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# **Injury and violence in the context of sustainable development**

**The first Bethune Round Table in Africa**

**Bethune Round Table 2024  
Conference on Global Surgery  
May 16–18, 2024  
Addis Ababa, Ethiopia**

**Abstracts**

The Bethune Round Table (BRT) is an annual interdisciplinary meeting dedicated to the field of global surgery to discuss challenges and solutions to improving surgical care for underserved and marginalized patients locally, regionally, and globally. For the past 22 years, Canada has hosted the BRT. In 2024, the BRT was held in Africa for the first time, organized and hosted by the Injury Prevention Initiative for Africa (IPIFA) in collaboration with the Canadian Network for International Surgery (CNIS) in Addis Ababa, Ethiopia.

This collection of abstracts, focusing mainly on the theme “Injury and Violence in the Context of Sustainable Development,” reflects the diverse range of topics discussed during the conference. The selected abstracts, representing the top contributions, highlight the critical challenges faced by underprivileged populations and the innovative approaches proposed to enhance surgical care accessibility and quality. By showcasing these findings, the 2024 abstract supplement not only emphasizes the need for effective interventions, but also seeks to inspire a collective effort toward achieving the United Nations Sustainable Development Goals related to health and well-being. As we present these abstracts in the *Canadian Journal of Surgery*, we hope to contribute to the ongoing dialogue and inspire further research and action in the field of global surgery.

For more information please visit:

<https://event.fourwaves.com/bethune2024/pages>

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**Members of the Scientific Committee:** Atalel Fentahun Awedew, MD, MPH, assistant professor of surgery, Debre Tabor University, Ethiopia; Meheret Befekadu Demissie, MD, plastic and reconstructive surgeon, ALERT Comprehensive Specialized Hospital, Addis Ababa, Ethiopia; Dominique Vervoort, MD, MPH, CPH, MBA, PhD candidate in health systems research, Institute of Health Policy, Management, and Evaluation, University of Toronto, MSc candidate in practical ethics, University of Oxford; Godfrey Sama Philipo, MD, MPH, MGSC, research and patient outcomes coordinator, COSECSA, ECSA Health Community, Arusha, Tanzania.

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### 01

**Optimizing of uptake of 3 WHO injury surveillance guidelines through digitization. Ronald Lett, Kidist Bartolomeos, Ryan Lett. From the Canadian Network for International Surgery (Ronald Lett); the World Health Organization (Bartolomeos); and Rigel Software (Ryan Lett).**

**Background:** The WHO guideline compendium is available in print or PDF. For maximum impact, digitization provides a technological solution for updating, sustaining, and optimizing guidelines. The objectives of this work were to 1) pilot digitization of 3 WHO surveillance guidelines using the WHO SMART (Standards-based, Machine-readable, Adaptive, Requirements-based, and Testable) approach; 2) develop key assets for digitization; and 3) demonstrate wireframes and software. **Methods:** Three existing WHO injury surveillance guidelines — WHO Injury Surveillance Guidelines (2002), WHO Guidelines for Conducting Community Surveys on Injuries and Violence (2004), and Fatal Injury Surveillance in Mortuaries and Hospitals (2012) — were chosen for digitization using the first 3 layers of the SMART approach. These digitized guidelines demonstrated clinical, household, and fatality interface functionality. Templates created a machine-

readable format that allowed automatic mapping to *International Classification of Diseases, 11th Revision* (ICD-11).

**Results:** The functionality of the selected digitized guidelines was demonstrated within the context of patient flow. High-fidelity wireframes with representative patients and households and artificial intelligence-generated pathology reports were prepared. A data collection software system linked to ICD-11, easily edited for local needs, recognizes common structures and can export data for epidemiological study.

**Conclusion:** Digitization of the WHO injury guidelines is of interest to injury specialists, and digitization can be done for other WHO guidelines. This method facilitates regular updating of data collection and prompts, thus improving uptake. Digitization of surveillance guidelines supports clinical decisions and data for stakeholders and facilitates learning. Machine-readable guidelines are readily revised as living guidelines, ensuring timely updates and high quality. Wide uptake in low- and middle-income countries will require addressing system and capacity challenges.

### 02

**Prospective study of pediatric neurotrauma surgery in Addis Ababa, Ethiopia: clinical presentation, injury types, and**

**trauma causes.** *Tsegazeab Laeke, Abenezer Tirsit, Azarias Kassabun.* From Addis Ababa University, College of Health Sciences, Neurosurgery Division, Addis Ababa, Ethiopia.

**Background:** Nearly 90% of all trauma-related deaths occur in low- and middle-income countries. Country-specific data on the prevalence and incidence of head injury in Africa are still insufficient. Neurotrauma contributes to more than half of all pediatric injuries. It is also a leading cause of death and disability in the pediatric age group. This study tries to shine light on the clinical presentation, injury types, and trauma causes in the pediatric age group. **Methods:** This prospective cross-sectional study was conducted from 2012 to 2016 at the 4 teaching hospitals in Addis Ababa. All surgically treated neurotrauma patients were enrolled, and demographics, injury mechanism, time to admission, Glasgow Coma Scale score, and American Spinal Injury Association (ASIA) Impairment Scale score at presentation were registered. We analyzed risk factors associated with different injury types, particularly severe traumatic brain injury. **Results:** A total of 1263 neurotrauma patients were included; 108 (8.6%) were children (age  $\leq 13$  yr). The sex distribution was less skewed among children than adults. The mean age was 8.04 years. Head injuries accounted for 98% of all neurotrauma; 77% had mild and 2% had severe head injury ( $p < 0.001$ ). Falls (34.9%) and assault (30.2%) were the most common injury mechanisms. The most common diagnosis was depressed skull fracture (74.1%) followed by acute epidural hematoma (15.7%). The mean time to presentation after injury was 85.8 hours. **Conclusion:** Falls and assaults were the most common causes of injury among pediatric neurotrauma patients. Depressed skull fracture was the most common diagnosis. Pediatric patients present to neurotrauma centres late, mainly because there are few centres that treat neurotrauma patients.

### 03

**Injury Surveillance Tanzania — a 10-year experience.** *Respicious Boniface, Victoria Munthali, Tarek Razek, Dan Deckelbaum, David Bracco.* From the Muhimbili Orthopaedic Institute (Boniface, Munthali); the Injury Control Centre Tanzania (Boniface, Munthali); the Jakaya Kikwete Cardiac Institute (Boniface); the Muhimbili University of Health and Allied Sciences (Boniface); and the McGill University Health Centre, Centre for Global Surgery, Montréal General Hospital, Montréal, Que., Canada (Razek, Deckelbaum, Bracco).

**Background:** Burden of trauma injury is high in low-income countries, including Tanzania. Tanzania, like most other low-income countries, has no coordinated trauma health care system, partly because the country does not have an established and coordinated trauma registry. Hence, a collaboration between the Canadian Network for International Surgery, the McGill University Centre for Global Surgery, and the Muhimbili Orthopaedic Institute established a nongovernmental organization called Injury Control Centre Tanzania (ICCT), which started implementing a trauma registry at 6 hospitals in the country. **Methods:** The registry contains 26 questions about demographic information, injury mechanism, patient clinical assessment, injury severity (Kampala Trauma Score), anatomic descriptors, and patient outcomes. Paper copies are

filled by trained nurses/clinical officers working in the emergency departments. Data entry and analysis is done at the ICCT office, which is located in the Muhimbili Orthopaedic Institute. **Results:** Between July 2013 and December 2022, a total of 65 050 injured patients were recorded in the registry. The most common cause of injury (58.5%) was road traffic crashes, with motorbikes contributing 66% of crashes. Most patients (73%) were male, and most (63.4%) were between the ages of 20 and 50 years. **Conclusion:** The data collected can lead into intervention plans or programs aimed at reducing the burden of injuries. It is therefore necessary to improve on data quality, enhance collaboration, and invest in resources to better understand and address the burden of injuries.

### 04

**Characteristics of traumatic injury requiring surgical care in Ethiopia.** *Elise Presser, Ermiyas Belay, Fitsum Kifle, Thomas G. Weiser, Katie Iverson.* From the Department of Surgery, Yale University, New Haven, Conn., USA (Presser); the Network For Perioperative and Critical Care, Addis Ababa, Ethiopia (Belay, Kifle); the Department of Public Health, College of Health Science, Wolkite University, Wolkite, Ethiopia (Belay); the Network for Perioperative and Critical Care, Debre Berhan University, Asrat Woldyes Health Sciences Campus, Debre Berhan, Ethiopia (Belay, Kifle); the Global Surgery Division, Department of Surgery, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa (Kifle); the Department of Surgery, Stanford University, Palo Alto, Calif., USA (Weiser); and the Department of Surgery, Medical College of Wisconsin, Milwaukee, Wis., USA (Iverson).

**Background:** The National Perioperative Improvement Network (NaPQIN) is a registry of surgical patients from 7 hospitals around Ethiopia. We investigated the epidemiology of patients in the NaPQIN database with surgical trauma. **Methods:** Patients who experienced a traumatic injury requiring surgery were identified in the NaPQIN database. Patient demographic, trauma, and surgical characteristics were extracted and analyzed. **Results:** We identified 1110 patients who experienced a traumatic injury requiring surgery. The average patient age was 33 years, and 81% were male. More than 60% of patients presented to another medical facility before the surgical facility, and 42% arrived at the surgical facility with a referral. Most patients travelled to the surgical facility by taxi (76%) or private vehicle (9%); only 12% came by ambulance. Assault was the most common mechanism of injury (68%), and 49% of care was for fractures. The most common injury sites were extremity (75%), skin (10%), and head or spine (8%). **Conclusion:** Patients with traumatic injuries requiring surgery rarely used ambulance services, and more than half initially presented to health facilities without the appropriate resources to address their conditions, suggesting a need for improved prehospital systems. Most surgical trauma resulted from assaults. While road traffic injuries were more common, assaults were more likely to require surgical intervention in this cohort. Expanded evaluation of traumatic injuries requiring surgery in Ethiopia is necessary to fully understand this phenomenon and to identify opportunities for improved care.

05

**Surgical, obstetric, trauma, and anesthesia-related health policies in Ghana: analysis and opportunities.** *Berjo Dongmo Takoutsing, David Ulrich Dalle, Celestin Bilong Mbangtang, Arsene Daniel Nyalundja, Jondre Macaraeg, Irene Dzirasa, Ulrick Sidney Kanmounye, Delanyo Dovlo, Kwadwo Koram, Eugene Nyarko, Desmond T. Jumbam.* From the Research Department, Association of Future African Neurosurgeons, Yaoundé, Cameroon (Takoutsing, Dalle, Mbangtang, Nyalundja, Kanmounye); the Health Policy and Advocacy Department, Operation Smile Inc. (Macaraeg, Dzirasa, Kanmounye, Jumbam); and the Faculty of Public Health, Ghana College of Physicians and Surgeons, Accra, Ghana (Dovlo, Koram, Nyarko).

