

The program for cancer detection, diagnosis, and treatment technologies for global health: A pathway for the translation of affordable, minimally-invasive point-of-care technologies to less-resourced settings

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Program/Project Purpose: Cancer kills more people worldwide than HIV/AIDS, tuberculosis, and malaria combined, and low- and middle-income countries (LMICs) bear the majority of this burden. While success in detection, diagnosis, and treatment has been reported in LMICs through the use of low-cost, point-of-care technologies, this area has largely been overlooked by the medical device industry and venture capital, as low-cost/affordable solutions offer less financial incentive for investment. The program presented here simplifies the pathway to market by funding investigative teams to adapt and validate existing technologies in low-resource settings. This program specifically supports the translation of these technologies, prioritizing patient outcomes in a manner not typically seen in other programs.

The program, currently in its second year, will soon support 13 technologies for cancer detection, diagnosis, and treatment (e.g., in vitro assays, imaging devices, ablation devices). It is anticipated that by year seven of the program, at least nine projects will have progressed through optimization, clinical validation, and business planning for dissemination and commercialization, uniquely leveraging these devices for success in clinical translation.

Structure/Method/Design: Each project consists of an adaptation phase (2 years: \$500k total costs/year) and validation phase (3 years: \$1M total costs/year). Projects are selected through NIH peer review with a carefully selected special emphasis panel briefed on the goals of the program. These projects are subsequently competitively selected for phase 2 funding based on completion of first-phase milestones.

All teams contain expertise in engineering, oncology, business and manufacturing, and are partnered with in-country global health organizations, positioning them for success in the validation and translation of their technologies.

Outcome & Evaluation: The seven preliminarily-funded projects are making strides in optimization, and several have initiated field validation via their in-country partners. The presentation will detail each project's specific outcomes.

Going Forward: It is anticipated that teams will experience similar yet distinct challenges, with each site presenting unique institutional (e.g., IRB) and regulatory issues. However, the program's structure will enable collaboration and information exchange through an active steering committee.

Funding: This program is funded by the National Cancer Institute and the National Institute of Biomedical Imaging and Bioengineering, NIH.

Abstract #: 1.022_TEC

Benefits of teleconference case discussions for residents on a global health elective

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Program: Telemedicine and international collaboration are promising avenues to improve healthcare services and medical education in low-middle income countries. Telemedicine conferences can be used to bridge the gap between residents training abroad and their home institution. The role of teleconferences in global health training has yet to be evaluated.

Methods: Each year, eight to ten residents from the University of Pittsburgh Medical Center Internal Medicine Residency Program travel to designated training sites including Kamuzu Central Hospital in Lilongwe, Malawi, and Sao Lucas Health Center and Hospital Central in Beira, Mozambique. At these sites, residents spend two consecutive months providing healthcare services to the local community and precepting medical students. To discuss global health cases, telemedicine conferences are held weekly between Pittsburgh and the abroad sites. Residents present clinical cases encountered during the week with accompanying photographs of physical examination findings, x-rays, or ultrasound to global health faculty including infectious disease physicians and generalist with clinical experience in sub-Saharan Africa. Host trainees are encouraged to join the discussion. Residents are expected to discuss diagnostic dilemmas, management decisions, and treatment options within the confines of limited resources. For this study, residents that traveled abroad between 2013 and 2015 were administered a 10-question survey regarding the benefits and drawbacks of the weekly telemedicine conferences.

Outcomes: 93% (14/15) of residents in the study completed the survey. All residents reported that feedback from faculty during the teleconferences was helpful. Most residents cited the benefit of advice obtained on management plans, diagnostic approaches, and clinical reasoning. The majority of residents (86%) reported that the teleconference altered their management plan in greater than 75% of cases. Residents also cited that emotional support and regular contact with mentors and home institution were an invaluable asset of the conferences. Residents recommended increasing the frequency of the sessions to biweekly.

Conclusions: Weekly telemedicine conferences provide global health residents an opportunity to discuss interesting as well as challenging cases encountered while abroad. These discussions are integral to the resident's training and may increase the educational yield of the global health experience for both the US and host country trainees.

Funding: None.

Abstract #: 1.023_TEC

Establishing sickle cell diagnostics in Malawi using hemoglobin electrophoresis

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