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LANCET POSTER COMPETITION FINALISTS

International Human Research and Ethics Standards: A Compilation of Legal Protections in Countries

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Background: Human research investigations, including population-based studies and clinical trials, have the potential to alleviate the burden of diseases that disproportionately affects many low- and middle-income countries (1). The advent of globally recognized standards in ethical research conduct has placed human rights at the forefront of investigations (2-4). While standards are not legally enforceable, countries have adopted legislation to protect human subjects. The extent of legal protections varies by country and may be dependent on existing governmental and scientific infrastructure.

Methods: The U.S. Office for Human Research Protections compiles an annual compilation of international human research standards in 120 countries (5). This database reviews thousands of laws, regulations, and guidelines related to the conduct of human subjects research. Each country is appended with legislation from eight core areas: general provisions, drugs and devices, clinical trial registries, research injury, privacy/data protection, biological materials, genetic, and embryo, stem cells, and cloning. A descriptive statistical analysis was conducted to explore the extent of countries with any protections in each of the eight categories. Each country was assigned a binary code if there was some legislation or standard reported in each of the categories and a total score was given to assess total categories covered.

Findings: A total of 118 countries had some information. A majority of countries had general human subjects standards (88.1%) and drugs and devices standards (83.9%) while the least coverage was found for country-level clinical trial registries (18.6%). Among the five regions defined by the database, North American and European countries had an average score across categories of 8 and 5.70, respectively. Contrastingly, Asian, Pacific, and the Middle Eastern countries (score = 3.97), Latin American and Caribbean countries (score = 3.14), and African (score = 2.22) had scores below half of eight categories.

Interpretation: Ethics and IRBs (Institutional Review Boards) are an essential component of human subjects research. While many studies are conducted in low- and middle-income countries, adequate protections afforded to subjects in these areas may not be adequate. This analysis describes the unmet need for legal protections for participants. Further work is needed to delineate appropriate standards.

Source of Funding: None.

Abstract #: *LAN.001*

Competing Solutions to Arsenic Contamination of Groundwater in Araihazar, Bangladesh: A Cost-Benefit Analysis

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Background: Exposure to arsenic from drinking water and food has been associated with cancer, skin lesions, developmental effects, cardiovascular disease (CVD) and neurotoxicity. Since the 1990s arsenic contamination in Bangladesh has attracted much attention given its magnitude: about 45 million people were exposed to concentrations above the standard of the World Health Organization. This suggests that preventive measures could be a more efficient strategy to address the problem than investing in treating the adverse health-effects of chronic arsenic exposure.

Methods: A cost-benefit analysis was conducted to compare two solutions to the arsenic contamination at Araihazar, Bangladesh. We estimate the net present value (NVP) of treating CVD cases related to arsenic exposure at a local primary care clinic, and of building arsenic-free public groundwater wells for 500 exposed households; using a 10-year horizon and a 5% discount rate. Data from the University of Chicago Research Bangladesh Clinic and epidemiological estimates by the Health Effects of Arsenic Longitudinal Study (HEALS) were used to estimate cost of treatment and social cost, measured as lost work output due to premature death attributable to arsenic exposure between 2011 and 2016.

Findings: Preliminary results show that primary care-based treatment of CVD related to arsenic exposure yields a per capita annual cost of $40.6 USD, while building arsenic-free public groundwater wells yields a cost of $39 USD per capita for the first year. Nevertheless, the social costs of providing treatment for the CVD cases at the local clinics outweighs the benefits of receiving primary-care based treatment on a 10-year time horizon.

Interpretation: For the 10-year horizon, results suggest that investing in building deep water tubewells generates less direct costs and will reduce social costs by a greater amount. However, building new deep wells represents a high capital cost for the first year, which depending on budgetary constraints, could be unachievable in the context of this community. Additionally, investment in the provision of primary care entails social benefits (externalities) not included in this analysis. Incidence and mortality rates will be updated to achieve more accurate estimations of direct costs.

Source of Funding: Metcalf Summer Research Fellowship granted by the Center for Global Health at the University of Chicago.

Abstract #: *LAN.002*

Collaborative Governance in Primary Health Care Facilities, Western Kenya: What is the Influence from the Community?