**Background:** Ghana is disproportionately affected by the burden of diseases in relation to surgery, obstetrics, trauma, and anesthesia (SOTA). Prioritization of SOTA care in health policies is essential to addressing this burden. We analyzed existing health policies in Ghana to identify gaps and opportunities for surgical system strengthening. **Methods:** Our analysis was conducted using the READ framework [(1) Ready the materials; (2) Extract the data; (3) Analyse the data; and (4) Distil your findings]. Included policy documents were sought from 5 repositories guided by search terms that used combinations and variants of SOTA care. Information was extracted from policy documents according to the 6 WHO health system domains. **Results:** We identified a total of 440 deduplicated and up-to-date policy documents from all repositories, and 52 (11.8%) mentioned SOTA care. The majority of SOTA policies focused on service delivery (78.8%) and governance (71.8%); health financing was the least represented health system domain (21.1%). This trend was similar across each SOTA specialty. Policies on obstetrics were most common (94.2%), followed by trauma (59.6%). The majority of surgery-oriented policies focused on ophthalmologic surgery (9.6%), whereas the fewest policies focused on pediatric, cardiac, and urological surgery (1.9% each). Regional and district levels of care were the focus of most policies (71.1% each). **Conclusion:** Our analysis demonstrates a low prioritization of SOTA care in existing health policies in Ghana. Most SOTA-related policies in Ghana focus on obstetric care and service delivery at the regional and district health levels.

06

**Trauma: a significant risk of catastrophic expenditure in Hawassa, Ethiopia.** *Emnet Tesfay Shimber, Taylor Jaraczewski, Maria Sgro, Ajiel Mae Basmayor, Asegid Ergete, Katherine Iverson, Mary Schroeder, Christopher Dodgion.* From the Hawassa University Comprehensive Specialized Hospital, Hawassa, Ethiopia (Shimber, Ergete, Dodgion); and the Medical College of Wisconsin, Milwaukee, Wis., USA (Jaraczewski, Sgro, Basmayor, Iverson, Schroeder, Dodgion).

**Background:** The Lancet Commission on Global Surgery provided a target of 100% protection against catastrophic health-care expenditure (CHE; i.e., cost greater than 10% of annual income) for surgical and anesthesia care by 2030. This study aimed to assess the economic outcomes of trauma care in an

Ethiopian cohort. **Methods:** A validated interviewer-facilitated financial survey was administered to a prospective convenience sample of admitted trauma patients (age > 18 yr) at Hawassa University Comprehensive Specialized Hospital (HUCSH) from June to August 2023. Associations with catastrophic expenditure were tested using  $\chi^2$ , Mann–Whitney *U*, or Kruskal–Wallis tests. Multivariable analysis was performed with logistic regression. **Results:** A total of 97 patients completed the survey; responders were primarily male (82.6%), aged 18–29 years (56.7%), uninsured (88.7%), and from urban areas (65%). The most common mechanism was motor vehicle crashes (57.7%). Median total expenditure was 10 428 Birr (interquartile range [IQR] 4507–22 417 Birr) (57 Birr = ~\$USD 1). Medication and supplies had the highest median cost at 2427 Birr (IQR 1020–7654 Birr). To cover the costs, 56.2% of respondents had to sell property/belongings or obtain a loan. Nearly half of patients (48.2%) had CHE. On multivariable analysis, rurality, receiving surgery, being from the Oromia region, and number of days in hospital were associated with CHE. **Conclusion:** Our findings highlight the need for increased capacity-building in rural areas and at the primary hospital level. Some financial protection strategies are crucial to facilitate equitable care. Building on these findings, our group is currently working on a similar study at the national level in Ethiopia.

07

**Improvements in trauma care and outcome using a trauma intake form with built-in decision support prompts at non-tertiary hospitals in Ghana: a randomized clinical trial.** *Adam Gyedu, Emmanuel Nakua, Peter Donkor, Charles Mock.* From the Department of Surgery, School of Medicine and Dentistry, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana (Gyedu, Donkor); the Department of Epidemiology and Biostatistics, School of Public Health, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana (Nakua); and the Department of Surgery, University of Washington, Seattle, Wash., USA (Mock).

**Background:** We sought to determine whether a simple quality improvement tool (a standardized trauma intake form [TIF] with built-in real-time clinical decision support prompts) could improve trauma care at non-tertiary hospitals in Ghana. **Methods:** We conducted a pragmatic, stepped-wedge cluster randomized trial at 8 hospitals. Differences in key performance indicators (KPIs) of trauma care and in mortality were assessed before and after introduction of the TIF using generalized linear mixed regression. **Results:** Trained research assistants observed the care of 4077 trauma patients ( $n = 2067$  before and  $n = 2010$  after TIF introduction). Before TIF introduction, only 2 of 20 KPIs of initial assessment and care were performed in at least 90% of patients. After TIF introduction, there were significant increases in 14 KPIs, with 12 KPIs performed in at least 90% of patients. For example, airway assessment increased from 73% to 98% ( $p = 0.006$ ), and chest examination increased from 62% to 97% ( $p = 0.001$ ). Mortality in seriously injured patients (Injury Severity Score  $\geq 9$ ;  $n = 175$  before and  $n = 186$  after TIF) decreased from 19.4% to 7.5% ( $p = 0.004$ ). There were significant improvements in KPIs and reductions in mortality among

seriously injured patients at both district (first-level) and regional (referral) hospitals and during both on-hours and off-hours (nights and weekends). **Conclusion:** This simple intervention improved care and lowered mortality. Similar interventions involving real-time clinical decision support prompts as part of routine documentation are applicable globally.

08

**Burden of injury in Africa, 2010–2021: analysis of Global Burden of Disease 2021.** *Atalel Awedew, Tsegazeab Laeke, Mestet Yibeltal, Mengistu Ayele.* From Debre Tabor University, Debre Tabor, Ethiopia (Awedew, Yibeltal); Addis Ababa University, College of Health Sciences, Neurosurgery Division, Addis Ababa, Ethiopia (Laeke); and Hawassa University, Hawassa, Ethiopia (Ayele).

**Background:** Injuries have contributed a high burden of death, disability, and economic costs. This study aims to present evidence on mortality, incidence, disability-adjusted life years (DALYs), and trends of injuries between 2010 and 2021 in Africa. **Methods:** This study was conducted using the standard Global Burden of Disease 2021 methodology and analytic tools. **Results:** The burden of injury in Africa was 76.2 million (95% uncertainty interval [UI] 71.6 million to 81.1 million) reported cases in 2021, with an age-standardized incidence rate of 5400 (95% UI 5000 to 5700) per 100 000. There was a 17% increase (95% UI 15% to 20%) in cases, and a 9% decrease (95% UI –10% to –7%) in the age-standardized incidence rate of injuries from 2010 to 2021. In Africa, 747 000 (95% UI 632 000 to 861 000) deaths were attributed to injuries in 2021, with an age-standardized death rate of 73 (95% UI 64 to 82) per 100 000. From 2010 to 2021, there was a 10% increase (95% UI 1% to 21%) in injury-related deaths, whereas the age-standardized death rate decreased by 14% (95% UI –20% to –7%). Moreover, injuries caused 47.4 million (95% UI 40.1 million to 55.2 million) DALYs in 2021. The age-standardized DALYs rate stood at 3700 (95% UI 3200 to 4200) per 100 000. Trends from 2010 to 2021 revealed a 6% increase (95% UI –3% to 16%) in injury-related DALYs, and a 16% reduction (95% UI –22% to –9%) in age-standardized DALYs rates. Examining specific injury categories, the highest age-standardized death rates in 2021 were observed for road injuries (23.8 [95% UI 21.0 to 26.4] per 100 000), falls (10.2 [95% UI 8.9 to 12.5] per 100 000), self-harm (9.2 [95% UI 8.0 to 10.5] per 100 000), and interpersonal violence (7.7 [95% UI 6.8 to 8.6] per 100 000). **Conclusion:** Africa has made notable progress in implementing effective preventive strategies and early interventions and in enhancing access to health care for injuries.

09

**A non-lethal left-sided thoracic impalement injury.** *Halid Melkamu, Sisay Bekele, Berhanu Hailemariam, Enku Shiferaw, Yishak Shiferaw, Wubetie Yirdaw.* From St. Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia.

**Background:** Impalement injuries are those that result from the injuring object or weapon being stuck on to the victim's body parts. Such cases occur rarely and, when they do, they pose a great challenge from transportation to anesthesia induction and surgical decision. The extremities are the most common parts of the body

where this occurs. Only a few reports of non-lethal left-side thoracic impalement injuries have been documented in the literature. **Case presentation and discussion:** A 25-year-old male patient presented 36 hours after sustaining an impalement injury to his left chest by a metallic spear. He underwent a left posterolateral thoracotomy incision, and the spear was removed successfully under direct vision. Thoracic impalement injuries occur very rarely in the civilian setting. The most important pillar in the management of such injuries is to avoid any manipulation of the impaled object outside of an operating theatre, where it is done under direct vision in a controlled manner. Postoperative care includes tube thoracostomy, antibiotics, chest physiotherapy, and other components of the Enhanced Recovery After Surgery protocol. **Conclusion:** Thoracic impalements are extremely uncommon, as are impalement injuries in general. When they do occur, they are managed by multidisciplinary teams, including surgeons, anesthesiologists, and emergency physicians. Early cardiothoracic consultation is necessary, and removal of the objects should not be attempted outside the operating theatre.

10

Withdrawn

11

**Pediatric falls: an analysis of patterns of injury and associated mortality from falls in urban India.** *Riya Sawhney, Shlok Patel, Debojit Basak, Deepa Kizbakke Veetil, Nobhojit Roy, Martin Gerdin Wärnberg, Santosh Rath.* From the WHO Collaborating Centre for Research in Surgical Care Delivery in Low- and Middle-Income Countries, Mumbai, India (Sawhney, Patel, Basak); the Faculty of Medicine and Health Sciences, McGill University, Montréal, Que., Canada (Sawhney); BJ Medical College, Ahmedabad, Gujarat, India (Patel); the IPGME&R-SSKM Hospital, Kolkata, India (Basak); the Department of Minimal Access Surgery, Manipal Hospitals, Delhi (Veetil); the George Institute for Global Health, New Delhi, India (Roy); the Department of Global Public Health, Karolinska Institutet, Stockholm, Sweden (Roy, Wärnberg); Perioperative Medicine and Intensive Care, Karolinska University Hospital, Stockholm, Sweden (Wärnberg); and the Department of Orthopaedics, Kalinga Institute of Medical Sciences, Bhubaneswar, India (Rath).

