

**Interpretation:** We found that Peruvian female community leaders were knowledgeable regarding osteoporosis and reported high health motivation. Due to their investment in their communities, this population should be a key component of future osteoporosis-related community-based studies and interventions. Finally, we were able to demonstrate that a larger study would be feasible and even desired within this population.

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### A Systematic Review of the Diseases Interaction between Helminthic Infections and Diabetic Mellitus

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**Background:** The hygiene hypothesis indicated that a lack of exposure to microorganisms or parasites during childhood increases the chances of having autoimmune diseases due to alteration of natural immune system development. The purpose of the review is to summarize the current knowledge and updates of any epidemiological association between helminthic infections and their interactions on diabetic metabolism.

**Methods:** We performed a systematic literature review from MEDLINE database to examine epidemiological relationship between the helminthes and the diabetic status. All articles were included without restriction on language, publication date, study settings, clinical signs, laboratory parameters and disease complications. The published articles were screened and validated by using PRISMA criteria.

**Findings:** We retrieved 11 articles (ten cross-sectional studies and one cohort study) which mentioned the frequency distribution of helminthic infections among diabetic and non-diabetic group or the prevalence of diabetes mellitus among helminth infected and non-infected ones. The prevalence rates and the intensities of diseases were compared between studied groups. Majority of studies revealed a protective effect of helminthes against both type 1 and type 2 diabetes mellitus while only a few studies identified a positive association that specific helminthes increasing the disease severity in diabetic patients.

**Interpretation:** Well-designed longitudinal studies are still needed to identify the causal link of these associations. The helminth related compound or ova of the helminthic species have been used for treatment of autoimmune diseases such as Crohn's disease and ulcerative colitis and if helminthes protective mechanism on blood sugar homeostasis is significant, a helminthic related substance can shortly be an alternative therapeutic regime in diabetic treatment. However, on the other hand, we should also be aware of the impact of deworming on blood sugar metabolism especially, in the tropical and subtropical countries which are currently undergoing a nationwide mass deworming program to reduce the morbidity of helminth related health problems.

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### Funding Flows for the Global Initiative for Children's Surgery (GICS): Lessons Learned

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**Background:** Despite surgical conditions accounting for an estimated 30% of the global burden of disease, and children comprising up to 50% of the population in the lowest-resource settings, the funds available for global children's surgery delivery are limited and poorly defined. Further, the focus of prior global health efforts has traditionally been determined by funding, often discounting the experience and priorities of local providers. Thus, our goal was to describe the funding associated with a unique initiative dedicated to improve children's surgical care, the Global Initiative for Children's Surgery (GICS), which prioritizes the perspectives of providers from low-resource settings.

**Methods:** A retrospective review of funding mechanisms was performed over the first 6 months of the initiative, April 2016 to September 2016. Funding was grouped and analyzed according to donor. Charities, professional organizations, universities, and transnational organizations focused on children's surgery were invited to participate and contribute to costs associated with two meetings in May, 2016 (London) and October, 2016 (Washington DC). Organizations were encouraged to contribute either to a general fund or to directly support providers from these areas with which they had established contacts.

**Findings:** Professional organizations, non-governmental organizations and academic institutions each contributed almost equally (28.4%, 28.1%, 25.2%, respectively.) The remainder of funds (18.3%) came from private individual donors. Specialty organizations from anesthesia, neurosurgery and orthopedics contributed. Funds supported the travel costs for providers from low-resource environments to participate in two global meetings. Most organizations preferred to sponsor providers from resource-poor areas with whom they had a previous working relationship. Professional organizations donated administrative time, and the remainder of the organizational work was done on a pro-bono basis.

**Interpretation:** The Global Initiative for Children's Surgery was supported by multiple funding mechanisms, including several children's surgery sub-specialties. Support across disciplines and types of organizations reflect the wide range of stakeholders. Key stakeholders preferred to sponsor LMIC providers to whom they were closely connected, emphasizing the existing networks that must be mobilized to develop a strategic voice for children's surgery. Tracking funds will help to marry interests with needs and funding resources, help realize gaps in funding and promote transparency. This approach may help support surgical capacity building.