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Program/Project Purpose: Community participation in governance refers to the collective involvement and engagement of people in decision making, either individually or collectively, in assessing

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their needs and organizing strategies to meet those needs to a desired performance. There is inadequate evidence on interest, level of influence and effects of participation on facility performance. This study sought to explore the structures, intrests and level of influnce of collaborative level representatives in provision of primary care services in Uasin Gishu County

Structure/Method/Design: Case Study Methodology. Five primary health care facilities were selected purposively, from the six different sub-Counties. Study population included health facility committee representatives and other stakeholders working to represent community members in health activities. Data collection was through observation, Key Informant interviews, informal group discussions and review of documents including minutes. . Data was captured using audio recording, pictures, notetaking and a reflective journal. Data was and transcribed cleaned coded and analyzed into emerging themes.

Findings: A total of 26 respondents were interviewed, and minutes of 5 facilities for s reviewed of the past 2 years starting 2014. Attended 3 public health public participation activities, and sat in three meetings. Health Facility Committee is the main formal government structure for community members to participate. There was no formal schedule for meetings attendance except for one facility.

Committee mainly meet when there is funds for facility or any project going on. The facility committee's members participated majorly in projects as opposed to day to day functioning of facility. The committee members generally attended all meetings funds.

Committee members with bigger influence were former political leaders or retired government officials. They are also able to lobby with government for mainly infrastructure support

Sometimes the committee members whistle blow on lack of drugs or shortage of facilities to political leaders like Governor.

Outcome & Evaluation: Structures of collaborative representation should be strengthened. A coordinated and collaborative response is required to tackle the complexity collaborative participation. Collaborative participation is a delicte process and needs strentnening for representation of community inteests

Going Forward: Community has some level of influce which utimately affects the service delivery.

Source of Funding: Consortium for Advanced Research Training in Africa (CARTA). Future heath systems.

Abstract #: *LAN.003*

TEAM Malawi: Low Cost Digital Microscopy for Automated Lab Testing

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Background: Today, Malawi is suffering from a major shortage of qualified lab technicians to scan, diagnose, and treat its population. Increased accessibility of accurate diagnostic mechanisms is the first step towards better specialized treatments which ultimately can lead to a healthier global population. Although not prevalent in developed countries, Tuberculosis affects 281 people per 100,000 in lesser developed nations, particularly in Africa. Current conventional light microscopy that examines Ziehl-Neelsen-stained direct smears requires trained staff and time. Fluorescence microscopy (FM) can be applied for specific situations and has shown to have high sensitivity, short examination time, and requires less sample magnification, rendering it more efficient. However, its widespread use has been limited by its high equipment cost, which warrants the need for automated, low cost digital fluorescence microscopy and systems for the detection and diagnosis of Tuberculosis.

Methods: The system we propose to build must be capable of running on battery power for an extended period of due to the limited reliability of power grids in Malawi. It will be able to use its on board computer to automatically focus, scan and process the fluorescing sample to accurately give a diagnosis by the WHO standards; freeing up to six hours of the technicians' time per day to perform other tasks. To increase its durability and assure reliability, the device will be designed to withstand a fall from chest height. Furthermore, the applications of this automated, low cost digital fluorescent microscopy unit are not limited to just Tuberculosis and can be potentially used to scan for neglected tropical diseases such as Schistosomiasis.

Findings: Interviews with lab technicians on past trips to Malawi indicated a clear benefit for improved technology to process and screen lab samples. Most of the technicians had a high workload and many did not have access to the equipment to manage that. This test platform will provide low-cost light-field and fluorescence digital microscopy that can take auto-focused images to scan slides for automated computer vision screening of samples.

Interpretation: The development of this low cost device will significantly increase the accessibility to FM techniques and improve global health overall.

Source of Funding: Pediatric Medical Devices Institute and Virginia Tech College of Engineering.

Abstract #: *LAN.004*

Development and Testing of a Low Cost Videolaryngoscope in a Resource Limited Setting

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Background: The role of videolaryngoscopy has been increasingly recognized for training and management of difficult airways. Videolaryngoscopes improve visualization of the glottis for the anesthesia team and enhance supervision of intubation technique. Videolaryngoscopy requires less force than direct laryngoscopy, reducing cervical spine movement and permitting awake airway inspection and intubation. Current commercial videolaryngoscopes are too expensive for many resource-limited settings. We sought to address this problem by developing an inexpensive, reusable videolaryngoscope.