**Background:** Falls are some of the most common childhood injuries. However, for vulnerable children in low- and middle-income countries such as India, mortality from falls is nearly 3 times that of high-income countries. This study aimed to assess falls-related patterns of injury and mortality in children in urban India. **Methods:** We conducted a retrospective analysis from the Toward Improved Trauma Care Outcomes database, comprising 16 000 trauma patients admitted to 4 tertiary centres in India between 2013 and 2015. We analyzed demographics, clinical scores, and type of injury for patients younger than 18 years who were admitted for falls and assessed survival probability in different age groups using Kaplan–Meier survival analysis. **Results:** Of the 1281 children admitted for falls, most were age 2–5 years (40%). Nearly all injuries (99%) were blunt trauma. The median Injury Severity Score was 9, and the median Glasgow Coma Scale score was 15. Overall, in-hospital mortality was 8%, and isolated

traumatic brain injury (TBI) was the most common (71%) injury among those who died. Mortality was significantly higher among male than female children (9% v. 5%,  $p = 0.009$ ). There was no significant difference in survival among age groups ( $p = 0.9$ ). **Conclusion:** The majority of pediatric patients admitted to urban hospitals in India for falls were between the ages of 2 and 5 years, with isolated TBI and male sex associated with greater mortality. These findings have the potential to inform age-specific falls prevention strategies and allocate resources toward targeted initiatives to improve access to care and, consequently, mortality associated with falls in urban India.

## 12

**Injuries to the maxillofacial region from improvised explosive devices: diagnostic findings and treatment approaches in a resource-limited setting.** *Mohammed A.S Abdullahi, Kefas Mbaya, Abubakar Kakasanda, Stephanie Danjuma, Hector Olosoji, Emmanuel Ameh.* From the University of Maiduguri Teaching Hospital, Maiduguri, Nigeria (Abdullahi, Mbaya, Kakasanda, Danjuma, Olosoji); and the National Hospital Abuja, Abuja, Nigeria (Ameh).

**Background:** The Boko Haram insurgency that started in 2009 entailed asymmetric conventional and nonconventional combat involving the Nigerian army, insurgents, and civilians. Improvised explosive devices (IEDs) are homemade bombs used by terrorists that can be made from stolen explosives, commercial blasting supplies, or fertilizer and often contain nails, bolts, and other sharp objects that create unique injury patterns presenting diagnostic and therapeutic challenges for health care providers. This retrospective study examined the maxillofacial wounds and patterns of injury among victims of Boko Haram IEDs who were treated at the University of Maiduguri Teaching Hospital (UMTH). **Methods:** This retrospective study was carried out over a 6-year period from January 2016 to January 2022. The clinical records, diagnostic findings, and treatment approaches for IED injuries to the maxillofacial region at UMTH were obtained from patients' case notes. Data were analyzed using the SPSS software version 20. **Results:** The study involved 14 patients. Patients were 14–43 years old, with a mean age of 29.5 years (standard deviation [SD] 8.81 yr). There were 3 (21.4%) females, with a male:female ratio of 4.7:1. Primary blast injuries were seen in 6 (42.9%) patients. Lacerations were the most common soft tissue injury. Upper-, mid-, and lower-third fractures occurred in 57.2%, 35.7%, and 21.4% of patients, respectively. Globe rupture occurred in 5 (28.5%) patients. The most common treatment was closed reduction with intermaxillary fixation. **Conclusion:** Most injury-related deaths occur in resource-poor nations with delayed surgical services. Prevention is key to reducing the occurrence of injuries from IEDs.

## 13

**Adult surgical admissions at a Botswana tertiary teaching hospital — spectrum, comorbidity profile, and outcomes.** *Alemayehu Bedada, Mpapho Joseph Motsumi, Shimelis Genna Hamda.* From the University of Botswana, Gaborone, Botswana.

**Background:** Documentation on the spectrum, comorbidities, profile, and outcomes of adult surgical admissions in Botswana is

limited. This information may guide human resource distribution for proposed rotations in the new general surgery training programs. **Methods:** The medical records of adult surgical admissions for a period of 1 year (August 2017 to July 2018) were reviewed retrospectively. Demographics, types of admissions, dates of admission and discharge, and known comorbidities were captured and the outcomes were analyzed. **Results:** Of the 2610 admissions, the mean age was 44.4 years and 60.8% were male. Gastrointestinal tract, neurosurgical, and cardiothoracic admissions accounted for 60.7%. Half (50.1%) were emergency admissions. Comorbidities were present in 45.6% of the admissions, and HIV-prevalence was 38.3% (697 of 1822) among those with known HIV status. Elective admissions underwent more surgical procedures, (59.6% [776 of 1303], crude odds ratio [COR] 1.9, 95% confidence interval [CI] 1.7–2.3,  $p = 0.001$ ). A total of 220 complications in 2610 admissions (8.4%) were documented, including superficial surgical site infections (3.1% [42 of 1355]) and deaths (6.1% [159 of 2610]). Hypertension (COR 1.8, 95% CI 1.1–3.4,  $p = 0.031$ ) were associated with higher mortality. Patients who were HIV-positive had longer hospital stays than those who were HIV-negative (COR 1.03, 95% CI 1.02–1.04,  $p = 0.001$ ). Among HIV-positive admissions, those with CD4 count < 200 had significantly higher composite complication and mortality rates than those with CD4 count  $\geq$  200 (COR 3.03, 95% CI 1.52–6.04,  $p = 0.002$  v. COR 4.34, 95% CI 2.08–9.05,  $p = 0.001$ ). **Conclusion:** Contributions of emergency and elective admissions were even. A higher burden of disease was found in gastroenterology. The higher mortality associated with hypertension, diabetes, and CD4 count < 200 warrant further study.

## 14

**Exploring police officers' perspectives on road traffic accident dynamics, management, and prevention in Jimma, Ethiopia: a phenomenological qualitative study.** *Shemsedin Ibro, Demuma Amdisa, Getachew Tilahun.* From the Institute of Health, Jimma University, Jimma, Ethiopia (Ibro, Amdisa); and the Research Center for Road and Transport Safety, Jimma University, Jimma, Ethiopia (Tilahun).

**Background:** Ethiopia faces a significant burden from road traffic accidents (RTAs), with a fatality rate among the highest in the world. This study delves into the perspectives of police officers on RTA dynamics, prevention, and challenges in the Jimma zone, aiming to enrich the qualitative evidence base for policy and practice improvements. **Methods:** This phenomenological qualitative study was conducted from June to August 2022 and engaged 9 police officials from 8 police departments in the Jimma zone through purposive sampling. Data were collected via audio-recorded in-depth interviews and field notes, then translated, transcribed, and analyzed using thematic analysis involving an iterative hybrid and line-by-line coding approach with Atlas.Ti software. **Results:** The analysis revealed 6 themes: RTA dynamics and impacts, causative factors, post-crash response, prevention efforts, record management challenges, and improvement proposals. Respondents noted an increasing RTA trend, predominantly affecting young adults. Multifaceted causes, including human factors, vehicle and road conditions, and systemic issues, like lax traffic management and driver training, were identified. Key barriers to prevention

included inadequate awareness, enforcement, and support. Deficiencies in emergency care access and data management were also highlighted. **Conclusion:** The study underscores a rising trend in RTAs within the Jimma zone, exacerbated by human, vehicular, and infrastructural factors, coupled with sub-optimal prevention measures. Recommendations include enhancing prevention policies, driver education, traffic control, legal enforcement, and digitizing crash records to better address the RTA burden.

## 15

**Effectiveness of steam sterilization practice on reusable surgical instruments and factors associated with ineffective sterilization in selected public hospitals.** *Meseret Abeza, Tsegazeab Laeke.* From the Nordic Medical Centre, Addis Ababa, Ethiopia (Abeza); and the Black Lion Specialized Hospital, Addis Ababa University, Addis Ababa, Ethiopia (Laeke).

**Background:** Surgical instrument sterilization is important for maintaining sterility. However, sterilization failure occurs, which may lead to surgical site infections and complications. It is crucial to evaluate the sterility of reusable surgical instruments. The Bowie–Dick and chemical indicator class 6 tests can be used to determine the effectiveness of sterilization. Our study aimed to evaluate the effectiveness of reusable surgical instruments in the practice of sterilization and the factors associated with ineffective sterilization at select public hospitals in Addis Ababa, Ethiopia, from March 1, 2023, to April 30, 2023. **Methods:** In a cross-sectional study, we assessed sterilization processes and outcomes in Addis Ababa's public hospitals. Eighty autoclave cycles were assessed in 4 hospitals using Bowie–Dick and chemical indicator class 6 tests. We audited medical device reprocessing cycles with a dedicated tool, and data were sequentially entered into EpiData software. Descriptive and regression analyses were performed. Logistic regression was used for the binary main outcome variable. **Results:** We found that 26.3% of sterilization cycles were ineffective, mostly owing to wet packs, laundry soap use, pre-soaking with bleach, and support staff cleaning the instruments. Effective steam sterilization can be achieved through rigorous control and routine follow-up. **Conclusion:** The study found a higher rate of ineffective steam sterilization. Major driving factors for ineffective sterilization were pre-soaking used instruments in bleach and loading the autoclave heavily. The hospitals should have to use Bowie–Dick and chemical integrator class 6 tests for validation of steam sterilization of reusable surgical instruments.

## 16

**Soft-tissue reconstruction of type IIIB open tibial fractures in low- and middle-income countries: a literature review.** *Matthew Boroditsky, Mark Hill.* From the Division of Plastic Surgery and the Faculty of Medicine, University of British Columbia, Vancouver, BC, Canada.

**Background:** Open tibial fractures (OTFs) significantly contribute to global mortality and disability, disproportionately affecting low- and middle-income countries (LMICs). Effective management requires a comprehensive multidisciplinary approach, yet LMICs face enduring challenges, including insufficient resources,

guidelines, and expertise in sustainable soft-tissue reconstruction. **Methods:** A literature review was conducted across 20 databases, focusing on ambulatory adult patients presenting with type IIIB OTFs. Various soft-tissue reconstructive techniques were analyzed to evaluate their effectiveness and barriers to implementation. Measured outcomes encompassed time to definitive soft-tissue coverage, infection, nonunion, flap complications, amputation rates, and quality of life indicators. **Results:** A total of 30 studies met the inclusion criteria for data analysis. The majority of OTFs occurred in young males predominantly due to road traffic accidents (73%), with marked delays in receiving definitive soft-tissue reconstruction (mean 16 d [range 2–42 d]). Local fasciocutaneous and perforator flaps were used most frequently, whereas free flap reconstruction was documented in only 5 studies. Notable complications included infections (25.6%), chronic osteomyelitis (9.2%), nonunion (21.7%), and flap-related complications (10.2%). Primary and secondary amputation rates were 8% and 4.3%, respectively. **Conclusion:** There is a pressing need to enhance soft-tissue reconstruction practices through comprehensive national trauma guidelines, interdisciplinary collaboration, and strategic resource distribution. A 3-pronged approach, advocating for the expansion of the plastic surgery workforce, task-sharing, and prioritization of soft-tissue coverage, should be integrated into national trauma care frameworks.

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**What are the core competencies for global surgical training? A scoping review.** *Roy Hilzenrat, Rachel Livergant, Jayd Adams, Catherine Binda, Allison Chhor, Helen Hsiao, Faizal Haji, Esther Chin.* From the Division of General Surgery, Department of Surgery, University of British Columbia, Vancouver, BC, Canada (Hilzenrat, Livergant); the Global Surgery Laboratory, Branch for Global Surgical Care, University of British Columbia, Vancouver, BC, Canada (Adams); the Faculty of Medicine, University of British Columbia, Vancouver, BC, Canada (Binda, Hsiao); the Faculty of Medicine, University of Ottawa, Ottawa, Ont., Canada (Chhor); the Department of Surgery, Branch for Global Surgical Care, University of British Columbia, Vancouver, BC, Canada (Haji, Chin); the Department of Surgery, British Columbia Children's Hospital, Vancouver, BC, Canada (Haji); and the Department of Obstetrics and Gynecology, McMaster University, Hamilton, Ont., Canada (Chin).

