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Bethune Round Table 2012 12th Annual Conference: Filling the Gap

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Impact of international collaboration on surgical services in a Nigerian tertiary centre. *A.A. Nasir,* A.S. Yusuf,† L.O. Abdur-Rahman,* B.A. Ahmed,‡ D. Panikar,§ M.K. Abraham.¶* From the Divisions of *Paediatric Surgery, †Neurosurgery and ‡Orthopaedic Surgery, Department of Surgery, University of Ilorin Teaching Hospital, Ilorin, Nigeria, and the Departments of §Neurosurgery and ¶Pediatric Surgery, Amrita Institute of Medical Sciences and Research Centre, Kochi, India

Background: Our aim was to highlight the impact of collaboration between 2 linked tertiary hospitals in Nigeria and India. **Methods:** We conducted a review of a collaboration between the Amrita Institute of Medical Sciences and Research Centre (AIMS), Kochi, India, and the University of Ilorin Teaching Hospital (UITH), Ilorin, Nigeria, to exchange personnel for the purpose of further training from August 2007 and December 2011. **Results:** One neurosurgeon, 2 pediatric surgeons and 1 orthopedic surgeon had additional exposure at AIMS for periods of 3 months to 1 year. Four neurosurgery and 3 pediatric surgery perioperative nurses have also been trained at AIMS for periods of 3 months. A pediatric surgeon was invited as faculty for laparoscopic training at Ilorin in 2010. The collaboration has resulted in exposure to surgical procedures not usually done in our centre. Our pediatric surgery unit has commenced laparoscopic surgery and pyeloplasty for pelvic ureteric junction obstruction in children. The orthopedic surgeon has commenced interlocking nailing and joint replacement. The neurosurgeon has successfully done endoscopic third ventriculostomy and microscopic resection of brain tumour. **Conclusion:** This international collaboration has led to capacity building with significant impact on surgical services at UITH. An international collaboration and exchange program is a feasible and desirable strategy for technology transfer between technology-advanced settings and resource-constrained centres.

Surgeons OverSeas Assessment of Surgical Needs (SOSAS) Rwanda: a useful rural health experience for medical students. *F. Niyonkuru,* R.T. Petroze,† R.S. Groen,‡§ E. Ntaganda,* A.L. Kushner,¶ J. Forrest Calland,§ P. Kyamanywa.** From the *Faculty of Medicine, National University of Rwanda, Butare, Rwanda, the †Department of Surgery, University of Virginia School of Medicine, Charlottesville, Va., the ‡Royal Tropical Institute, Amsterdam, the Netherlands, §Surgeons OverSeas (SOS) and the ¶Department of Surgery, Columbia University, New York, NY

Background: Over 90% of the Rwandan population of 10 million is rural, with only 5 physicians and 0.5 surgeons per

100 000 persons. There is 1 medical school in the country that provides training at 3 referral hospitals, but no rural experience. We employed junior medical students as field interviewers for a nationwide population study. We aim to discuss the educational role of the experience and how it affected student perceptions of healthcare in Rwanda. **Methods:** In October 2011, 8 medical students and 2 information technology (IT) students were recruited to serve as interviewers for Surgeons OverSeas Assessment of Surgical Needs (SOSAS) Rwanda. Students were responsible for team management, transportation and personal budget, contacting local village leaders and field data collection, spending up to 1 week at a time in the field. All students who finished the study completed an online evaluation. **Results:** In all, 7 of 8 medical students and 2 of 2 IT students completed the survey. We further analyzed the results of the 7 medical students. All students had prior research experience. Only 29% had lived in a village during the previous 5 years and 43% during the previous 10 years. All students agreed that the research was a useful educational experience, with free responses pointing to a wider understanding of health conditions and barriers to health access at the district level as well as skills acquisition in time management, hard work, public speaking and problem solving. **Conclusion:** In a population with limited access to hospital-based surgical services, community-based experiences can be an important adjunct to medical education.

Preinternship Nigerian medical graduates lack basic musculoskeletal competency. *T.E. Nottidge, U. Ekrikpo, A.O. Ifesanya, R.E. Nnabuko.* From the Faculty of Clinical Sciences, University of Uyo, Uyo, Akwa-Ibom State, Nigeria

Background: Our goal was to assess the basic musculoskeletal competency of preinternship graduates from some Nigerian medical schools. **Methods:** The authors administered the Freedman and Bernstein basic musculoskeletal competency examination (*J Bone Joint Surg Am* 1998;80:1421-7) to 113 preinternship graduates from 7 Nigerian medical schools, over a 3-year period from 2008 to 2010, at the University of Uyo Teaching Hospital. Two final-year specialist residents took the examination as a test of criterion relevance. **Results:** These graduates failed this test of basic musculoskeletal competency, obtaining scores ranging from 7% to 67% (pass score was 73.1%). Duration of the orthopedic posting and observation of operative fracture fixation were not significant determinants of the score ($p = 0.14$ and 0.88 , respectively). The 2 final-year specialist residents had scores of 73% and 75%, respectively. **Conclusion:** Basic musculoskeletal competency among preinternship Nigerian medical graduates is inadequate. The Freedman and Bernstein test needs to be further assessed for its criterion relevance in this environment. The Nigerian medical

system does not require that medical doctors undergo postinternship training before they can independently practice medicine. Consequently, the need for adequacy in undergraduate musculoskeletal education is higher in this environment than in the developed world, where postinternship training is mandatory. In the same test administered to final-year students at Harvard Medical School (*Acad Med* 2007;82:452-7) and at the University of West Indies (*West Indian Med J* 2001;50:66-8), 26% (using 70% as pass score) and 28% of students, respectively, passed. Nigerian medical education needs an upgrade, to deliver effective undergraduate musculoskeletal training. A future study would be to administer this test on postinternship Nigerian doctors.

Decompressive craniectomy: a low-cost surgical technique from a developing country. A. Olufemi Adeleye. From the Division of Neurological Surgery, Department of Surgery, College of Medicine, University of Ibadan, Ibadan, Nigeria

Background: Decompressive craniectomy (DC) is a very attractive surgical treatment option for managing traumatic brain injuries in the low-middle income countries (LMICs). The procedure, however, has many technical details with significant logistic/economic considerations that may constitute major constraints in the LMICs. **Methods:** We present an illustrated cost-saving, evidence-based technique of DC in evolution in our practice. This is a continuing refinement of the procedure of “hDC temporalis,” essentially an osteoplastic decompressive craniectomy (*Acta Neurochir (Wien)* 2011;153:2259-63), earlier described by us (*Surg Neurol Int* 2011;2:150). **Results:** To achieve an osteoplastic DC, the frontotemporoparietal trauma skull flap is raised, hinged on the ipsilateral temporalis muscle as described earlier. But before then, the trauma scalp flap itself is raised in a galeal-skeletonizing plane to preserve the subgaleal fascia (so-called loose areolar tissue) on the pericranium. Thus, a very generous and bulky composite subgaleal fascia-pericranial flap is almost always available for loose augmented dural plasty following a cruciate durotomy. **Conclusion:** The technique presented has virtually eliminated the need for artificial dural substitutes and achieved generous augmented duraplasty following durotomies for DC in our practice. This is an illustrated technical report of a surgical procedure of osteoplastic DC, the “hDC temporalis” (that is, hinged DC using the temporalis muscle) as already described. The report is further supplemented with a description of our technique for raising a generous and bulky-enough composite autologous dural graft, which is free of any additional cost of artificial dural substitute to the patient. The whole surgical paradigm is aimed at obviating many of the known cost and logistic constraints of DC that make the life-saving procedure not so attractive in resource-poor practice settings.

