identify the causative agents. Methicillin-resistant *Staphylococcus aureus* (MRSA) was identified as a pathogen contributing to mortality and all isolates had identical antimicrobial sensitivity patterns. All staff in the unit was subjected to screening for MRSA. Staff members that were MRSA-positive were decolonized and subsequently rescreened. **Results:** Postmortem results for the period of Jan. 1 to Dec. 31, 2012 and Jan. 1 to June 30, 2013 revealed that 33% (4 of 12) and 40% (2 of 5) of deaths, respectively, were due to septic processes. Four of 20 patients (20%) with positive cultures were infected with MRSA; these isolates had identical antimicrobial sensitivity patterns. One patient had been reported 11 months before the other 3. Four of the 22 staff were positive for MRSA and all isolates had the exact antimicrobial sensitivity pattern as that of the patients' isolates. Postdecolonization culture results for staff are currently pending. **Conclusion:** Sepsis was responsible for a significant percentage of deaths in the Georgetown Public Hospital Corporation Burn Care Unit, with MRSA being implicated in a number of cases. Staff who are carriers of MRSA have been identified as sources of transmission to patients and may be contributing to patient infection and death.

P17. Standardizing goals and objectives for resident electives in international surgery. J. Westerholm. From the Tansen Mission Hospital, Nepal

Background: It is becoming increasingly common for residents to incorporate an elective in a developing country into their training program. The many benefits of such an experience include exposure to a wide range of surgical problems, and a high volume of cases, as well as the opportunity to hone one's cross-cultural communication skills. Because of the variety of possible settings for an international elective, it is difficult to standardize a clear set of goals and objectives that will apply to all such experiences. However, more uniform guidelines are needed. The author's purpose is to develop standardized goals and objectives for an international surgery residency elective. **Methods:** Based on a combination of the author's personal observations and communication with other surgeons working in an international setting, goals and objectives for an international surgery elective were developed. They were organized according to the CanMEDS model. **Results:** Objectives in the medical expert/clinical decision maker category included knowledge of basic science and anatomy, general clinical knowledge, and knowledge of specific clinical problems and procedures commonly encountered in developing countries. In the communicator and collaborator categories, objectives focused on teamwork and cross-cultural communication. The manager category included appropriate management of limited resources. Similar objectives were developed for

the health advocate, scholar, and professional categories.

Conclusion: The author has developed goals and objectives that can be used by residents participating in international surgery electives during their training. Future goals would be to validate these objectives and make them a standardized part of general surgery curricula across the country.

P18. Dr. Lucille Teasdale-Corti: a legacy of empowerment.

A. Culp. From the Michael G. DeGroote School of Medicine, McMaster University, Hamilton, Ont.

Background: The Royal College of Physicians and Surgeons of Canada presents the Teasdale-Corti Humanitarian Award to Canadian physicians who demonstrate altruism and integrity, courage and perseverance, in the alleviation of human suffering. Most Canadians are unfamiliar with the surgeon after whom the award is named. This presentation will highlight the life and legacy of Dr. Lucille Teasdale-Corti. **Methods:** Information was collected from the websites of Lacor Hospital, the Canadian Association of General Surgeons (CAGS) and the International Development Research Centre. The framework is based on Ronald Lett's review article on International Surgery, published in the *Canadian Journal of Surgery* in 2003. Much of the historical narrative is based on a collection of letters compiled by the Teasdale-Corti Foundation. **Results:** Dr. Teasdale-Corti's legacy is explored through 4 key domains: research, education, development and advocacy. Highlights include the Teasdale-Corti Global Health Research Partnership Program, the CAGS Lacor Project, the Teasdale-Corti Foundation, and the Teasdale-Corti Humanitarian Award. **Conclusion:** Dr. Teasdale-Corti spent 35 years in Uganda developing a hospital capable of providing quality services despite barriers of poverty, violence and poor access to healthcare. Her vision that emphasized sustainability and collaboration is what made her work a success. It is appropriate to celebrate her accomplishments, and recognize the importance of incorporating such principles into modern paradigms of international surgery.

P19. Outcomes of patients that underwent laparotomy at a large referral hospital in Rwanda over a one-year period. G. Baison,* R. Maine,† E. Nsengiyumva,‡ G. Ntakiriruta,§ J. Mubiligi,¶ R. Rivello, J.D.D. Havugimana.† From *Harvard University, Boston, Mass., †Program in Global Surgery and Social Change, Harvard, Boston, Mass., ‡National Hospital of Rwanda, §University of Rwanda, School of Medicine, Butare, Rwanda, ¶Inshuti Mu Buzima, Rwanda, and the**