**Background:** In the last few decades, global surgery has emerged as an academic field in its own right. While the number and range of training programs in global surgery have grown, there is limited research investigating the competencies of an academic global surgeon. This scoping review aimed to summarize the learning objectives and competencies required for modern global surgery curricula. **Methods:** An extensive review of electronic databases (MEDLINE, Embase, Emcare, PsycInfo, Global Health, Global Index Medicus) and the grey literature was conducted in compliance with the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews to identify learning objectives and competencies pertaining to academic global surgery. Findings were thematically categorized according to the 11 Consortium of Universities for Global Health competency domains. **Results:** The scoping review yielded 333 distinct learning objectives and competencies

from 43 academic publications and 61 grey literature sources, including international representative bodies, nongovernment organizations, and postgraduate curricula. The identified catalogue of learning objectives and competencies underscored important themes in academic global surgery, including cultural humility, quality improvement, advocacy, Indigenous health, and anti-colonialism. **Conclusion:** This scoping review captured the broad landscape of vital skills and competencies required as a foundation for contemporary academic global surgery curricula. The emergence of themes not traditionally included in global surgery education highlights the modern shift in focus from mission-based trips to bidirectional partnerships, sustainability, capacity strengthening, health equity, sociocultural awareness, and self-governance. Integrating these forward-looking themes into global surgery curricula is crucial to elevating the worldwide standard of surgical care while forging an adept, globally minded accompanying workforce.

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**Delays in care for children with low anorectal malformations in southwestern Uganda: a cross-sectional survey.** *Felix Oyania, Caroline Q. Stephens, Sarah Ullrich, Meera Kotagal, Francis Bajunirwe, Doruk E. Ozgediz, Dan Poenaru.* From the Mbarara University of Science and Technology, Mbarara, Uganda (Oyania, Bajunirwe); the University of California San Francisco Center for Health Equity in Surgery and Anesthesia, San Francisco, Calif., USA (Oyania, Stephens, Ozgediz); the Cincinnati Children's Hospital Medical Center, University of Cincinnati College of Medicine, Ohio, USA (Ullrich, Kotagal); and McGill University, Montréal, Que., Canada (Poenaru).

**Background:** Disparities in anorectal malformation (ARM) outcomes between high- and low-income countries may be partially attributed to delayed diagnosis in the latter setting. The Three Delays Model, comprising delays in seeking, accessing, and receiving care, provides a framework for exploring these challenges. We sought to examine the frequency and nature of the preoperative delays in children presenting for surgical correction of low ARMs. **Methods:** We conducted a cross-sectional study examining the delays in care among children with low ARMs in southwestern Uganda between June 2021 and July 2023. Delayed diagnosis was defined as diagnosis made after 48 hours. Potential associated factors, such as caregiver, community, and health care factors, were examined. **Results:** A total of 80 patients were included in the study. The median age at diagnosis was 29.2 days. In 82% of patients, the parents observed abnormality, and 74% experienced delayed diagnosis. Among reasons for delays in seeking care, 23% of caregivers reported no knowledge of their child's disease. For delays in reaching care, 37% experienced financial problems, and 28% lacked appropriate referral or formal diagnosis from a health centre, contributing to delays in receiving care. **Conclusion:** Delays in care are frequent problems for children with low ARMs. Finances and caregivers' and health care workers' knowledge contribute significantly to these delays. To mitigate these delays, we recommend improving referral processes, prioritizing newborn screening examinations, advocating for a national child health insurance policy, and enhancing the training of primary health care providers.

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**Prehospital care for trauma patients in Ethiopia: a systematic review.** *Dionysia Kravarioti, Lye-Yeng Wong, Tsegazeab Laeke Teklemariam, Abenezer Tirsit, Tewodros Liyew, Mark Ferguson, Timothy Plackett, Jaymie Claire Henry, Christopher Dodgion, Meseret Admasu Abeza, Seye Mesfin Minas.* From the Department of Medicine, Democritus University of Thrace, Alexandroupolis, Greece (Kravarioti); The G4 Alliance, Chicago, Ill., USA (Kravarioti, Wong, Liyew, Henry, Dodgion); the Department of General Surgery, Oregon Health & Sciences University, Portland, Ore., USA (Wong); the Department of Cardiothoracic Surgery, Stanford University, Palo Alto, Calif., USA (Wong); the Neurosurgery Division, Surgery Department, Addis Ababa University College of Health Sciences, Addis Ababa, Ethiopia (Teklemariam, Tirsit); the Jhpiego-affiliate of Johns Hopkins University, Baltimore, Md., USA (Teklemariam, Liyew, Minas); the Ethiopian Medical Association's Standing Committee on Medical Research and Scholarships, Addis Ababa, Ethiopia (Liyew); the Section of Thoracic Surgery, Department of Surgery, University of Chicago, Chicago, Ill., USA (Ferguson); the Department of Surgery, University of Chicago, Chicago, Ill., USA (Plackett); the Department of Cardiothoracic Surgery, Baylor College of Medicine, Houston, Texas, USA (Henry); the Division of Trauma and Critical Care, Medical College of Wisconsin, Milwaukee, Wis., USA (Dodgion); the Nordic Medical Centre, Addis Ababa, Ethiopia (Abeza); and the Injury Prevention Initiative for Africa, Addis Ababa, Ethiopia (Abeza, Minas).

**Background:** Most trauma-related deaths occur in prehospital settings. However, the proportion of emergency trauma patients in Ethiopia receiving care in prehospital settings ranges from 0% to 38%. This review aimed to understand how prehospital trauma care in Ethiopia has evolved over the years and to provide objective data for professionals working to improve prehospital trauma care in Ethiopia and reduce the global burden of trauma. **Methods:** We searched for original, free English-language articles discussing prehospital trauma care in Ethiopia between 1990 and April 2023 in the PubMed and Cochrane databases. When the reviewer responsible for the screening doubted whether an article should be included, another independent author evaluated it. The quality of each included article was also assessed by 2 independent authors using the AXIS and CASP tools. The findings were presented according to the Preferred Reporting Items for Systematic reviews and Meta-Analyses. **Results:** Twenty-eight articles met the inclusion criteria and emphasized that prehospital trauma care in Ethiopia remains insufficient. Over the years, most trauma patients were not transferred by ambulances but by other means, with a median arrival time of more than an hour. More specifically, on average only 32.33% (range 9.0%–70.1%) of trauma patients were transferred by ambulance. A shortage of trained personnel and a limited number of emergency professionals were also reported, the mean prehospital mortality rate for emergency patients was 26% (range 15%–36.1%), and no hospital used the WHO trauma registry. **Conclusion:** Despite years of efforts, prehospital trauma care in Ethiopia faces various problems and remains inadequate. Decisive measures must be taken to reverse this situation.



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**Improving access to pediatric foot and ankle surgery in low-resource areas using smart glasses technology for telementoring of surgeons — a pilot study.** *Maryse Bouchard, Dimuthu Tennakoon.* From the Division of Orthopaedic Surgery, the Hospital for Sick Children, University of Toronto, Toronto, Ont., Canada (Bouchard); and the Department of Paediatric Orthopaedic Surgery, Lady Ridgeway Children's Hospital, Colombo, Sri Lanka (Tennakoon).

**Background:** Most children affected by foot and ankle conditions, such as clubfoot, live in low- and middle-income countries. Left untreated, foot deformities result in reduced mobility, severe pain, inability to wear shoes, social stigma, and socioeconomic impacts. Opportunities for surgical training in resource-poor areas are limited, with the COVID-19 pandemic further isolating patients and medical professionals. This was a pilot study evaluating the use of smart glasses technology for telementoring of surgeons as an innovative approach to surgical training that can create a model for sustainable capacity building of global pediatric foot and ankle surgery. **Methods:** We conducted a 6-month telementoring program for pediatric orthopaedic surgeons aiming to perform Vuzix-guided surgery every 2 weeks with preoperative planning and case discussions. To assess skill acquisition, Objective Structured Assessment of Technical Skill (OSATS) and Global Rating Score (GRS) were completed. This was a collaboration between SickKids Hospital, Ohana One, and Steps2Walk. **Results:** One surgeon pair from Canada (mentor) and Sri Lanka (mentee) performed 8 surgeries in 6 months between October 2021 and April 2022 and reviewed more than 30 patients virtually. Surgical procedures included soft-tissue releases, tendon transfers, and osteotomies, with excellent OSATS and GRS scores. While both mentor and mentee surveys demonstrated great benefit, challenges with the hardware (glasses), software platforms, and Internet connection were frequent. This pair continues their mentorship, and the mentee has trained local colleagues in foot and ankle surgery. **Conclusion:** Telementoring can be an effective adjunct to surgical training and confidence building for mentees in resource-poor areas.

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**Pathways to equitable clinical exchanges: a review of licensure requirements of 52 medical boards in the United States.** *Riya Sawhney, Rabul Burra, Fleming Mathew, Annabelle Jones, Sargun Virk, Shlok Patel, Tanaz Vaghaiwalla, James Hudspeth, Tracy Rabin, Virginia Rowthorn, Raymond R. Price, Nakul Raykar.* From the Association of Academic Global Surgery (Sawhney, Burra, Mathew, Vaghaiwalla, Raykar); the Faculty of Medicine and Health Sciences, McGill University, Montréal, Que., Canada (Sawhney); the Biological Sciences Collegiate Division, University of Chicago, Chicago, Ill., USA (Burra); the Division of Thoracic Surgery and Interventional Pulmonology, Beth Israel Deaconess Medical Center, Boston, Mass., USA (Mathew); the Program in Global Surgery and Social Change, Harvard Medical School, Boston, Mass., USA (Jones); Anesthesiology, Weill Cornell Medicine, New York, N.Y., USA (Virk); B.J. Medical College, Ahmedabad, Gujarat, India (Patel); the DeWitt Daughtry Department of Surgery, University of Miami Miller School of Medicine, Miami, Fla., USA (Vaghaiwalla); the Department of Internal Medicine,

Chobanian & Avedisian School of Medicine at Boston University, Boston, Mass., USA (Hudspeth); the Department of Internal Medicine, Yale School of Medicine, New Haven, Conn., USA (Rabin); the University of Maryland School of Graduate Studies, Baltimore, Md., USA (Rowthorn); the Center for Global Surgery, Department of Surgery, University of Utah, Salt Lake City, Utah, USA (Price); and the Department of Trauma, Burn, and Surgical Critical Care, Brigham & Women's Hospital, Boston, Mass., USA (Raykar).