Efficacy of surgical management with manual vacuum aspiration versus medical management with misoprostol for evacuation of first trimester miscarriages: a randomized trial in Pakistan. S. Ali, S. Batoool Mazhar. From the Maternal and Child Health Centre, Pakistan Institute of Medical Sciences, Islamabad, Pakistan

Background: First trimester (T1) miscarriages can be managed by various methods such as surgical evacuation by manual vac-

uum aspiration (MVA) and medical evacuation with misoprostol. The purpose of this study was to compare the efficacy of MVA versus vaginal misoprostol for complete uterine evacuation in T1 miscarriages. **Methods:** From January to July 2011, pregnant women presenting with T1 miscarriages, of 12 weeks gestational age or less, to the outpatient department and emergency department at the Pakistan Institute of Medical Sciences Maternal and Child Health Centre in Islamabad were randomized to either MVA or vaginal misoprostol. Completeness of evacuation was determined by ultrasound confirmation of central endometrial thickness of 7 mm or less (before discharge in the MVA group and after 1 week in the misoprostol group). The χ^2 test was used to calculate the difference in efficacy between the 2 groups. **Results:** A total of 130 women were recruited, 65 of whom had surgical evacuation with MVA and 65 had medical evacuation with misoprostol. The success rate for achieving complete uterine evacuation was higher for the MVA group (96.9%) versus the misoprostol group (87.7%) and was statistically significant ($p = 0.048$). **Conclusion:** Manual vacuum aspiration is more efficacious than misoprostol for complete evacuation of T1 miscarriages. Misoprostol is currently favoured for management of T1 miscarriages for its cost-effectiveness; however, it requires close follow-up for risk of hemorrhage, infection and incomplete evacuation. Given that MVA is more efficacious and is associated with less need for close follow-up, it should be the management of choice for patients where follow-up is difficult, in both developing and developed countries.

Gaps in workforce for surgical care of children in Nigeria: increasing capacity through international partnerships. E.A. Ameh. From the Division of Paediatric Surgery, Department of Surgery, Ahmadu Bello University Teaching Hospital, Zaria, Nigeria

Background: Our goal was to ascertain gaps in workforce capacity for specialized surgical care of children in Nigeria and to explore role of international partnerships to increase capacity. **Methods:** Tertiary referral hospitals in Nigeria that had a pediatric surgery service were requested to complete an online survey using SurveyMonkey. Fourteen of 27 hospitals completed the survey. During the period, there were a total of 49 tertiary hospitals in Nigeria. **Results:** There were 68 practising pediatric surgeons; 27 (55%) hospitals had a pediatric surgeon. Each hospital had 1–3 pediatric surgeons (median 2). In the 14 hospitals completing the survey, the number of pediatric trained nurses in the surgical wards was 0–10 (median 4, 4 hospitals had no pediatric trained nurse), general surgery 3–14 (median 5), urology 1–4 (median 3), plastic surgery 0–4 (median 2), cardiothoracic surgery 0–3 (median 2, 6 hospitals had none), neurosurgery 0–4 (median 1, 5 hospitals had none), orthopedic surgery 1–7 (median 3, 1 hospital had an orthopedic surgeon with interest/training in pediatric orthopedics), otolaryngology 1–5 (median 4), anesthesia 0–8 (median 4, 2 hospitals had no physician anaesthetist, 1 had an anesthetist with interest/training in pediatric anesthesia), nurse anesthetists 0–19 (median 8, in 1 hospital, anesthesia was provided entirely by nurse anesthetists), pathology 0–7 (median 4), radiology 0–9 (median 6) and oncology 0–5 (median 2). Aside from pediatric surgery, all other specialties do not have a training program for pediatric specialization, making it difficult to develop such capacity. **Conclusion:** Considering the lack of training

programs for pediatric specialization in most of the specialties, international partnerships and collaborations are necessary to help develop the capacity and relevant educational resources. International partnerships would be helpful in increasing and strengthening the workforce capacity for specialized surgical care of children in Nigerian referral hospitals.

Analyses of the gap between surgical resident and faculty surgeons concerning operating theatre teaching: report from Addis Ababa University, Ethiopia. A. Bekele,* B. Kotisso,* S. Shiferaw.† From the *Department of Surgery, School of Medicine, and the †School of Public Health, Addis Ababa University, Ethiopia.

Background: In a continent like Africa, where the number of surgeons is alarmingly low, training of a large number of residents is the way forward. However, sudden expansion in the number of trainees in an existing teaching environment may bring the quality of the most fundamental education, i.e., operation room teaching, into question. **Methods:** We wanted to investigate the different perceptions of our surgeons-under-training and faculty concerning preoperative preparation, intraoperative teaching and postoperative feedback. A validated questionnaire was administered to our surgical residents and faculty at the Addis Ababa University, School of Medicine, Department of Surgery. Results were analyzed with 2-sample *t* tests, comparing Likert scores. Findings were significant if $p < 0.05$. **Results:** In all, 40 residents (15 second years, 15 third years and 10 final years) and 30 faculty members completed the survey. With respect to preoperative preparation, significant differences were found in perceptions about reading (3.77 v. 2.45, $p = 0.001$) and anatomy review (3.73 v. 2.34, $p = 0.001$) before the procedure. There was a very significant difference with regards to intraoperative teaching activities, i.e., teaching of the operative steps (2.60 v. 3.79, $p = 0.048$), instrument handling (2.30 v. 3.72, $p = 0.002$) and surgical technique (2.23 v. 3.83, $p = 0.001$). Significant disagreement was found in the perceived effort of the faculty to act as a teacher in the operating room (2.13 v. 3.94, $p = 0.002$). Postoperatively, significant differences were found in perceptions of positive feedback (2.48 v. 3.86, $p = 0.01$) and feedback on areas to improve (1.85 v. 3.34, $p = 0.001$). **Conclusion:** There is agreement on the need to improve the current operation theatre teaching system. However, the difference between resident and faculty in the teaching-learning process is alarmingly significant. As there is no substitute to the intraoperative training of residents, every effort must be made to not trade off number of graduates with quality and competence of surgeons-under-training.