****Brigham and Women's Hospital, Boston, Mass.**

Background: A significant number of patients in Rwanda who require surgery must transfer to main referral hospitals where most trained surgical providers work. However, the impact of patient transfer on patient outcomes remains unknown. This is particularly important for patients undergoing laparotomy, which is associated with high mortality rates in other sub-Saharan African countries. **Methods:** We conducted a retrospective cohort study to assess the outcomes of patients who underwent laparotomy at the National University Hospital of Rwanda (NUR) from 2011 to 2012. Cases were identified using the general surgery operative logs. **Results:** A total of 508 cases were analyzed, with 39% ($n = 199$) being female and 61% ($n = 309$) being

male patients. 84% ($n = 428$) of the patients came as transfers, although only 14% ($n = 61$) patients had transfer documentation in their medical charts. Only, 16 patients underwent surgery at the district hospital level. Of these, 14 transferred after experiencing a complication, most commonly wound dehiscence. Of all cases analyzed, 42.2% ($n = 214$) developed postoperative complications at the referral centre. The most common complication was an unplanned reoperation which was required by 42% of all patients with complications. Overall mortality was 15% in this cohort. **Conclusion:** At NUR, a significant number of the laparotomy patients were transferred from district hospitals, of which a larger proportion underwent primary laparotomy at NUR. Although the complication rate was high, the mortality rate was lower than that recorded in the literature. This study suggests that improved practices are needed to minimize postoperative complications and improve the care of transferred patients in Rwanda.

P20. The Haiti Breast Cancer Initiative: preliminary epidemiological data. *C. Ong,^{*} A.C. Chavarri,[†] J.G. Meara,[‡] J. Pyda,^{*} L. Shulman,[§] R. Damuse,[¶] J.H. Pierre.[¶]* From the *Program in Global Surgery, Harvard Medical School, Boston, Mass., †Rwanda Military Hospital, Kigali, Rwanda, ‡Harvard Medical School, Boston, Mass., §Dana Farber Cancer Institute, and the ¶Partners In Health/Zanmi Lasante, Cange, Haiti

Background: The growing burden of cancer worldwide has not spared developing countries. Many low-income countries lack robust epidemiological data, thus disease statistics are extrapolated from regional estimates. Haitian and American physicians and researchers partnered to establish the Haiti Breast Cancer Initiative (HBCI), a prospective, hospital-based cancer registry in Haiti, to gain more country-specific granularity and enable comparisons to disease patterns regionally and of the Haitian diaspora. **Methods:** A questionnaire was developed and validated by multidisciplinary oncology experts in the United States and Haiti and administered to patients presenting to 2 Haitian hospitals. Demographics and clinical characteristics were tabulated. Local Haitian data was then compared with data from Haitian women enrolled in the Massachusetts Cancer Registry. **Results:** In the first year of implementation, 136 women were enrolled. Median age at time of diagnosis was 47, 19.8% presented before age 40. Most patients presented at stage IIIB (30.9%) or with regionally advanced disease (52.2%). A total of 11.8% presented with metastatic disease. Incidence ranged from 4.51–7.86 per 100 000. Patients in HBCI present at a younger age, with higher proportion of hormone receptor-negative disease, and with more

advanced disease than do Haitian patients residing in Massachusetts ($p < 0.0001$). **Conclusion:** Our estimate for country-specific incidence is higher than the GLOBOCAN2008 regional estimate of 4.4 per 100 000. Patients in Haiti present younger and at more advanced stage than do patients in America, including patients of Haitian descent. International collaboration ensured the cultural suitability and successful design and implementation of the registry, has led to capacity-building for research and clinical documentation, and will inform future plans for resource allocation and interventions.

P21. User fees and essential surgical services in Tanzania: theory, practice and impact. *G. Knapp,^{*} M. Hoogerboord,^{*} A. Ernest,[†] A. Gesase.[†]* From the

*Global Surgery Office, Dalhousie University, Halifax, NS, and the †University of Dodoma, Tanzania

Background: Out-of-pocket expenditures for health care represent a significant proportion of total health care expenditure throughout sub-Saharan Africa. The theory and implementation of user-fees and the other determinants of total out-of-pocket costs are discussed within the context of essential surgical service financing and delivery in Tanzania. The fee schedule at Dodoma Regional Hospital is used as a case study. **Methods:** Stakeholder interviews and fee schedule collection were conducted at Dodoma Regional Hospital. This primary data was coupled with the extensive use of peer-reviewed academic literature and grey, institution-generated material. **Results:** User fees were designed to increase revenue and incentivize efficient use of scarce medical resources. However, subsequent evaluation of these policies has routinely found that user fees disproportionately burdened lower-income individuals and significantly decreased their use of medically necessary services. They also challenge the degree to which individuals are protected from the financial consequences of medically necessary healthcare utilization. At Dodoma Regional Hospital, a flat rate of 60 000/20 000 Tanzanian shillings (TZS) (\$34/\$12 USD) is levied for all major/minor procedures respectively. Maternal health, including Cesarean section is exempt from the fee schedule. Additional costs include a bed fee of 3000 TZS (\$2 USD) and the cost of drugs/equipment if in-house supply is insufficient. However, user fees only represent one component of out-of-pocket expenditure. Other direct and indirect costs such as: travel, food, patient and caregiver opportunity costs and tips/bribes must also be considered. **Conclusion:** The research and policy implications of this evaluation are posed within the new paradigm of health system development and primary care that is inclusive of essential surgical intervention.