**Background:** Short-term clinical exchange programs in surgery offer the opportunity for bilateral skills transfer. Visas and medical licensure are known barriers to physicians from low- and middle-income countries (LMICs) participating in hands-on, clinical experiences in the US. We examine licensure requirements of US state medical boards (SMBs) to identify opportunities for clinical short-term exchanges for physicians in LMICs. **Methods:** A 7-point questionnaire on temporary/limited licensure regulations was distributed to SMBs of 50 US states and 2 territories via email ( $n = 25$ ) and telephone ( $n = 4$ ). The survey response rate was 56%. Licensure regulations were manually reviewed in cases of non-response ( $n = 23$ ) and to corroborate all responses received from SMBs ( $n = 29$ ). **Results:** Only 24 (46%) SMBs potentially offered limited licensure for physicians in LMICs. All of them (24 [100%]) required legal recourse to work in the US, commonly accepting US residents/citizens or J-1 physician visa holders. Educational Commission for Foreign Medical Graduates certification (20 [83%]) and completion of United States Medical Licensing Examination steps 1–2 (17 [71%]) were the most common professional requirements. Mean application cost was \$229.90 (range \$0–675), and mean unexpired license validity was 282 days (range 10–730 d). On synthesis of immigration, professional, and application requirements, only 5 states' regulations may actually be amenable to LMIC physicians' clinical involvement in exchange programs. **Conclusion:** US medical boards do not provide specific provisions for short-term clinical exchange. Potential short-term visitors would be subject to a lengthy and expensive process intended for physicians attempting to change their country of practice. Reformed licensure and immigration policies are required to facilitate pathways for short-term clinical exchange.

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**Effectiveness of a hybrid trauma training course for health care providers in Kenya.** *Gilgamesh Eamer, Stephen Mutiso, Yvette Kisaka, Gladwell Gathecha, Ronald Lett.* From the Children's Hospital of Eastern Ontario, Ottawa, Ont., Canada (Eamer); the Department of Surgery, University of Ottawa, Ottawa, Ont., Canada (Eamer); the Canadian Network for International Surgery (Eamer, Lett); the Division of non-communicable diseases, Ministry of Health, Government of Kenya, Nairobi, Kenya (Mutiso, Kisaka, Gathecha); and the Department of Surgery, University of British Columbia, Vancouver, BC, Canada (Lett).

**Background:** Trauma is a major contributor to morbidity and mortality in the developing world. Lack of training in trauma care contributes to trauma mortality. The Canadian Network for International Surgery (CNIS) created the Trauma Team Training (TTT) course to address this. **Methods:** The course was updated

in 2020, and a pre- and post-course evaluation was created with identical questions to assess knowledge acquisition from the course. Sixty-nine health care workers in Kenya ( $n = 45$ ) and Guyana ( $n = 24$ ) in 3 training sessions who completed the course assessments before and after the course were included. **Results:** There was a significant increase in score between the pre- and post-course marks (pre-course 81.1%, post-course 89.2%, paired  $t$  test  $p < 0.001$ ). Following adjustment for repeat sampling, 6 of 19 questions saw significant improvement following the course, while no questions had a worse outcome. **Conclusion:** The TTT course seems to significantly improve health care providers' knowledge on trauma management, but further iterative improvement of the course and our evaluation material is required along with long-term follow-up.

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**Incisional negative-pressure wound therapy as breakthrough adjunct in preventing surgical site infection in contaminated and dirty laparotomy wounds in sub-Saharan African children.** *Chibuike Onu, Emmanuel Ameb, Matthias Igoche, Paschal Anyanwu.* From the Division of Paediatric Surgery, Department of Surgery, National Hospital Abuja, Abuja, Nigeria.

**Background:** A surgical site infection (SSI) is one that occurs within 30 days of surgery, or within 90 days if an implant has been used. Most SSIs in clinical practice are superficial (i.e., affecting the skin and subcutaneous planes). Routine primary closure of these layers in wounds with a significant risk of SSI is safe; however, added intervention may be beneficial. Incisional negative-pressure wound therapy (INPWT) through removal of exudates could help to reduce the incidence of infection in such wounds, though this had not been established in children. We sought to evaluate the effectiveness of INPWT in reducing the incidence of SSIs in primarily closed contaminated and dirty laparotomy wounds in children. **Methods:** We carried out a prospective study over a 1-year period (2019–2020) using 36 patients who met the above criteria. They were randomized into 2 groups: group A received INPWT in addition to standard therapy, while group B received only standard therapy. We used Centers for Disease Control and Prevention criteria for SSIs in diagnosis. **Results:** Sixteen patients in each group completed the study. Patient age range was 0.03 to 15 years, 15 (46.9%) were girls, and 17 (53.1%) were boys. Eleven (34.4%) were elective cases, while 21 (65.6%) were emergencies. Fourteen (43.8%) were contaminated cases, while 18 (56.2%) were dirty cases. The SSI rate in group A was 2 (12.5%) compared with 10 (56.2%) in group B, ( $p = 0.009$ ). **Conclusion:** Compared with standard therapy alone, adding INPWT significantly reduces the rate of SSIs in primarily closed contaminated and dirty pediatric laparotomy wounds.

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**Comparing clinical with microbiological assessment in predicting skin graft take at National Hospital, Abuja.** *Eunice Onuh, Oikeh Ojeamen, Edith Terna Yawe, Amina Abubakar, Yakubu Ashoms, Hadiza Suleiman, Naomi Musa.* From the National Hospital Abuja, Abuja, Nigeria (Onuh, Ojeamen, Yawe, Ashoms, Suleiman, Musa); and the University of Abuja Teaching Hospital, Gwagwalada, Nigeria (Abubakar).

**Background:** Skin graft loss due to infection is a complication of skin grafting; hence, wound swab microscopy, culture, and sensitivity

is done before skin grafting is undertaken. The role of clinical judgment in deciding when to skin graft a wound bed is underreported. This study was designed to determine the accuracy of clinical judgment alone in predicting the success of skin grafting. **Methods:** This was a prospective study including all patients who underwent skin grafting during the study period, randomized into 2 groups. Readiness for skin grafting was assessed using clinical criteria alone for group 1 and using clinical and microbiological criteria for group 2. The percentage graft take was reviewed on the fifth day postoperatively. Data were analyzed using SPSS software version 25, with a  $p$  value  $< 0.05$  considered statistically significant. **Results:** Forty patients were included in the study, 20 in each group. The male:female ratio was 3:1. The most common indication for skin grafting was trauma. There was no significant difference in the percentage graft take and incidence of complications between the 2 groups. The patients in group 2 had a significantly longer duration of wound healing (mean  $76.20 \pm 7.8$  d v.  $42.1 \pm 10.5$  d,  $p = 0.013$ ). **Conclusion:** There is no significant difference in skin graft take when a wound bed is assessed using clinical criteria alone compared with clinical and microbiologic criteria before skin grafting. Therefore, the use of clinical criteria alone is suitable for the assessment of a wound bed for skin grafting.

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**Etiology and patterns of pediatric long bone fractures seen at a regional referral and university teaching hospital in southwestern Uganda.** *Daniel Kisitu Kyengeru.* From the Mbarara University of Science and Technology, Department of Surgery, Mbarara, Uganda.

**Background:** Fractures account for up to one-quarter of pediatric traumatic injuries, with prevalence projected to increase with increasing motorization and urbanization in sub-Saharan Africa. Data pertaining to the demographics of the affected population, the etiology, and pattern of fractures in Uganda remain scarce. We sought to document the setting, etiology, and pattern of pediatric long bone fractures in patients presenting to Mbarara Regional Referral Hospital. **Methods:** This was a cross-sectional observational study taking place over a 3-month period, recruiting trauma patients younger than 18 years presenting with radiographic evidence of long bone fractures. Data collected included demographics, injury mechanism, and AO fracture pattern. **Results:** We enrolled 77 participants with a mean age of  $9.7 \pm 5$  years. The highest incidence was in males aged 13–17 years and females aged 9–12 years. Road traffic accidents (42.9%), mainly resulting from motorcycles (39.4%) and falls (40.3%), caused most of the fractures. Fractures were mainly closed (90.8%) and simple (81.6%), involving the diaphysis (48%), and were isolated (74%). Most of the fractures were sustained outdoors (83.1%), and significantly more often occurred at home than in other settings (46.8%,  $p < 0.001$ ). **Conclusion:** The high incidence of fractures near the homes and those following road traffic accidents warrants the formulation of safety guidelines for the prevention of childhood injuries.

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**Late-presenting developmental dysplasia of the hip in Ethiopia: a retrospective cohort study of 116 hips.** *Netsanet Abebe, Richard Gardener.* From St. Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia (Abebe); and

**The Hospital for Sick Children, University of Toronto, Toronto, Ont., Canada (Gardener).**

**Background:** Developmental dysplasia of the hip (DDH) is considered a rare condition in sub-Saharan Africa, with several articles reporting a virtual immunity to the condition. This is the first study reporting on the surgical treatment of late-presenting DDH in Ethiopia, where the incidence appears unusually high when compared with the rest of sub-Saharan Africa. **Methods:** We performed a retrospective cohort study of 88 patients (116 hips) older than 18 months who underwent open hip reduction with or without femoral and pelvic osteotomies between 2013 and 2017. Mean age at the time of surgery was 33 months (range 18–96 mo). Mean follow up was 6.6 years (range 4.0–9.5 yr). All patients were reviewed more than 4 years postoperatively using clinical and radiological assessment. **Results:** The clinical result was excellent in 102 hips (87.9%). Most (84%) hips were Severin grade 1 or 2. There was a 30% incidence of avascular necrosis (AVN), with the majority (21 of 35 affected hips) being type 2 growth disturbance. There was a 10% incidence of early subluxation or dislocation that required revision surgery. In these hips, the AVN incidence was 50%, with type 3 or 4 AVN/growth disturbance being more common. **Conclusion:** This is the first study of operatively managed DDH from Ethiopia and the central African region. The overall outcome is encouraging, but highlights the importance of a stable, concentric, and gentle reduction from the outset of surgery. A large screening initiative is underway to assess the incidence of DDH and to minimize late presentation with public health measures.

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**Addressing critical challenges: aortoiliac occlusive disease management in Ethiopia. Dagim Berhanu, Neyou Seyoum Abebe, Henok T/Silasie Zeleke. From the Department of Surgery, Hawassa University College of Medicine and Health Sciences, Hawassa, Ethiopia (Berhanu); and the Department of Surgery, Addis Ababa University College of Medicine and Health Sciences, Addis Ababa, Ethiopia (Abebe, Zeleke).**

**Background:** Aortoiliac occlusive disease, mainly due to atherosclerosis, results in narrowing or blockage of the abdominal aorta and common iliac arteries, causing symptoms ranging from leg pain to severe limb-threatening ischemia. Revascularization with open surgical treatment is preferred for extensive disease, especially in patients with advanced ischemic symptoms. Data in low- and middle-income country (LMIC) settings on vascular disease burden are limited. This study reports the outcomes of open surgery for aortoiliac occlusive disease at Tikur Anbessa Specialized Hospital (TASH), Addis Ababa, Ethiopia, between January 2018 and May 2023, showcasing successful treatment outcomes in a constrained setting. **Methods:** A 6-year retrospective cross-sectional study analyzed outcomes of 36 patients who underwent open aortoiliac reconstructions at TASH. Surgical results were summarized using descriptive statistics. **Results:** Thirty-six patients underwent open surgical reconstruction for chronic atherosclerotic aortoiliac occlusive disease. The majority were male (63.9%), and the mean age was  $61.1 \pm 12.3$  years. Hypertension (50%) was the predominant risk factor, followed by diabetes and smoking (30.6% each). Ischemic tissue loss was the primary indi-

cation for surgery (69.4%), with most patients showing infrainguinal vessel involvement (91.7%). Anatomic reconstruction was the most common technique (63.9%), resulting in symptom resolution in 91.7% of patients postoperatively. Early complications occurred in 41.7% of cases, with late graft occlusion and postoperative death observed in 13.9% and 8.3% of patients, respectively. **Conclusion:** Tailored management, comprehensive postoperative care, and vigilant follow-up are essential for optimizing aortoiliac occlusive disease outcomes. Further research and long-term studies are needed to improve management in resource-limited settings.