Introduction of structured operative obstetric course at Mbarara Regional Referral Hospital with resultant reduction in maternal mortality. I. Bonet,* J. Ngonzi.† From the *Department of Obstetrics and Gynecology and the †Maternal Perinatal Audit Committee, Mbarara Regional Referral Hospital, Mbarara, Uganda

Background: The maternal mortality rate in Uganda is 435 of 100 000 live births (UDHS 2010). A baseline retrospective review of maternal mortalities 3 years ago revealed a number of avoidable factors. The leading cause of maternal mortality is sepsis (both puerperal and postabortal sepsis), followed by obstetric

hemorrhage (especially postpartum hemorrhage), pre-eclampsia/eclampsia, etc. This was before the structured operative obstetric (SOO) course was introduced. Factors involved in the maternal deaths reviewed included nonexistent use of the WHO surgical safety checklist and clinical management protocols. Monitoring of patients' vitals perioperative was just 5%. When the SOO course was introduced, a number of health cadres were trained, including intern doctors and resident doctors. Careful follow-up on proper management of these mothers was done, and the missing gaps are now beginning to close. **Methods:** We are monitoring adoption of SOO course recommendations in the care of pregnant and postpartum women. **Results:** Currently, review of the progress indicates the following: 80% use of the WHO surgical safety checklist, protocols have been developed and introduced and are now currently in use, and patient perioperative vitals monitoring has improved to 70%. The maternal mortality rate at Mbarara Regional Referral Hospital in 2009 was 722; this has reduced to 374 in 2010 and 325 in 2011. **Conclusion:** These interventions are low cost and have contributed to reduction of maternal mortality at our institution. The SOO course has contributed significantly to improving clinicians' knowledge and skills in the management of these mothers, resulting in improved maternal health.

A training cascade for Ethiopian surgical and obstetrical care: an interprofessional, educational, leadership and skills training program. M. Derbew,* K. Dorman,† N. Byrne,‡ L. Satterthwaite,‡ R. Pittini,‡ T. Tajirian,‡ R. Kneebone,§ F. Bello,§ D. Desalegn,* F. Henok,* A. Dubrowsk.‡ From the *Faculty of Medicine, Addis Ababa University, Ethiopia, †McMaster University, Hamilton, the ‡University of Toronto, Toronto, Ont., and §Imperial College, London, United Kingdom

Background: A 3-year capacity-building collaborative project in faculty development in interprofessional education, leadership and technical skills training was undertaken with the objective of being replicated by the Ethiopian participants in various sub-Saharan medical schools. **Methods:** Initially, the universities of Addis Ababa, Toronto and Imperial College planned the project. Next, the training content of the project was delivered; it focused on individualized simulation-based technical skills for Ethiopian faculty in the departments of surgery, obstetrics and gynecology, nursing and midwifery. This content was replicated by trained local faculty at 3 additional Ethiopian medical schools. Finally, a comprehensive process-based evaluation identified and measured the achievement of expected and unanticipated outcomes. **Results:** The training program was conducted at 4 Ethiopian medical schools with a total of 63 participants. The trained cohort instructed 45 additional learners based on a developed instructional handbook. The evaluation data show increased acceptance of simulation, a capacity to create and replicate surgical training simulators, knowledge and skills required to teach other faculty, and collaboration between medical schools in Ethiopia and internationally. **Conclusion:** An undertaking between 3 international medical schools and 3 additional Ethiopian schools produced positive effects in faculty capacity-building, curriculum development and institutional acceptance. Questions concerning sustainability depend upon continued commitment to collaboration and resource allocation. The emphasis of this study was based on

2 transferable principles: first, training local trainers to continue the training program with colleagues, and second, using an established evaluation model to determine the processes and outcomes of the project.

Undergraduate surgery clerkship and the choice of surgery as a career: perspective from a developing country. S.O. Ekenze, F.O. Ugwumba, U.M. Obi. From the Department of Surgery, University of Nigeria Teaching Hospital, Enugu, Nigeria

Background: Despite increasing number of medical students in the West African subregion, the proportion selecting surgery as a career has decreased. Previous studies indicate that most students choose their ultimate career during undergraduate training. This study was undertaken to assess the medical student's perception of the surgery clerkship and determine its influence in the choice of surgery as a career. **Methods:** The study involved a cross-sectional survey of the 2009 and 2010 graduating medical class of the University of Nigeria, using self-administered questionnaires. The clerkship evaluation was assessed using a 3-point Likert scale (1 = poor, 3 = excellent). **Results:** The response rate was 70.3% (275 of 391), the median age of the students was 25.7 (range 21–36) years and 179 (65.1%) were male and 96 (34.9%) female. Sixty-one (22.2%) rated the overall quality of their surgery clerkship as excellent (mean score 2). Compared with the other 3 major clerkships, surgery has the least rating for overall quality (mean score surgery 2, others 2.2). Aspects of the clerkship experience that contributed to the overall poor rating include quality of opportunity to participate in direct patient care; clarity of posting goals and objectives; experience in learning history-taking skills, basic physical examination skills, and interpretation of laboratory data; accessibility of faculty; and student perception that they were treated in a respectful manner. More involvement in direct patient care ($n = 154$, 56%) and improvement in faculty:student ratio and student–faculty interaction ($n = 91$, 33.1%) were the major suggestions to improve clerkship quality. Overall, 96 (34.9%) selected surgery as a specialty choice and 39.3% (108 of 275) selected the other 3 major specialties. Factors indicated as major influence in the choice of specialty include personal inclination (44.4%), clerkship experience (30.9%) and diligence of faculty (7.6%). **Conclusion:** There is need to review surgery clerkship in our setting with a view to improving clerkship experience. This may further enhance the attraction of surgery as a specialty choice among medical students. We need to study ways of improving undergraduate surgery clerkship in order to attract the best and the brightest medical students to a career in surgery.

Intramedullary nail versus external fixation in management of open tibia fractures: experience in a developing country. E. Oluwadare, I.C. Ikem, L.M. Oginni. From the Department of Orthopaedics and Traumatology, Faculty of Clinical Sciences, College of Health Sciences, Obafemi Awolowo University Teaching Hospitals Complex, Ife-Ife, Nigeria

Background: Our aim was to compare outcomes of management of open tibia fracture using external fixation and unreamed interlocking intramedullary nail. The incidence of deep wound

infection and mean duration of fracture healing were compared as objectives. **Methods:** Study design was interventional. Forty patients who presented with open fractures were recruited serially. Alternate patients were placed into each group. All the patients had wound debridement. Twenty patients (study group) had primary interlocking fixation, whereas the other 20 patients (control group) had external fixation. All were followed up for 9 months. Two patients in the study group were lost to follow-up. **Results:** Overall mean age was 39.4 years and 82.5% of patients were male. Motor vehical collision (42.5%) and motorcycle collision (40%) were the commonest etiological factors. The incidence of deep wound infection was 0.35×10^3 and 0.11×10^3 for the control and study groups, respectively. The relative risk of developing infection in the control group was 3.2. All the patients in the study group and 80% in the control group achieved union. Twenty patients in the control group had nonunion. Mean duration of union was 14.8 weeks and 14.4 weeks in the control and study groups, respectively, with the difference not being statistically significant ($t = 0.133$, $p = 0.895$). **Conclusion:** Unreamed interlocking intramedullary nailing is a safe alternative to external fixation in the management of open tibia fracture. A low incidence of infection with implant surgeries was obtained as recorded in the western world. This may help allay fears in the management of open tibia fracture with intramedullary nailing henceforth in developing countries.

