Fogarty International Center

Fogarty Advances Technology and Innovation to Improve Health Care Globally

The Issue

People who live in rural and other resource-limited settings have unique constraints to health care and higher risk of poor health outcomes, both here in the U.S. and around the world. These settings tend to have fewer hospitals, physicians, and infrastructure to perform both routine and specialized procedures. Bridging gaps in accessibility and outcomes requires novel solutions that can leverage less-specialized medical providers, increase access to easier to use and affordable diagnostic tools, and bring services to the point-of-care and to the home.

Fogarty's Approach

The Fogarty International Center (FIC) supports solution-driven research that aims to improve health care in low-resource settings. Technological innovation is catalyzed through partnership between U.S. and international researchers who incorporate context-specific factors, such as usability, affordability, and durability. Projects build-on existing, widely available systems, like mobile phones, to ensure that solutions can be implemented in real-world settings.

FIC drives technology development and evaluation through grant programs that have catalyzed new collaborations between engineers, data scientists, clinician scientists, anthropologists, and more, resulting in transformative ideas and novel directions in research. These programs include:

- Mobile Health: Technology and Outcomes in Low- and Middle-Income Countries
- Harnessing Data Science for Health Discovery and Innovation in Africa (DS-I Africa; a Common Fund program co-led by FIC)
- National Institute of Biomedical Imaging and Bioengineering (NIBIB) Point of Care Technology Research Network (POCTRN)

Facts and Figures from 2014-2024

- **225** grants funded working in **63** countries
- Funded **118** US institutions in **37** States/DC
- **18** Collaborating NIH Institutes, Centers and Offices
- **30** Early-Stage Investigators Supported

Spotlight on FIC's Partnership with NIBIB

FIC has collaborated with the NIBIB to support impactful technologies for global health since 2004. This partnership demonstrates the power of leveraging low-resource environments globally to spur innovative ideas that lead to prevention, detection, diagnosis, and treatment of disease. In addition to co-funding and co-managing 17 awards and co-leading DS-I Africa, NIBIB programs like the NIH Technology Accelerator Challenge have provided larger follow-on research funding to support the expansion of novel technologies that FIC programs initially catalyzed. This collective support furthers opportunities for technologies to progress along the translation pipeline and ultimately meet the needs of patients around the world.

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Success Stories: Global to Domestic Impacts on Health Care

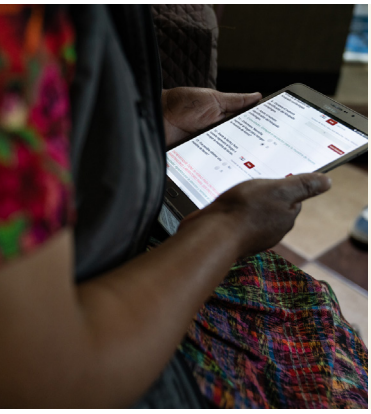
While FIC investments support research in international settings, resulting technologies and data benefit people globally, including in the U.S.

Multi-purpose Technology Platforms Enhance Health Care Across Diseases

Grantees from Indiana and Kenya invented and validated a non-invasive method to detect anemia by applying novel image processing to smartphone photos of the inner eyelid. This method removes the need for a blood-draw, analysis equipment, and trained personnel, which are all typically needed for anemia testing. An initial FIC investment demonstrated proof of concept that the method can be used to assess blood hemoglobin in patients in Kenya and led to the launch of a U.S.-based start-up company. The easy-to-use platform has now expanded to detect sickle cell disease, malaria, and pre-eclampsia, with new funds to support applications internationally and in the U.S.

Affordable Diagnostics Transform Disease Management in Low-Resource Environments

POCTRN-supported investigators in Illinois are leading a network of 48 U.S. and African universities and 10 U.S. and African companies to develop a pipeline of point of care technologies to meet the clinical needs of people living with HIV/AIDS and emerging infectious diseases globally. A supported pilot project in Massachusetts has created a patterned blood spot card – a paper device that measures out defined volumes of blood that can be dried for future analysis. The inexpensive device can be used for accurate analysis of blood cell counts, viruses, parasites, and other markers of health in low-resource settings and has been piloted in Ghana, Peru, Senegal, South Africa and the U.S. The team is currently working to scale-up device manufacturing for broad impact.



Innovative Systems Approaches Deliver Timely and Appropriate Care

A team of researchers from Georgia and Guatemala developed and evaluated a maternal health referral system that leverages smartphone-based decision support technology and commercially available sensors to improve care coordination in rural Guatemala. A randomized controlled feasibility trial demonstrated that the referral system increased referral rates for pregnancy complications and now the system is implemented as the standard of care by a Guatemalan NGO. The team has been recently funded to add artificial intelligence (AI)-enabled maternal hypertension screening and to extend the intervention across 13 sites in the state of Georgia.

AI Tools Enable Early Detection of Cancer by Non-Specialist Medical Providers

Grantees in Michigan and Kenya are utilizing digital pathology and AI-assisted tools to enhance colon cancer diagnosis and prognosis, particularly in areas with a limited number of pathologists. The team scans tissue slides into high-resolution images and develops and applies algorithms to identify cancerous regions. The ongoing work is validating the ability of AI to increase diagnostic capacity in Kenya, while also informing health system improvement in the U.S. health care systems that face similar resource constraints (e.g. rural health care systems).