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Background: Sickle cell disease (SCD) is highly prevalent in sub-Saharan Africa; however, resources for accurate diagnosis and treatment are largely unavailable. Prior to December 2014, neither neonatal screening nor standardized methods for SCD diagnosis were routinely available in Malawi.

Methods: We initiated alkaline hemoglobin electrophoresis (HbE) for SCD diagnosis in the capital city of Lilongwe in November 2014. Alkaline HbE is an affordable and reliable diagnostic test for hemoglobinopathies including SCD. Site-specific standard operating procedures and protocols were developed and incorporated into an existing laboratory facility maintained by UNC Project Malawi, A 20 year old collaboration between the Malawi Ministry of Health and UNC. An imperative of this work was to train local Malawian laboratory technicians and clinicians on how to use and interpret the test results to ensure long term viability of the test.

Findings: Between January and May 2015, a total of 137 sequential patients with clinically suspected SCD were enrolled. Of those enrolled, 117 patients were confirmed to have HbSS, two were HbAS, 12 were HbAA, and the diagnosis was uncertain in six patients. Of 125 children who were chronically cared for as SCD patients prior to enrollment, 107 (86%) were confirmed to have HbSS. Patients were principally from the central region of Malawi with most living within the Lilongwe city limits. However, 9% of patients presented from non-Lilongwe districts and some patients were from up to 500 km away. Alkaline HbE was easy to set up and operate, inexpensive compared to other gold standard tests, and reliably delivered prompt and clinically meaningful results to patients and clinicians. We found that HbE was easily accommodated within existing UNC Project Malawi laboratory infrastructure. Our estimates put the cost per test at 3-4 USD, accounting for equipment and reagents but not indirect costs such as electricity, space, and personnel.

Interpretation: The implementation of decades-old technology now provides a foundation for future studies to understand the natural history of SCD in Malawi and develop intervention strategies appropriate for the setting to improve outcomes.

Funding: UJMT Fogarty Global Health Fellows Program (grant #R25TW009340), The Medical College of Georgia at Georgia Regents University, the J. William Fulbright Foundation, and the National Heart, Lung, Blood Institute (grant #U01HL117659).

Abstract #: 1.024_TEC

An assessment of essential maternal, newborn and child health equipment at Kenyatta National Hospital: Filling critical knowledge gaps to inform program design

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Background: WHO guidance on essential interventions for the management of reproductive, maternal, newborn and child health includes the availability of high-quality medical equipment that is

accessible, affordable and context appropriate. However, medical equipment is often unavailable in low-resource settings, exacerbated by human resource shortages and training capacity. This paper presents findings from a needs assessment conducted at Kenyatta National Hospital to assess gaps in the availability of equipment in the labor and delivery and neonatal units and to identify the factors that contribute to the limited availability of equipment.

Methods: We employed a descriptive study design and collected data from clinical, engineering and administrative staff in the procurement, labor, and delivery, neonatal and biomedical departments. Data collection included hospital statistics, thirty key informant interviews, and twelve clinical observations. Key informants were selected using convenience sampling. The study was approved by the KNH Ethics and Research Committee and written informed consent was obtained from all interviewees as well as patients and guardians (where applicable) participating in the clinical observations.

Findings: While hospital statistics revealed a 6% increase in the number of deliveries between January 2010 and December 2013, there was a 46% increase in the number of low birth weight infants delivered at KNH. Examination lights and delivery beds were found to be insufficient in number and often had limited functionality due to defective components like missing light bulbs or faulty hydraulic systems. Suction machines, resuscitation tables, vacuum extractors, and incubators were reportedly regularly unavailable due to frequent breakdowns owing to overuse and irregular maintenance schedules. The difficulty in locally procuring spare parts was a significant finding across all pieces of equipment.

Interpretation: Based on these findings, Kenyatta National Hospital and University of Nairobi will co-design prototypes that take into account the unique needs of clinicians and hospital engineers working in low-resource settings with a special focus on the availability of spare parts locally. The first batch of prototypes will be for suction machines, vacuum extractors, examination lights and phototherapy machines.

Funding: Innovations for Maternal, Newborn and Child Health, a Concern Worldwide (US) initiative funded by the Gates Foundation.

Abstract #: 1.025_TEC

Technology and innovation in global health leadership education: A new model

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Program Purpose: From addressing outbreaks to climate change, global health professionals increasingly require leadership skills, training, and diverse professional networks to successfully work across teams and cultures. Advances in technology provide opportunity to innovate and transform global health education into virtual global learning experiences where the above can be gained. This study presents an innovative educational model of global health leadership launched in Fall 2015 - "Global Health Live" - which