The College of Surgeons of East, Central and Southern Africa (COSECSA) filling the gap; increasing the number of surgeons. P.G. Jani,* A. Howard.† From the *Department of Surgery, University of Nairobi, Kenya, and the †Department of Health Policy, Management and Evaluation, University of Toronto, Toronto, Ont.

Background: Our aim was to highlight the role of the College of Surgeons of East, Central and Southern Africa (COSECSA) in filling the gap, increasing the number of surgeons in 11 countries in Africa, and to project the possible role of COSECSA in the 5 years to come. **Methods:** We conducted a critical review of COSECSA activities and analysis of its records, especially of the training courses organized, e-learning programs started, accreditations, examinations conducted and others. **Results:** COSECSA, with the aim of filling the gap and increasing the number of surgeons, has accredited more than 70 hospitals in 11 African countries for training surgeons. To further improve surgical training, COSECSA has 2 e-learning programs established, one since June 2005, namely Surgery in Africa (SIA), and the other, School for Surgeons (SfS), running for some years now. From 2011, it became mandatory to participate in e-learning before the candidates could take their examinations. Of the 25 MCS candidates taking their clinical examinations, 24 had completed all the 6 SfS cases online, and most of the member (MCS) and fellowship (FCS) candidates had completed at least 6 SIA certificates of the monthly reviews. With the small numbers and short duration, it was difficult to prove any improvement in training statistically, but it was clear that the candidates performed better than in past years, as reported by the broad panel of internal and external examiners, and some data will be presented to support this. In addition to e-learning, numerous other courses were organized to improve both the teaching and learning of the basic science subjects for the membership

candidates. Analysis of these various trainer and trainee courses will be presented. The 2011 COSECSA clinical examinations attracted a total of 17 foreign examiners from 7 countries, indicating that the examination processes have matured immensely, and details of these will be highlighted. A total of 225 candidates have trained in surgery, with 95 MCS graduates working as junior surgeons and 61 FCS graduates (in 5 subspecialties), providing consultant-level surgical services, many of them in rural areas in the region. Analysis of their work will be presented as achievements of COSECSA. Difficulties faced by the college, especially financial constraints of the college, economic hardships of the candidates, training in the peripheral areas and running of the various courses, will be discussed. With the same rate of progress, COSECSA will have approximately 100 candidates for examinations every year in 5 years to come. **Conclusion:** Through its training courses and e-learning programs, and its accreditation and examination processes, COSECSA has developed into a unique and incomparable regional surgical accrediting and training body in 11 countries in Africa. Its impact so far is clearly visible, and the future prospects of filling the gap appear highly promising. The main purpose of COSECSA is to increase the number of surgeons in the region and bridge the gap.

Clinical officer surgical training in Africa: COST-Africa. M. Labib. From the School of Medicine, University of Zambia, Lusaka, Zambia

Africa's neglected burden of disease: Africa's high maternal mortality is well recognized, with between 200 and 2000 women dying per 100 000 deliveries. This compares to 3–20 maternal deaths per 100 000 in Europe. Less well recognized is the scale of surgical disability-adjusted life years (DALYs) lost in Africa from trauma and inflammatory abdominal conditions. The lives of countless numbers of men, women and children could easily be saved through timely, safe and effective district-level surgery and a systematic surgical response to tackle this burden of disease could also strengthen district health systems for the neglected rural poor. **How to respond:** African countries have surgeons trained to top international standards, but far too few to tackle the population burden of disease that could be greatly reduced through surgery. No amount of training workshops and task-shifting to volunteers will compensate for Africa's absolute shortage of formally trained health staff: doctors, nurses and clinical officers. Clinical officers (COs) have been the backbone of clinical care services at health centres and district hospitals in sub-Saharan Africa for decades. They usually have 3 years of clinical training and can manage most of the common major diseases. Their qualifications make it much more difficult for them to emigrate than it is for a medical doctor or nurse. **What this research project offers:** The European Union has indicated that it will fund clinical officer surgical training in Africa (COST-Africa; 2011–15) under its Framework Programme 7. Investigators will design, implement and evaluate a unique, scalable, district CO surgical training program that addresses the scope of the deficit in surgical skills in Malawi and Zambia. Specifically, it will (1) map and assess the nature, scale, distribution and consequences of the deficit in surgical skills in Zambia and Malawi and evaluate the effects of related interventions and policies; (2) design and implement surgical training interventions for COs in Zambia and Malawi, which include in-service training, supervi-

sion and quality control; (3) measure the effectiveness and impact of the interventions at the levels of health worker, patient, health facility and district population; (4) establish the cost-effectiveness of the intervention; (5) support national and regional policy makers in developing career paths and retention strategies for surgically trained COs and specialist surgeon-trainers. **Project design/training and evaluation/who we are:** Two different training models will be evaluated. First, in Zambia, the Surgical Society of Zambia will oversee a 2-year national training program for COs, combined with hospital attachments, followed by a 6-month internship at provincial hospitals. Second, in Malawi, surgeons at the College of Medicine will oversee a program of centralized and district hospital in-service training for COs. A controlled trial impact and economic evaluation will be led, respectively, by the Royal College of Surgeons in Ireland (project coordinator) and the Radboud University Nijmegen in the Netherlands. **How Africa will benefit:** COST-Africa will first bring benefits to the people of Malawi and Zambia, especially rural dwellers who lack easy access to urban centres and whose only hope of life-saving emergency surgery is if it can be delivered at the nearest district hospital. The outcome will be a fully tested model that will: (1) make a major and sustainable impact on Africa's burden of disease; (2) provide African countries with surgically trained and retainable health professionals; and (3) demonstrate the potential for a 3-fold role for Africa's small pool of highly trained surgeons — as specialists, trainers and quality assurers — helping to retain them in Africa. Roll out of lessons taught to other African countries will be through the College of Surgeons of East, Central and Southern Africa (COSECSA), whose members span 9 African countries.