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**Patient-centred surgical care for children in low- and middle-income countries — a systematic scoping review of the literature. Riya Sawhney, Kacylia Roy Proulx, Ayla Gerk, Elena Guadagno, Dan Poenaru. From the Faculty of Medicine and Health Sciences, McGill University, Montréal, Que., Canada (Sawhney, Proulx, Gerk, Poenaru); and the Harvey E. Beardmore Division of Pediatric Surgery, Montreal Children's Hospital, McGill University Health Centre, Montréal, Que., Canada (Guadagno, Poenaru).**

**Background:** Studies exploring patient-centred care (PCC) in pediatric surgery have been disproportionately concentrated in high-income countries. This review explored the adoption of PCC in low- and middle-income countries (LMICs). **Methods:** Seven databases were searched from inception until January 2023 to retrieve relevant articles in pediatric surgery in LMICs. We focused on 6 key PCC domains: patient-reported outcomes (PROs), patient-reported experiences (PREs), shared decision-making (SDM), patient education, patient satisfaction, and informed consent. **Results:** Of 8050 studies screened, 230 underwent full-text review, and 48 were finally included. Most were single-centre (87.5%), cross-sectional studies (41.7%) from the southeast Asian (35.4%) and eastern Mediterranean regions (33.3%) — primarily India (29.2%) and Iran (18.8%). Studies most frequently focused on postoperative care (45.8%) and pediatric general surgery (18.8%). The most common PCC domains were PREs ( $n = 30$ ), PROs ( $n = 16$ ), and patient/parent satisfaction ( $n = 16$ ); informed consent ( $n = 2$ ) and SDM ( $n = 1$ ) were least studied. Only 13 studies (27%) directly elicited children's perspectives. Despite all studies originating in LMICs, 25% of first authors and 18% of senior authors lacked LMIC affiliations. **Conclusion:** The adoption of patient-centred care in LMICs focuses predominantly on PREs and PROs. Domains such as informed consent and SDM are rarely encountered in the literature, and the voices of children are rarely prioritized in their care. Opportunities to enhance patient-centred care in LMICs abound, with the potential to improve the surgical care of children in resource-limited settings.

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**Virtual and augmented reality for simulation training in low- and middle-income countries — a systematic review. Shreenik Kundu, Boaz Laor, Riya Sawhney, Taylor Wurdeman, Fabio Botelho, Ayla Gerk, Elena Guadagno, Dan Poenaru. From McGill University, Montréal, Que., Canada (Kundu, Laor, Sawhney, Botelho, Gerk, Poenaru); the Montreal Children's Hospital, McGill University Health Centre, Montréal, Que., Canada (Kundu, Sawhney,**

Botelho, Gerk, Guadagno, Poenaru); the Loma Linda University Medical Center, Loma Linda, Calif., USA (Wurdeman); and the Program in Global Surgery and Social Change, Harvard Medical School, Boston, Mass., USA (Wurdeman, Gerk).

**Background:** Operative management and critical care training face challenges due to resource constraints in low- and middle-income countries (LMICs). Virtual (VR) and augmented reality (AR) offer potential solutions by overcoming traditional barriers like cost and accessibility. We systematically reviewed the use of head-mounted VR/AR technologies for training health care workers in LMICs, evaluating their feasibility and adoption. **Methods:** Following Preferred Reporting Items for Systematic reviews and Meta-Analyses guidelines, a comprehensive search across 8 databases was conducted up to November 2023, focusing on VR/AR in provider training in LMICs, without language restrictions. The protocol was registered on PROSPERO (CRD42023477034). **Results:** Of 11 010 titles and abstracts, 60 underwent full-text review, and 10 were included. All studies showed that VR/AR improved knowledge, and most (70%) increased learners' engagement. Specific areas such as operative planning were highlighted in 10% of the studies, clinical skill acquisition in 20%, and educational engagement in 30%. Three studies (30%) objectively demonstrated that VR/AR are accessible, and 4 (40%) highlighted technology adoption. Key challenges identified were connectivity issues in 1 study (10%), setup difficulties in 2 (20%), and user fatigue in 1 (10%). The studies highlighted the preference of VR/AR due to its engaging and realistic training environment. **Conclusion:** VR/AR technologies can democratize education, making advanced training accessible in resource-limited settings. Our findings suggest an improvement in knowledge and engagement among health care workers in LMICs, supporting further research for broader implementation and integration into global surgical initiatives to improve outcomes.

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**Clinical profile and outcome of penetrating traumatic brain injury war victim military patients in Ethiopia: a prospective study.** *Mengistu Ayele, Azarias Kassahun, Tsegazeab Laeke, Mestet Yibeltal, Bereket Hailu, Ermias Fikru.* From the Hawassa University College of Medicine and Health Sciences, Hawassa, Ethiopia (Ayele); Addis Ababa University School of Medicine, Addis Ababa, Ethiopia (Kassahun, Laeke); Debre Tabor University College of Medicine and Health Sciences, Debre Tabor, Ethiopia (Yibeltal); Werabe University College of Medicine and Health Sciences, Werabe, Ethiopia (Hailu); and Debre Berhan University College of Health Sciences, Debre Berhan, Ethiopia (Fikru).

**Background:** Penetrating traumatic brain injury (TBI) has high morbidity, mortality, and disability among survivors. Managing penetrating TBI requires addressing the emergent conditions along with long-term rehabilitation care and remains a challenge in low-income settings. Studies on penetrating TBI have been scarce, including in the Ethiopian context. **Methods:** A prospective cohort study was conducted at 3 neurosurgical teaching hospitals in Addis Ababa, Ethiopia, between 2021 and 2023. Data were collected and analyzed using SPSS software

version 25. The short-term outcome at discharge was assessed using the Glasgow Outcome Scale (GOS). **Results:** Among 67 patients, 66 (98.5%) were male, and 9% of them were younger than 18 years. Bullets caused 80.6% of injuries. Bullets crossed the midline, danger zone, and posterior fossa in 28.4%, 32.8%, and 9% of cases, respectively. Brain abscess and wound site infection occurred in 20.9% of cases each, followed by cerebrospinal fluid leak, seizures, meningitis, hydrocephalus, and posttraumatic stress disorder occurring in 16.5%, 12%, 7.5%, 7.5%, and 1.5% of patients, respectively. The outcome was good in 56.7% of cases. Death occurred in 10.4%, vegetative state in 6%, severe disability in 26.9%, and moderate disability in 38.8%. The bullet crossing the danger zone was associated with poor outcome (adjusted odds ratio 6.56, 95% confidence interval 2.10–20.5,  $p = 0.039$ ). **Conclusion:** Enduring disability necessitates urgent comprehensive after-care rehabilitation. Pediatric soldier participation in war indicates the violation of international laws.

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**Addressing the paramedic shortage in Ethiopia: a critical analysis for emergency medical service improvement.** *Shemsedin Amme Ibro, Abdeta Workineh, Fikadu Balcha, Fira Abamecha, Shoka Shemsi, Abdullab Saleh Alruwaili.* From the Institute of Health, Jimma University, Jimma, Ethiopia (Ibro, Workineh, Balcha, Abamecha, Shemsi); and the Emergency Medical Services Program, College of Applied Medical Sciences, King Saud Bin Abdulaziz University for Health Sciences, Riyadh, Saudi Arabia (Alruwaili).

**Background:** Ethiopia's emergency medical service (EMS) system is critically affected by a shortage of trained workers like paramedics, compromising the quality of prehospital care (PHC). This study aimed to shed light on the urgent need to enhance paramedic education to address this gap. **Methods:** A mixed-methods approach, including a literature review complemented with stakeholder needs assessment using a qualitative approach and expert appraisals was employed. We analyzed 30 sources, including articles from PubMed, Scopus, and Google Scholar databases and relevant government documents focusing on PHC, education, and training. Ongoing qualitative data collection from key EMS stakeholders will provide a current perspective on the challenges and opportunities within the Ethiopian EMS system. **Results:** The absence of bachelor-level paramedic training has resulted in a scarcity of qualified personnel, undermining EMS development and service utilization, while low knowledge and practice levels are also reported among health care providers. Government initiatives, such as the Health Sector Transformation Plan II 2021–2025, aimed at establishing a strong EMS system, and the emergence of jurisdictional-type EMS in the different parts of the country demonstrate strategic emphasis and a commitment to EMS improvement. However, challenges such as resource limitations, workforce shortages, and the absence of organization and standardization persist. **Conclusion:** Addressing the paramedic shortage through standardized training, undergraduate programs, and faculty development is crucial for EMS system advancement in Ethiopia. A robust educational infrastructure for paramedics is essential for improving PHC and supporting the health system's emergency response capacity.

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**Empowering voices: the role of social media in civilian agency during the Sudanese Civil War.** *Gabriel Rodriguez, Anna Jose, Shabd Ebied.* From the Westchester Medical Center, New York Medical College, Valhalla, N.Y., USA (Rodriguez, Jose); and Omdurman Islamic University, Omdurman, Sudan (Ebied).

**Background:** Amidst the Sudanese civil war, social media has emerged as a vital tool, providing civilians with a platform to voice their experiences, document atrocities, and mobilize for change. This study examines the role of social media in civilian agency during the Sudanese Civil War. **Methods:** We used Armed Conflict Location and Event Data Project (ACLED) data for Sudan from January 1, 2022, to April 26, 2024, encompassing reported incidents of social conflict (battles, protests, riots, violence targeting civilians). A comparative analysis was conducted, examining social media utilization before and after the onset of the Sudanese Civil War on April 15, 2023. An independent samples proportion test was employed to assess changes in social media usage, with a significance level set at  $p < 0.05$ . **Results:** Prior to the war, approximately 43% of all events were reported through social media, predominantly protests (> 90%), while sexual violence/abductions were scarcely reported (1.4%). After onset of the war, the overall proportion of social media-reported events slightly declined to 37.4% ( $p < 0.001$ ), notably affecting protest reports (33.5%), while reports of sexual violence/abductions surged to 42.8% ( $p < 0.001$ ). **Conclusion:** Social media has been a constant presence in Sudan when it comes to reported incidents of social conflict; however, its use has become critical for events of sexual violence/abductions. This new trend has the potential to empower women and communities, ensure awareness of the issue, and enable justice for victims.