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### Use of Ultrasound in an Outpatient Primary Care Clinic in Mozambique

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**Program/Project Purpose:** Ultrasound is a valuable inpatient diagnostic tool in developing countries, where other types of imaging may not be available. It is not known how ultrasound technology contributes to patient care in a limited-resource, outpatient primary care setting. This information is vital to developing appropriate training programs for practitioners in this setting. This study aimed to quantify the number, type, indication and usefulness of ultrasound at an urban health center in Beira, Mozambique.

**Structure/Method/Design:** We conducted a two-month observational study at the Sao Lucas Health Center, a government health center supported by the Catholic University of Mozambique in collaboration with the University of Pittsburgh, from February–April 2016. Ultrasound operators were the clinic director, Mozambican physicians, and global health residents from the University of Pittsburgh, all of whom received formal ultrasound training. Using a Siemans Acuson X000 machine a log-book was used to record the age and sex of patients, indication for exam, type of exam and findings. Operators were asked to assess if ultrasound contributed to: (1) confirmation of a diagnosis/gestational date, (2) exclusion of a potential diagnosis, or (3) revealed unexpected findings.

**Outcome & Evaluation:** During 44 clinical days, 369 ultrasounds were performed. Most patients were female (88%) and median age was 26 years. A majority of exams evaluated women's health complaints, including amenorrhea/suspected pregnancy (23%), gestational age/fetal position in gravid women (24%), pregnancy complications such as bleeding and absence of fetal movement (5%), and other gynecologic complaints (6%). Other indications for exam were abdominal complaints (24%). Less common indications were cardio-pulmonary, urologic, soft tissue, breast and ENT symptoms. Ultrasound was used to confirm a suspected diagnosis in 163 cases (44%), most often pregnancy and gestational age. The exam was used to rule-out a diagnosis in 115 cases

(32%) and to reveal an unsuspected diagnosis in 91 cases (25%). Unsuspected diagnoses included intramuscular abscess in patient with cellulitis, ectopic pregnancy in patient with amenorrhea, and pericardial effusion and ascites in a patient with chronic cough.

**Going Forward:** Ultrasound is a valuable outpatient primary care tool in limited-resource settings, and is particularly useful in the evaluation of obstetric and gynecologic complaints. Clinical training in primary care should include acquisition and interpretation of ultrasound images.

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### Demographics and Mortality Outcomes of Neurotrauma in Guatemala City

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**Background:** In Guatemala, trauma is the leading cause of productive years of life lost and the fourth leading cause of death, but no published data is available on the incidence of neurotrauma. This study was conducted to obtain basic demographic information on traumatic brain injury (TBI) patients at the second highest-volume hospital in the country; determine whether TBI severity and other demographic variables correlated to poor outcomes; and place this information in the context of neurotrauma worldwide.

**Methods:** Case series study of TBI patients who were admitted to Hospital General San Juan de Dios in Guatemala City, Guatemala from May 2013–April 2015. Data was collected from nursing logs in the hospital's trauma bay and reports submitted to the Ministry of Health. Age, gender, and severity of TBI were compared to hospital length of stay (LOS) and in-hospital mortality. TBI severity was graded as mild (GCS=13–15), moderate (GCI=9–12), and severe (GCI=3–8).

**Findings:** 360 patients aged 15–91 years were included. The mean age was 39.2 years (SD=18.4). Patients were predominantly male (n=310, 86.1%). 119 patients (33.1%) received a TBI diagnosis of mild, 105 (29.2%) moderate, and 136 (37.8%) severe. Men were more likely to receive a severe TBI diagnosis (p=0.006, 40.3% men vs. 22.0% women). Overall mortality rate from TBI was 43.9% (n=158). Mortality rates increased with age (p=0.002) and severity grading (p<0.001). Mortality rates for mild, moderate, and severe grading were 21.0% (n=25), 41.0% (n=43), and 66.2% (n=90), respectively. Demographic variables, however, did not affect hospital length of stay (R<sup>2</sup>=0.00044). The median LOS was six days; most patients were discharged within one day (n=86, 23.9%).

**Interpretation:** Neurotrauma in Guatemala is linked to significantly higher mortality than in comparable countries. A 2009 study examining TBI outcomes in 46 countries participating in the CRASH trial found similar patient demographics but a mortality rate of 26.2% in other lower-middle income countries. Hospital