Secondary neuronal injuries following cervical spine trauma: audit of 68 consecutive patients admitted to neurosurgical services in Enugu, Nigeria. W.C. Mezue, E. Onyiah, I.C. Iloabachie, S.C. Ohaegbulam. From the University of Nigeria Teaching Hospital and the Memfys Hospital for Neurosurgery, Enugu, Nigeria

Background: This study examines the factors contributing to secondary neuronal injury and suggests steps to improve standard of care in spinal trauma patients in Nigeria. **Methods:** We conducted a questionnaire-based prospective study of 68 consecutive patients admitted with cervical cord injury to the 2 neurosurgical centres in Enugu between March 2008 and October 2010. **Results:** In all, 53 (77.9%) patients were male, with a mean age of 33.9 (range 15–69) years; 23.5% had concomitant head injury. There was an average of 3.5 hours delay between trauma and presentation to initial care and an average of 10.4 days (range 2 h to 18 wk) to neurosurgical care. Of patients, 57.3% were initially admitted into primary or private medical care and 16.2% to alternative care. Only 26.5% presented primarily to centres with trauma services. None of the patients received cervical protection or any medical/paramedical care before arriving to the initial care centre: 94.1% were extracted by passer-bys and 17.7% were sitting on their way to initial care. Of the 55 patients transported lying down, over 60% were in back seat of saloon cars; 41.2% noticed inability to move the limbs after removal from the scene, whereas 7.4% noticed it on the way to or after arrival in hospital. During transfer to neurosurgical centres, only 30.9% had cervical support and only 11.8% were transported in an ambulance.

Conclusion: Ignorance of prehospital management of patients with cervical injuries exists in the general population and among medical personnel. Many patients sustain secondary neuronal injury from uninformed but well-intentioned volunteers. These preventable injuries highlight the urgent need for trained paramedical services and public enlightenment.

Capacity building and workforce expansion in surgery, anesthesia and perioperative care: the GPAS model in Uganda. C. Mijumbi,* S. Kaggwa,* J. Tindimwebwa,* J. Mabweijano,* M. Lipnick,† G. Dubowitz,† L. Goetz,‡ S. Jayaraman,§ A. Kwizera,* D. Ozgediz.‡ From the *Mulago Hospital and Makerere University, Kampala, Uganda, the †University of California San Francisco, San Francisco, Calif., the ‡University of Buffalo, Buffalo, NY, and §Brigham and Women's Hospital, Boston, Mass.

Background: Surgery and perioperative care remain neglected in global health. Though many programs address these challenges, a defining model has yet to be established. We describe the formation, challenges and accomplishments of Global Partners in Anesthesia and Surgery (GPAS) in Uganda. **Methods:** Our model was built on collaboration between academic surgery departments in the United States and Uganda and expanded to anesthesia. After conducting needs assessments, we developed projects focusing on: workforce expansion, enhanced learning and work environments, increased collaborative research and increased coordination, with an intentional shift away from the trainee exchange, equipment donation and clinical service delivery models. **Results:** A scholarship and recruitment program helped increase enrollment of postgraduate surgery and anesthesia trainees over 4-fold between 2007 and 2011. We improved the learning environment through the creation of a resident resource room and training courses, including prehospital and hospital-based trauma care. Collaborative research in locally identified priority areas included trauma, occupational exposure and surgical epidemiology. Infrastructure-related projects focused on increasing local biomedical support rather than equipment donations. Conferences, regular communication, project transparency and a local coordinator have increased collaboration among northern partners working in Uganda. **Conclusion:** The GPAS projects have helped increase recruitment in surgery and anesthesia, expand local research and increase stakeholder collaboration in surgery and perioperative care in Uganda. Further assessment is needed to measure impact on the surgical disease burden. This model may prove useful to other global partnerships seeking to augment capacity for surgery and anesthesia care in resource-constrained settings.

Knowledge retention surveys: identifying the effectiveness of a road safety education program in Dar es Salaam, Tanzania. K. Zimmerman,* J. Matagane,† T. Bishop,† A. Guerrero.‡ From *Amend, New York, NY, †Amend, Dar es Salaam, Tanzania, and ‡InterTrauma Medical Consulting, New York, NY

Background: Knowledge, attitude and belief surveys were implemented as part of a road safety education program in primary schools in Dar es Salaam, Tanzania. The purpose of this study was to quantify the effectiveness of the educational program

and to identify how well the students were able to retain information 2 weeks later. **Methods:** The surveys were given at 5 of the 20 primary schools and were collected for all children in grade standard 3 (approximately 9–10 years old) and grade standard 7 (approximately 14–16 years old). The surveys were administered before the educational program, immediately after the program and 2 weeks later. During each stage of the survey, children were asked to complete the same 10 “true or false” questions about road traffic safety. **Results:** Road safety lessons were taught to a total of 66 629 children in 20 primary schools from Dec. 1, 2010, to Nov. 30, 2011. Of these, 1065 students were given the survey. Overall, the pupils answered 68.4% (CI 65.4%–71.1%) of the survey questions correctly before the lessons, and after the educational program correctly answered 85.0% (CI 82.9%–87.1%). The increase in knowledge, attitudes and beliefs demonstrated immediately after the educational program was sustained, as demonstrated by the students scoring, on average, 81.4% (CI 79.0%–83.7%) of the questions correctly 2 weeks later. This was similar for both grades tested. **Conclusion:** The findings of the survey demonstrate a noticeable improvement in students' knowledge of road safety following the lessons. Conducting road safety lessons for students at select primary schools in Dar es Salaam, Tanzania, has proven to be worthwhile, as both levels of students surveyed demonstrated increased knowledge about road safety following the lessons and demonstrated sustained retention. The characteristics of the educational program are reviewed in detail. Road traffic injuries are a significant threat, especially for pedestrians who are a vulnerable group of road users. Children are often injured as pedestrians and have very different crash characteristics than adults, therefore it is beneficial to have tools tailored to their needs as road users. This study provides evidence that road safety education has the potential to be valuable in preventing injuries and deaths.

A tale of 2 fellowships: a comparative analysis of Canadian and East-African pediatric surgical training. R. Baird,* M. Ganey,* D. Poenaru.† From the *Division of Pediatric Surgery, The Montreal Children's Hospital, McGill University, Montréal, Que., and the †Bethany Kids at Kijabe Hospital, Kijabe, Kenya

Background: Profound differences exist in the practice of pediatric general surgery between developed and developing nations, including manpower, technology, infrastructure and access to care. Significant variability in the educational experience of trainees also likely exists. We compared the training of senior fellows in a Canadian (CAN) and an East-African (EA) pediatric surgery fellowship program to identify opportunities for educational partnerships. **Methods:** The complete case-log of 3 senior pediatric surgery fellows from a Canadian and an East-African institution were investigated; index case volumes were compared with median case numbers of pediatric surgery training programs in North America (NA) as defined by the Accreditation Council for Graduate Medical Education. Cases were also categorized according to subspecialty and technique. Comparative statistics were calculated, with $p < 0.05$ considered significant. **Results:** The median total number of cases did not differ between CAN, EA and NA trainees overall (see Table). East-African trainees had significant deficiencies in several index case volumes compared with the NA median, including congenital diaphragmatic hernia

Table. Case logs of senior pediatric surgery fellows in Canada (CAN) and East Africa (EA) compared with median case numbers of pediatric surgery training programs in North America (NA)*