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**Assessment of knowledge, attitude, and practice of Basic Life Support (BLS) among medical interns of Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia.** *Samuel Girma, Abigael Abiy.* From Addis Ababa University, Addis Ababa, Ethiopia.

**Background:** Despite Basic Life Support (BLS) being a cornerstone intervention for cardiac arrest, its effectiveness relies on swift emergency response activation, consistent recognition of critical events, and a well-trained health care workforce. Given Ethiopia's high accidental death rate, assessing BLS knowledge and skills among primary health care professionals becomes crucial. Hence, this study aimed to evaluate the knowledge, attitudes, and practices of BLS among medical interns at the nation's largest tertiary hospital. **Methods:** A facility-based, cross-sectional, quantitative study was conducted at Tikur Anbessa Specialized Hospital from September to December 2023 using a standardized questionnaire adapted from pre-tested and validated instruments used in similar research. Data analysis was performed using Stata software version 14. **Results:** Among 150 respondents (male:female ratio 2.2:1), 52% demonstrated good knowledge, 82% had good attitude, and 67% had good practice. Most (77%) had taken BLS training before. Having prior BLS training (adjusted odds ratio [AOR] 3.2, 95% confidence interval [CI] 1.4–7.6), good knowledge of BLS (AOR 2.5, 95% CI 1.1–5.9), and a

positive attitude toward BLS (AOR 2.8, 95% CI 1.0–7.1) were significantly associated with good BLS practice. **Conclusion:** Training in BLS can improve patient outcomes during emergency settings. Our study found that training and possessing good knowledge and attitude were significantly associated with the practice of BLS. Future research should assess long-term knowledge retention and practical skill application.

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**Snapshot of trauma and anesthesia care capacity and preparedness in resource-limited setup in the face of war: the case of northern Ethiopia.** *Hussien Endris Assen, Kalab Tesfaye, Kassaye Demeke, Aklilu Yibeyis, Khalid Jemal, Demeke Yilkal, Ashenafi Amsalu, Lema Derseh, Yophtabe W/Gerima, Tadesse Belayneh, Mekuanint Tiruneh, Almar Bitew, Sewbesew Yitayih, Tadesse Awoke, Chanyalew Worku, Anissa Mohammed, Mohammed Alemu, Mohammed Yesuf, Fantu Mamo, Kegniet Sbitu, Biks Liyew.* From the Department of Anesthesia, College of Medicine and Health Science, School of Medicine, University of Gondar, Gondar, Ethiopia (Assen, Yilkal, W/Gerima, Belayneh); the Department of Epidemiology and Biostatistics, Institute of Public Health, College of Medicine and Health Science, School of Medicine, University of Gondar, Gondar, Ethiopia (Derseh, Awoke, Mamo); the Department of Orthopedics, College of Medicine and Health Science, School of Medicine, University of Gondar, Gondar, Ethiopia (Tefaye, Bitew, Yesuf); the Department of Internal Medicine, College of Medicine and Health Science, School of Medicine, University of Gondar, Gondar, Ethiopia (Demeke); the Department of Surgery, College of Medicine and Health Science, School of Medicine, University of Gondar, Gondar, Ethiopia (Yiheyis, Amsalu, Tiruneh, Alemu); the Department of Obstetrics and Gynecology, College of Medicine and Health Science, School of Medicine, University of Gondar, Gondar, Ethiopia (Jemal); the Department of Psychiatry, College of Medicine and Health Science, School of Medicine, University of Gondar, Gondar, Ethiopia (Yitayih); the Department of Nursing, College of Medicine and Health Science, School of Medicine, University of Gondar, Gondar, Ethiopia (Worku); the Department of Epidemiology and Biostatistics, School of Public Health, College of Medicine and Health Science, Wollo University, South Wollo, Ethiopia (Mohammed); the Department of Health Education and Behavioural Science, College of Medicine and Health Science, School of Medicine, University of Gondar, Gondar, Ethiopia (Sbitu); and the Department of Emergency and Critical Care Nursing, College of Medicine and Health Science, School of Medicine, University of Gondar, Gondar, Ethiopia (Liyew).

**Background:** More than 5 billion people worldwide lack access to safe surgery and anesthesia. Low- and middle-income countries face significant challenges in workforce, infrastructure, and medication for safe anesthesia and trauma care. War exacerbates existing situations. We assessed trauma and anesthesia care capacity and preparedness of hospitals in war-affected regions of northern Ethiopia in 2021. **Methods:** We conducted a facility-based cross-sectional survey of hospitals in war-affected north-west areas of Ethiopia using a modified World Federation of

Societies of Anaesthesiologists Anaesthesia Facility Assessment Tool, International Assessment of Capacity for Trauma, and WHO tools. **Results:** Seventeen hospitals (13 primary, 3 general, 1 tertiary referral) were surveyed. Thirty-nine functional operation rooms were available, with 270 surgical beds. Two hospitals had intensive care units (18 beds); only 1 had mechanical ventilators with continuous monitoring. There were 34 general and orthopedic surgeons, 24 obstetrician-gynecologists, 91 nonphysician anesthesia providers, and 1 anesthesiologist. None had trauma-specific training. There was inconsistent access to running water, oxygen, and electricity across all hospitals. Three hospitals were unable to perform basic emergency procedures, 4 hospitals provided open fracture repairs, and 9 provided laparotomy services. Most hospitals used spinal and general anesthesia. Few had blood typing and cross-matching, with no component blood products. Hospitals used paper charts, with inconsistent documentation. Few facilities had all basic anesthesia and essential medications. **Conclusion:** Trauma and anesthesia capacity and preparedness in northwest Ethiopia is low, with critical shortages across each domain.

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**Prehospital features of trauma victims and their association with outcomes in southern Ethiopia.** *Ayeneu Gucho, Gezabegn Tilahun, Timothy Love, Andrew Chew.* From the Pan African Academy of Christian Surgeons, Soddo Christian Hospital, Sodo, Ethiopia.

**Background:** Globally, 5 million people die from injuries each year. Trauma is among the leading causes of death, especially in low- and middle-income countries. Effective prehospital care can lead to prevention of deaths and reduced disability. This study aimed to assess prehospital features of trauma victims and their association with outcomes in a rural setting. **Methods:** A single-institution retrospective analysis was performed on trauma patients who presented directly to Soddo Christian Hospital between January 2020 and October 2022. Patients referred from other hospitals, patients with remote trauma, those managed as outpatients, and patients with exclusively orthopedic injuries were excluded from the study. **Results:** A total of 451 prehospital trauma patients were managed over the study period of 34 months. Most (80.7%) were male, and the mean age was 30 years (range 1–85 yr). Traffic accidents constituted the most common mechanisms (47.7%), followed by assaults, falls, and animal attacks. In total, 40.6% of patients were brought to the hospital from home after injury. Mean prehospital time was 21 hours, and only 23% patients arrived within the “golden hour.” Only 0.9% of patients were accompanied by a health care worker of some kind. Analysis demonstrated significant associations between mortality and prehospital duration, mode of transport, accompaniment during transport, and presentation directly from the scene of injury. Hospital stay was also noted to correlate with transportation. **Conclusion:** This study describes the prevalent delay in presentation, suboptimal transportation means, and lack of prehospital medical personnel. Improving prehospital care could improve patient outcomes following trauma.

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**Assessing prioritization of trauma and surgical care in Uganda’s health policy documents: a bibliometric analysis.** *Brian Kasagga, Berjo Takoutsing, Obuku Ekwaro, Emmanuel*

*Elobu.* From the Makerere University School of Medicine, Kampala, Uganda (Kasagga); the Society of Uganda Gastrointestinal and Endoscopic Surgeons, Kampala, Uganda (Kasagga, Elobu); the Association of Future African Neurosurgeons, Yaoundé, Cameroon (Takoutsing); the Clinical Epidemiology Unit, Makerere University College of Health Sciences, Kampala, Uganda (Ekwaro).

**Background:** Globally, the escalating burden of trauma, encompassing injuries and burns, disproportionately impacts low- and middle-income countries (LMICs), emphasizing the pressing need for evidence-based policies that prioritize trauma care. We aimed to assess the extent of prioritization of surgery, trauma, and anesthesia care in Uganda’s Ministry of Health documents. **Methods:** Key decision-making documents were identified from the Ministry of Health website. A keyword search was conducted on these documents using terms related to surgical, obstetric, trauma, and anesthesia (SOTA) care. Additionally, for comparison, the same documents were searched using nonsurgical keywords, following the approach outlined by Meara and colleagues. Surgical mentions were also categorized within health-system building blocks. **Results:** In total, surgical terms comprised 1061 mentions, while nonsurgical terms comprised 9791. Of these, injury accounted for 392 mentions (37%) and burns for 116 (10.9%). Surgical mentions were primarily concentrated in service delivery (71.64%) and health information (24.52%), with lower proportions in leadership and governance (18.49%), and health system financing (2.17%). **Conclusion:** This study underscores Uganda’s insufficient prioritization of trauma and surgical care in policy documents, necessitating comprehensive strategies to address trauma care and prevention. Integrating SOTA care into existing policies and formulating national surgical, obstetric, and anesthesia plans is crucial. Collaborative efforts among stakeholders and ministries are essential for incorporating trauma management into key decision documents. This would not only improve trauma-associated mortality and morbidity, but also contribute to building more resilient and trauma-inclusive health systems, enhance surgical health outcomes, and contribute to the broader sustainable development agenda in Uganda.

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**Readiness of tertiary care hospitals in Ethiopia for trauma registry implementation.** *Degisew Dersso Mengistu, Alex Zhuang, Bethlehem Shiferew, Gelila Mengistu, Ayalew Zewdie, Nabom Tadelles, Alegnta Gebreyesus, Elise Presser, Katie Iverson, Chris Dodgion, Thomas G. Weiser, Rachel Koch, Nichole Starr.* From the Ethiopian Federal Ministry of Health, Addis Ababa, Ethiopia (Mengistu, Shiferew, Gebreyesus, Tadelles); the Boston University School of Medicine, Boston, Mass., USA (Zhuang); the Addis Ababa Burn, Emergency & Trauma Center, Addis Ababa, Ethiopia (Mengistu, Zewdie); Yale University, New Haven, Conn., USA (Presser); the Medical College of Wisconsin, Milwaukee, Wis., USA (Iverson, Dodgion); Stanford University, Palo Alto, Calif., USA (Weiser); and the University of California, San Francisco, San Francisco, Calif., USA (Koch, Starr).