Case	Group; median (range)		
	CAN, n = 3	EA, n = 3	NA, n = 66
Total	900 (813–942)	927 (860–1185)	1152 (798–1797)
Index cases			
ARM	11 (5–11)	23 (19–35)	13 (3–53)
Orchidopexy	29 (23–38)	35 (21–44)	20 (6–65)
CDH repair	8 (7–12)	1 (0–2)†	13 (3–34)†
Lung resection	10 (9–14)	0 (0–0)†	12 (3–38)†
Subspecialty cases			
Neonatal (nonneurosurgical)	181 (137–211)†	32 (30–38)†	
Minimally invasive	169 (124–206)†	6 (3–8)†	
Urology	66 (48–71)†	177 (120–179)†	
Neurosurgery	1 (0–5)†	414 (242–524)†	
Plastic surgery	4 (4–5)†	70 (69–104)†	

ARM = anorectal malformation; CDH = congenital diaphragmatic hernia.
 *Summary statistics derived from the Accreditation Council for Graduate Medical Education (ACGME) website.
 †p < 0.05.

repair, lung resections and others. East-African trainees also had significantly fewer general neonatal cases and minimally invasive procedures when compared their CAN peers. East-African trainees demonstrated significantly more case volume in alternative subspecialties, including neurosurgery, urology and plastic surgery. **Conclusion:** Differences exist in the training experience of Canadian versus East-African pediatric surgery trainees, reflecting the difference in the spectrum of surgical practice on each continent. Electives abroad would enrich the training experience of fellows on both continents.

Outcomes of closed diaphyseal femur fractures treated with the SIGN nail. S. Carsen, S. Park, D. Simon, L.G. Zirkle, R.J. Feibel.

Background: The burden of orthopedic trauma in the developing world is significant and disproportionate. The Surgical Implant Generation Network (SIGN) has developed a low-cost intramedullary prosthesis for use in the treatment of fractures of the femur, with the prosthesis and necessary tools donated. Our primary purpose was to examine the postoperative radiographs of closed diaphyseal femur fractures treated with the SIGN nail to assess for alignment. Our secondary goal was to assess the functionality and robustness of data in the SIGN database. **Methods:** A retrospective review was undertaken of patients treated for a diaphyseal femur fracture. Exclusion criteria included open fractures and those without postoperative radiographs. In all, 500 randomly selected cases were analyzed for location of fracture, fracture classification (AO/OTA classification) and degree of comminution. Measurements of alignment were made on orthogonal radiographs, with malalignment defined as deformity in either the sagittal or coronal plane greater than 5°. Radiograph quality and adequacy was also graded. **Results:** The incidence of malalignment in postoperative radiographs was found to be 8.4%. More than 90% of reviewed radiographs were of acceptable or good quality. Comminution was found to be an independent pre-

dictor of malalignment. **Conclusion:** The incidence of malalignment in femoral fractures treated with the SIGN nail closely approximated the incidence previously reported in the literature for a North American trauma centre. This is encouraging, and provides support for the continued and expanded use of the SIGN prosthesis throughout the developing world. Additionally, the SIGN database, which is populated by data submitted by surgeons around the world, was found to be a satisfactory resource.

Managing surgical emergencies: delivering a new course for the College of Surgeons of East Central and Southern Africa. J.S. Dreyer, J.A.F. Hannay, R.H.S. Lane; Association of Surgeons of Great Britain and Ireland (ASGBI).

Background: A practical course on management of surgical emergencies was developed, as requested by the College of Surgeons of East Central and Southern Africa (COSECSA) and guided by the learning needs of surgical trainees in East/Central Africa, to teach structured thinking processes in surgical emergencies, thoroughly assess participants’ knowledge, technical and nontechnical skills, and correlate assessment scores with participants’ feedback on course quality. **Methods:** Curriculum design was aimed at learners’ needs, as guided by local trainers and previous teaching. A 5-day course was developed on emergencies in critical care and trauma, general surgery, orthopedics, obstetrics and urology; it was delivered through lectures, tutorials and practical sessions, with individual mentoring. Participants’ knowledge was assessed through end-of-course tests, and their practical and nontechnical skills evaluated formatively. Opportunity for detailed written and verbal feedback was provided. **Results:** All participants completed the course successfully, passed knowledge tests and received satisfactory scores in continuous assessment. Formative assessment identified outliers for nontechnical skills. Candidates rated course content, delivery and usefulness very highly; “open text” noted no such previous training. **Conclusion:** An intensive course on management of surgical emergencies can be effectively delivered by a small core faculty for each specialty. Feedback from participants and local faculty indicated that this course filled a specific learning niche. Effective assessment should be based on continuous evaluation. Surgical emergencies, especially in trauma, are major causes of surgical activity and morbidity in Africa. These patients often need critical care. Effective teaching of surgical and team-working skills should improve patient care by trainees, who are often “at the coalface” in surgical emergency care in African hospitals.

An evaluation of the exam for the University of Guyana Diploma in Surgery. R.J. Fairfull Smith,* B.H. Cameron,† M. Rambaran.‡ From the *University of Ottawa, Ottawa, the †McMaster International Surgery Desk, Hamilton, Ont., and the ‡Institute for Health Science Education, Guyana

Background: The University of Guyana, in collaboration with the Canadian Association of General Surgeons, developed a 2.5-year Postgraduate Diploma in Surgery program, which now has 13 graduates. The final exam consists of 100 multiple choice questions (MCQ), a short answer question exam and an oral exam. We evaluated the validity and reliability of the MCQ exam by administering the 2011 Guyana exam to Canadian surgical

residents. **Methods:** The Guyana MCQ exam was written by 61 residents from 2 Canadian general surgery training programs (Ottawa and McMaster). Results were compared with those of all Guyana graduates. **Results:** See Table below.

Table. Results of the Guyana multiple choice exam written by Guyanese and Canadian general surgery residents

Surgical resident	No. candidates	Average % (range) [SD]	
Guyana			
2008	5	64.2	(55–70)
2009	4	66.5	(61–71)
2010	3*	61.0	(52–66)
2011	2	61.0	(58–64)
Canada			
PGY 1	14	51.2	(39–61) [7.4]
PGY 2	13	58.9	(49–68) [5.3]
PGY 3	16	62.5	(52–76) [7.2]
PGY 4	5	66.0	(50–74) [9.7]
PGY 5	13	68.6	(60–76) [5.8]

PGY = postgraduate year; SD = standard deviation.
*1 failure.

Conclusion: First, the results of the exam in Guyana were consistent from year to year. Second, the exam reliably discriminated between Canadian residents at different levels of training. Third, the Guyanese graduates achieved a level of knowledge equivalent to a mid-upper level Canadian resident. The University of Guyana and its postgraduate dipoloma in surgery residents can have confidence in the exam system, with the assurance that a high level of knowledge is being achieved by graduates.

Priority setting for health resource allocation in Brazil: a scoping literature review. *F. Ferri-de-Barros,* J. Gibson,†‡ A. Howard.†* From the *Department of Surgery, University of Calgary, Alberta Children’s Hospital, Calgary, Alta., the †Department of Healthy Policy, Management and Evaluation, University of Toronto, and the ‡Joint Centre for Bioethics, University of Toronto, Toronto, Ont.

Background: To describe priority setting for health resource allocation across the public–private Brazilian health system. **Methods:** For knowledge synthesis, we conducted a scoping review of the literature. We searched databases MEDLINE, EMBASE and Google, using MeSH headings “priority setting” or “resource allocation” or “rationing” and “health services” and “Brazil.” Two authors independently reviewed the abstracts, selected full text articles, documents and manuscripts and scrutinized relevant references according to the following inclusion criteria: empirical studies on priority setting for health resource allocation in Brazil, documents and legislation published by the Brazilian government and relevant manuscripts published by diverse interest groups. We contacted key Brazilian authors, including leading bioethicists, for commentaries or dissertations related to the review. **Results:** Nine articles met the inclusion criteria. Priority setting is well described and legislated for the Brazilian public health care system; however, rationing of health resources occurs implicitly. We found no studies or documents describing priority setting for the privately financed health system. **Conclusion:** T power imbalance among decision-makers and

across the public–private mix represents a systematic bias against low-income families. Research on this topic may facilitate societal learning and empowerment toward health equity in Brazil. Rationing resources is required to address competing population health needs. Fostering capacity for surgical services may undermine capacity for competing health priorities. Explicit processes and reasoning are critical for ensuring ethical deliberation in diverse contexts and health systems. This is particularly relevant, yet poorly studied, in developing countries, including Brazil.

Foreign aid effects on orthopedic capacity at the Hospital Saint Nicholas, Haiti. *J. Friedman, A. Costas, J.G. Meara, M. St-Albin, G. Dyer.*

Background: Since the earthquake that struck Haiti in 2010, there has been an influx of foreign surgeons. However, to our knowledge, there has been no study to determine how this foreign aid has affected overall orthopedic programs in Haiti. The purpose of this study is to measure the long-term effects of foreign surgical aid on the Hospital Saint Nicholas in Saint Marc orthopedic program to determine foreign-aid successes and areas that need future skills transfer. **Methods:** This project is a retrospective study using orthopedic surgeries from the Hospital Saint Nicholas surgical log book from June 2009 through November 2011. Post-earthquake month-by-month comparisons were made to identify trends in orthopedic volume, case complexity and proportion of cases performed by Haitian versus non-Haitian surgeons. Post-earthquake numbers were also compared with prequake numbers to assess overall program improvement. **Results:** In all, 481 orthopedic procedures were performed, making up 20% of all surgeries. Preliminary results show an overall increase in orthopedic surgeries and number of complex surgeries as compared with prequake numbers. Postearthquake numbers vary greatly from month to month; however, it appears that higher numbers correlated with foreign surgeon presence. **Conclusion:** Although there has been an increase in orthopedic surgeries and an increase in complexity, these increases may be dependent on foreign surgeon presence and thus may not be sustainable. Future foreign surgical aid needs to better emphasize skills transfer for sustainable benefit.

ReTHINK aid: international maternal health collaborations. *R. Gill,* P. Rama Devi.†* From the *Department of Obstetrics and Gynecology, University of Ottawa, Ottawa, Ont., and the †Lifespring Hospital, Head Quality Assurance, Hyderabad, India

Background: Many challenges limit India’s progress toward its commitment to reduce maternal mortality. Therefore, the concept of social entrepreneurship has evolved to synergize philanthropic and market-based solutions to address this. This case study outlines a social enterprise in India that focuses on eliminating maternal mortality by providing low-cost, high-quality obstetrical care to the working poor. **Methods:** This case review is an observational study conducted in November and December 2011 to gather information on the quality of maternal and newborn care provided by Lifespring Hospitals, a chain of 16 maternity hospitals in Hyderabad, India. **Results:** Lifespring is a joint venture between Hindustan Latex Limited, a government of India enterprise, and Acumen Fund, a New York social venture-capitalist company. It offers basic obstetrical care that costs 50%

less than other hospitals. The total number of deliveries at all 16 sites since 2005 to December 2011 was 13 445, and the total number of outpatient department visits was 230 732. The maternal mortality was 0 and the neonatal mortality was 5 per 1000 live births. The services provided at Lifespring include antenatal care, postnatal care, deliveries, family planning services, medical termination of pregnancy, pediatric care, diagnostic services, pharmacy and health care education, access to skilled healthcare providers, blood transfusions and well-equipped operating theatres. **Conclusion:** Given the complexity of maternal healthcare disparities, we must consider innovative solutions to eradicate high rates of maternal mortality and gender inequities. Lifespring demonstrates how a group of social entrepreneurs are addressing medical, socioeconomic and health-related causes of maternal mortality by applying an innovative model. Developing social enterprises is a new concept, connecting social innovation and healthcare and thus demonstrating a novel way of rethinking about international health.

Effect of electronic medical record implementation on patient and staff satisfaction, and chart completeness in a resource-limited antenatal clinic in Kenya. *A. Gray,* C. Henshaw,* J. Wright,* J. Leah,* R.F. Spitzer,* D. Caloia,* E. Omenge,† B. Chemwolo.†* From the *Department of Obstetrics and Gynecology, University of Toronto, Toronto, Ont., and the †Moi Teaching and Referral Hospital and Moi University School of Medicine, Department of Reproductive Health, Eldoret, Kenya

Background: Electronic medical records (EMRs) are thought to improve patient care through a variety of means. However, the study of EMR implementation in resource-poor settings has been minimal. We conducted a study comparing patient/staff satisfaction and completeness of patient charts before EMR implementation (2009) and 1 year post EMR implementation (2011) at a busy antenatal clinic in Kenya. The purpose was to determine the effects of EMR on patient care in a resource-limited setting. **Methods:** The study consisted of 3 parts: a patient satisfaction questionnaire, a staff satisfaction questionnaire and a retrospective chart review. For patient surveys, 124 (2009) and 150 (2011) patients were interviewed during their clinic visit. Questions related to the complete time for their visit, their understanding of the information presented and their overall satisfaction. For the chart review, charts of 250 patients were examined for completeness of key indicators used in antenatal care. Staff in the antenatal unit was also surveyed for overall satisfaction. **Results:** The results showed that the self-reported time it took for women to complete their visits was very significantly reduced ($p = 0.000$) after implementation of EMRs. The documentation of administered tetanus toxoid and testing for HIV and sexually transmitted infection were significantly increased with EMRs, and positive trends were also seen in documentation of malaria prophylaxis. **Conclusion:** Although greater sample numbers would help show more significant trends, this pilot study was able to demonstrate a positive impact of EMRs on antenatal patient care in a resource-limited setting. We demonstrated that EMRs can be a valuable investment in resource-limited settings.