**Background:** The Ethiopian Ministry of Health has redoubled efforts to implement trauma registries in tertiary hospitals to

characterize epidemiology and inform quality improvement (QI) efforts. This study presents infrastructure availability at select hospitals in Ethiopia for supporting trauma registries. **Methods:** We conducted surveys between February 2020 and May 2021 at 11 hospitals treating trauma patients in Ethiopia, using a 94-item questionnaire to characterize trauma management, resources, QI staff, and the status of trauma registry implementation. Seven hospitals were in Addis Ababa, and 4 were in other cities. **Results:** Eleven respondents representing 11 hospitals answered 68% of survey questions (1149 of 1683 possible entries). Most were specialized (54.5%) and teaching (63.6%) hospitals that had a morbidity and mortality conference (70%) and preventable death reviews (60%), but only 2 had a functional trauma registry; 7 kept a log book of trauma activations. Most (90%) had a QI office, but few had an office ( $n = 4$ ), a trauma registry manager ( $n = 1$ ), or nurse coordinator ( $n = 3$ ) designated for a trauma registry, and none had a trauma data manager. General surgery (100%), orthopedic (100%), and neurosurgical (88.9%) services were widely available, but few staff had received any formal trauma training. **Conclusion:** The Ministry of Health in Ethiopia has a strong commitment to improve trauma care. To scale up the quality of trauma care provided, attention should be paid to addressing barriers to implementing trauma registries faced by some of the largest hospitals in Ethiopia, such as lack of dedicated space, staff, and training.

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**Rapid review: humanitarian organizations and existing policy on sustainable surgical care in conflict and post-conflict zones.** *Davy Lau, Irena Zivkovic, Shabrizad Joharifard, Emilie Joos, Naisan Garraway.* From the University of British Columbia, Vancouver, BC, Canada.

**Background:** In areas of conflict, it is an ethical responsibility of surgical providers to adopt practices that promote long-lasting sustainability of care. This study's objective was to identify examples of sustainable surgical practices and policies by humanitarian organizations in conflict and post-conflict zones. **Methods:** A rapid review was conducted on MEDLINE, including articles containing language that described sustainable surgical practices or policies in the aforementioned context. Sustainability was defined using criteria from a modified Delphi consensus framework on the sustainability of global surgery partnerships. **Results:** Twenty-nine articles were included out of 1057 screened. They described 54 surgical programs by 14 humanitarian organizations, most commonly Médecins Sans Frontières ( $n = 25$ ) and International Committee of the Red Cross ( $n = 5$ ). The following pillars of sustainability were explicitly described: stakeholder engagement (61.11%), multidisciplinary involvement (53.70%), context-relevant education (85.19%), multisource funding (9.26%), outcome measurement (68.52%), and handover to local stakeholders (18.52%). The mean duration of programs was  $7.95 \pm 6.73$  years. None of the included articles explicitly cited a sustainability policy that guides the organization's surgical care provision in this context. **Conclusion:** While the review identified examples of sustainable surgical practices, it remains unclear what organization-wide policies exist on sustainable surgery. The next steps are to conduct a grey literature review to identify such policies, as these would be essential to promoting long-lasting change in these areas.

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**The United Nations Global Surgery Learning Hub: enhancing human resource capacity in surgical care.** *Francesca Vituci, Eric O'Flynn, Ines Péric, Léa Simon, Geoffrey Ibbotson.* From the Global Surgery Foundation, Geneva, Switzerland (Vituci, Ibbotson); the Royal College of Surgeons in Ireland Institute of Global Surgery, Dublin, Ireland (O'Flynn, Péric); and the United Nations Institute of Training and Research, Geneva, Switzerland (Simon).

**Background:** Many surgical, anesthetic, obstetric, and perioperative nursing trainees, training programs, and practitioners in low-resource settings lack access to appropriate training materials. The open-access SURGhub e-learning platform was launched in June 2023 to address this gap, by offering access to curated, peer-reviewed, high-quality training resources suitable for low-resource contexts. **Methods:** We interrogated platform data to understand learner characteristics, such as location, specialty, and level of training. We also analyzed usage patterns, learner behaviour, and feedback. **Results:** As of April 25, 2024, SURGhub provided 53 open-access courses in surgery, perioperative nursing, obstetrics and gynecology, anesthesia, and nontechnical skills. In total, 4324 registered learners have completed 1532 courses, with UN certificates of completion awarded. Learner data are available for 2846 learners from 164 countries. Ethiopia ( $n = 158$ ), Nigeria ( $n = 155$ ), and Kenya ( $n = 155$ ) have the largest number of learners. Where specialty is indicated, learners — both in-service and in training — are predominantly surgeons ( $n = 749$ ), with significant numbers of general medical officers ( $n = 376$ ), nurses ( $n = 272$ ), and anesthesiologists ( $n = 224$ ). The average course satisfaction feedback score is 4.7/5. The most used course, "Surgical Foundations" by the College of Surgeons of East, Central and Southern Africa, has been used for 47 633 hours. **Conclusion:** SURGhub is supporting training and upskilling of the surgical care team by broadening access to quality training material in low-resource settings worldwide. Evaluation, continuous evolution, and partnerships with interested institutions are crucial to ensure SURGhub's effectiveness in meeting the diverse needs of learners.

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**Disaster surge capacity rise through reverse triage in Addis Ababa hospitals.** *Tsion Seyoum, Aklilu Azazh, Lemlem Beza.* From Black Lion Hospital, Addis Ababa University, College of Health Sciences, Addis Ababa, Ethiopia.

**Background:** Plans must be in place before a disaster or pandemic strikes in order to reduce damage and maintain control. Hospitals play a leading role in disaster and incidence response by identifying inpatients who can be safely discharged early, which can create additional surge capacity. Implementing reverse triage allows hospitals to optimize resources and prioritize patients based on their medical needs. We sought to examine the impact of reverse triage on surge capacity of public hospitals in Addis Ababa, Ethiopia, during disaster. **Methods:** We carried out a hospital-based cross-sectional study to gather primary data from 3 public hospitals (Tikur Anbessa Specialized Hospital, St. Paul's Hospital Millennium Medical College, and Zewditu Memorial Hospital), which were included by convenience sampling, and data were collected from September 1 to September 30, 2023. Descriptive statistics and

binomial logistic regression were employed to identify factors associated with a rise in hospital surge capacity. **Results:** A total of 296 participants met the eligibility criteria and were included in the study. In most cases (69.3%), the source of admission was the emergency department. Patients were assessed for early discharge based on their reverse triage score using the Reverse Triage Tool of Leuven. The approximate percentage of patients who qualified for an early discharge was 58.4% (95% confidence interval 52.6%–64.1%). **Conclusion:** This study showed the impact of reverse triage on increasing surge capacity in Addis Ababa's health care facilities during a catastrophic event in a short period of time.

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**Outcome of major burn injury management involving high-dose multivitamins in Enugu, Nigeria.** *Ifeanyichukwu Onah, Chijioko Chukwuma.* From the National Orthopedic Hospital, Enugu, Nigeria.

**Background:** Burn injury causes significant alteration in homeostasis, and depletes nutritional reserve. Major burn injury frequently occurs in the nutritionally challenged low-income populations of sub-Saharan Africa. Replacement of micronutrients including vitamins is essential for good outcomes. Burn injury causes significant increase in oxidative stress and release of oxygen radicals. Administration of antioxidant vitamins, such as vitamins A, C, and E, may improve patient outcomes and survival by mopping up oxygen radicals, moderation of response to trauma, and promotion of healing. This study evaluated the outcome of major burn management involving high dose multivitamins. **Methods:** We conducted a 5-year retrospective study of all patients with major burns managed in a plastic surgery unit that routinely uses high-dose vitamins A, C, and E. We collected data on patient demographics; the cause, degree, and agent for the burn; wound dressing; systemic antibiotics used; start time of systemic antibiotics; level compliance to vitamins; duration of hospital admission; and time for epithelialization. Compliance was categorized. The data were analyzed using SPSS software version 22. **Results:** Seventy-four of the 116 patients managed using the protocol of administration of high-dose vitamins A, C, and E were studied. There was a significant difference in the duration of admission between patients with good compliance and those with poor compliance (post hoc analyses  $p = 0.009$ ,  $p = 0.020$ , and  $p = 0.008$  for vitamins A, C, and E, respectively). **Conclusion:** Patients with good compliance had shorter duration of hospital admission. There was a difference in the time to epithelialization among the patients with different degrees of compliance.

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**A collaboration between Hawassa and Houston in a competitive hackathon for surgical innovation.** *Dagim Berhanu, Jason Sheno, Nick Sears, Yoseph Bedore, Richard Caplan.* From the Department of Surgery, Hawassa University, College of Medicine and Health Sciences, Hawassa, Ethiopia (Berhanu, Bedore); the School of Engineering Medicine, Texas A&M University, College Station, Texas, USA (Sheno, Sears); and the Houston Methodist Hospital, Houston, Texas, USA (Caplan).

**Background:** Innovation is the key to expanding access to affordable health care in low- and middle-income countries (LMICs).

Leveraging the creative potential of LMICs through initiatives like hackathons can lead to the development of cost-effective solutions to health care challenges. This study aimed to explore the potential of hackathons as a platform for generating low-cost solutions to challenges in LMICs and fostering collaboration among institutions across geographical boundaries. **Methods:** This collaboration entailed the generation of gaps in care in Hawassa, which allowed ideation of possible solutions and prototyping in a Houston Methodist Hospital/Texas A&M EnMed hackathon. Projects were evaluated using a predefined weighted rubric, and winners had the opportunity to showcase their innovations at the 12th Annual Global Health Conference of the Houston Global Health Collaborative. **Results:** The projects are anticipated to promote collaboration for each potential need in the hope of generating a successful final product. Moreover, the success of the pilot event has laid the groundwork for a broader city-wide hackathon in 2025, with the participation of additional institutions within the Texas Medical Center, aimed at addressing health care challenges in LMICs. The winning innovation — a battery-operated operating room suction system — underscores the potential of hackathons to spur surgical innovation in LMICs. Furthermore, the relationships forged through this collaborative effort are expected to foster future innovation and collaboration among participating institutions. **Conclusion:** This model not only offers a scalable approach to engaging students and faculty in global health innovation, but also holds promise for addressing health care challenges and promoting cost-effective health care solutions worldwide.

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**Humanitarian surgery: an experience from the Afar region of Ethiopia.** *Wongel Tena Shale.* From Jimma University, Jimma, Ethiopia.

**Background:** The Afar region of Ethiopia is affected by intermittent tribal armed conflicts occurring throughout the year, and dealing with mass casualties monthly is the norm for some of the hospitals in the region. This study aimed to highlight experiences of Ethiopian surgeons practising humanitarian surgery, while shedding an incisive light on the toll that conflict takes on an already fragile health care facility. **Methods:** This study was based on prospective observations and narratives at the Mohammed Akile Memorial Hospital (MAMH) between June 2020 and November 2021. Qualitative and quantitative data are used to critique the setup at present and emphasize strategies to optimize resources and enhance patient outcomes in the future. **Results:** The MAMH is one of the hospitals in the Afar region receiving mass casualties on a regular basis. According to an audit from June 2020 to June 2021, 269 major and 171 minor surgical procedures were performed in the hospital, most of which treated gunshot wounds during mass casualties. While we continued to provide emergency surgical care in a humanitarian setting and learned how to manage mass casualties in a resource-constrained setting, the care we provided was not comprehensive. **Conclusion:** There has been a humanitarian crisis in Ethiopia's Afar region for several decades. Improving access to and quality of emergency surgical care should be a top priority. Developing a system to enable surgical trainees to visit and undertake rotations there could be beneficial.