Implementation of awake craniotomy in the developing world: data from China, Indonesia and Africa. *K. Howe,**

*G. Zhou,† J. July,‡ T. Totimeh,§ R. Mahmud,¶ M. Bernstein.** From *Canada, †China, ‡Indonesia, §Ghana and ¶Nigeria

Background: Our goal was to evaluate the feasibility and sustainability of teaching awake craniotomies as a means to improve access to neurosurgical care in resource-poor countries. **Methods:** A Canadian staff neurosurgeon with significant awake craniotomy experience initiated projects in China, Indonesia, Ghana and Nigeria. The surgical team varied between projects, but included 1 or more of the following: operating room nurses, a surgical resident and a neuroanesthetist. Cases were selected by the home country, informed consent obtained in the presence of visiting staff and surgery performed by the local neurosurgical team. **Results:** Twenty-five awake craniotomy cases were recorded over 2007–2011 in China ($n = 8$), Indonesia ($n = 11$), Ghana ($n = 4$) and Nigeria ($n = 2$). All had preoperative MRI performed. The diagnoses were as follows: glioblastoma multiforme (10 of 25), anaplastic astrocytoma (1 of 25), neuroendocrine tumour (1 of 25), low-grade glioma (3 of 25), meningioma (4 of 25) and metastases (4 of 25). Although intraoperative seizure was reported for a single case, there was no case requiring perioperative intubation. Length-of-stay ranged from 2 to 21 days, with 12 of 25 in hospital for fewer than 7 days. Postoperative morbidity included seizure (4 of 25) and weakness (temporary 2 of 25, permanent 1 of 25). There were no postoperative mortalities. **Conclusion:** Awake craniotomy for brain tumours can be taught and implemented in established neurosurgical centres in the developing world. The procedure is safe, limits length-of-stay in hospital and is sustainable, as centres continued to perform the procedure independently. Awake craniotomy obviates the need for intubation, additional lines and catheters, and typically requires decreased recovery time. These data are proof-of-principle that this tool has the potential to significantly improve access to neurosurgical care in the developing world.

Regionalization of diabetes care In Guyana, South America. *I. Bhoj,* B. Ostrow,† J. Lowe,† C. Lawton,‡ L. Lee Kozody,§ P. Coutts,§ H. Nesbeth,¶ A. Revoredo,§ R. Kirton,** G. Sibbald.†* From the *Georgetown Public Hospital Corporation, Georgetown, Guyana, the †University of Toronto, ‡Sunnybrook Health Sciences Centre and §Canadian Association of Wound Care, Toronto, the ¶Trillium Health Centre Mississauga, Ont., and the **Guyana Diabetic Foot Project – Phase 2

Background: Our goal was to develop a community-based diabetes care program inside the multilevel public health system in Guyana, South America. **Methods:** We aimed to regionalize the benefits of Guyana Diabetic Foot Project – Phase 1 (48% reduction in major amputations) to 6 administrative regions. We rolled out training in the highest level priorities for diabetes care in developing countries in 3 streams: foot care for high-risk persons, glycemic and blood pressure control and on-job training. We expanded the Guyanese key opinion leader pool from 7 to 11 and delivered 36 training sessions targeting 353 health care workers. We developed training modules and enablers in diabetes education, glycemic control and blood pressure treatment. There were 10 visits by Canadian diabetes/wound care experts to train and mentor the trainers and monitor results. We employed a project manager and 7 clerical staff. We renovated and staffed 7 new

regional diabetic foot centres based on the interprofessional model and provided appropriate equipment. We developed the public HbA1c testing capacity. **Results:** The project has completed its second year of activity. The logistic and infrastructure components have been established. The interprofessional key opinion leader team has 10 members. The first cohort of 192 regional trainees from 89 facilities has received training in medical and foot care. On-job training and mentoring has occurred at 45 facilities, 7 regional foot centres are operational and over 2000 patients have been screened for foot status. **Conclusion:** This sustainable model is a complex intervention, targeting patients, providers and health care systems, and is linked to patient outcomes. It has important generalizable implications for healthcare delivery in low-income settings.

Quantifying the burden of pediatric surgical disease due to delayed access to care. D. Poenaru. From BethanyKids at Kijabe Hospital, Kijabe, Kenya

Background: Congenital abnormalities are a significant component of the global burden of disease among children. This burden, measured in disability-adjusted life years (DALYs), comprises met, unmet and unmeetable needs. A significant part of the unmet need is caused by the “lost” DALYs of children with untreated surgical conditions owing to delayed access to care. We attempt to quantify the magnitude of this delayed burden in a major pediatric surgical centre in Kenya. **Methods:** The surgical records of all initial congenital procedures performed on children (< 18 yr) between 2001 and 2011 were extracted from the hospital database. Delay in surgery was calculated by subtracting the ideal age for each procedure from the actual age. Delayed burden in DALYs was calculated by multiplying surgical delay by estimated disability weight for each condition. **Results:** Over the 10-year period, 4020 initial congenital procedures were performed. Patients mean age was 2.2 years and 39% were female. The mean delay in surgical care and delayed burden by specialty follow in the Table. **Conclusion:** The data illustrate the significant delay and backlog in surgical care for children in low-middle income countries (LMICs). The cumulative delayed burden is significant and unfortunately unrecoverable. This initial attempt at quantifying the pediatric surgical backlog in LMICs provides methodology for estimating an overlooked component of burden of disease. Further validation can provide advocacy tools for increased surgical resource allocation in LMICs.

Table. Delay in surgical care and burden to patients at a major pediatric surgical centre in Kenya

Specialty	No.	Mean delay, yr	Burden, DALY
General	256	1.9	182.0
Neurosurgery	2728	0.9	1000.5
Plastics	468	6.2	327.7
Orthopedics/rehabilitation	50	5.5	61.0
Urology	518	6.2	475.7
Total	4020	5.5	2046.8

DALY = disability-adjusted life years.

Implementation of oncology surgery in Western Kenya. B. Rosen, J. Dodge, C. Giede, W. Jimenez, P. Cibulka, S. Sinesat, M. Bernardini, J. McAlpine, S. Finlayson, D. Miller, O. Elkanah, P. Itsura, L. Elit.

Background: In general, surgery for early stage cancers is curative. In Kenya, cervix cancer (CC) mortality is very high, yet there has been little emphasis on early detection. Screening for CC using visual inspection with acetic acid (VIA) has been shown to be reliable and cost effective in identifying and facilitating treatment of preinvasive disease. Screening also identifies early stage invasive disease that can be cured with radical hysterectomy (RH), if available. We conducted a pilot surgical training program to teach RH in Kenya. **Methods:** Training modules were developed by The Society of Gynecologic Oncology of Canada consisting of PowerPoint and video presentations of RH and its complications. A detailed process of evaluation was used for each participating surgeon, including pre- and posttests and intraoperative evaluation by a surgical mentor. **Results:** Two Kenyan gynecologists completed all modules and with the mentor performed 6 RHs in their setting. The Kenyans completed a seventh RH independently and have now completed 45 RHs in Kenya. We documented improved knowledge surrounding RH and surgical skills during the training period. **Conclusion:** This program demonstrates that surgical treatment of early stage cancers can be effectively taught and implemented in a low-resource country. The World Health Organization has identified that cancer rates in Africa are increasing, and some countries are investing in cancer detection and treatment programs that will require surgical training, given that there are few trained oncology surgeons in Kenya. This education model could easily be adapted and applied to other groups and likely other cancer sites.