#### **FOCUS**

A roundup of Fogarty's published research from January to December 2025

#### **PROFILE**

Rehnuma Haque, MD, PhD, studies blood lead levels of women in Bangladesh

#### Q&A

Art Reingold, MD, recounts UC Berkeley's impact on Fogarty's AITRP program

#### DIRECTOR'S COLUMN

Peter Kilmarx, MD, discusses Fogarty's role in the America First initiative

NATIONAL INSTITUTES OF HEALTH • DEPARTMENT OF HEALTH AND HUMAN SERVICES



#### DIRECTOR'S COLUMN | DR. PETER KILMARX



### an America-first global health strategy

The new policy environment provides an opportunity to articulate this more clearly: Fogarty's global collaborations have always and will always accelerate American innovation and make America healthier, stronger, and more prosperous.

partment of State released the "America First Global Health Strategy," emphasizing that U.S. investments in global health should directly advance the health, security, and economic interests of Americans. Around the same time, NIH issued updated guidance on maximizing and safeguarding foreign collaborations, underscoring that all NIH-supported research conducted abroad should generate knowledge applicable to understanding, improving, or protecting the health of people in the United States. Together, these policies reflect a broader alignment of federal science and foreign policy—global health engagement must deliver clear value back home.

IN SEPTEMBER 2025, the U.S. De-

Fogarty's longstanding mission and our unique experience place us squarely at this intersection. For more than 55 years, Fogarty has supported research, training, and scientific partnerships around the world, yet these investments have

never been "charity" or foreign aid. They have always been mutually beneficial. The new policy environment provides an opportunity to articulate this more clearly: Fogarty's global collaborations have always and will always accelerate American innovation and make America healthier, stronger, and more prosperous.

In fact, the new alignment speaks to the existing concept of reciprocal innovation, a framework that recognizes innovation flows in both directions. Reciprocal innovation promotes a bi-directional exchange of ideas and solutions, driven by real-world needs, operational creativity, and the ingenuity of local researchers and communities across global settings. Traditionally, global health has emphasized the transfer of technologies and practices from high-income countries to low- and middle-income countries (LMICs). Yet LMICs also develop extraordinary innovations, such as community health worker models, mobile health platforms, point-of-care diagnostics.



#### **Global Health Matters**

OGARTY INTERNATIONAL CENTER

drone delivery networks, and frugal engineering approaches, all of which directly translate to the U.S. environment.

A reciprocal innovation framework fits squarely within the America First Global Health Strategy with its emphasis on strengthening global disease surveillance, accelerating medical innovation, and fostering U.S. leadership through scientific partnership. These goals cannot be achieved in isolation. They require worldwide collaborative research networks that can detect emerging threats, generate new knowledge, and develop scalable solutions long before diseases reach U.S. shores. They also require understanding which global health approaches can be adapted for American challenges, particularly in rural, underserved, or resource-limited areas.

When we frame global health research around mutual benefit, we make clear how international partnerships advance U.S. health, innovation, and security.

Examples already abound.

Telemedicine platforms, originally deployed with community health workers in East Africa and other low-bandwidth settings, have also been adopted by U.S. clinics to extend specialist care in underserved communities. Service delivery models pioneered in sub-Saharan Africa, such as

differentiated HIV care and community adherence groups, have informed U.S. strategies for managing chronic conditions, including HIV and diabetes, in resource-limited settings. Pointof-care diagnostic innovations from south Asia, including lowcost molecular and rapid testing platforms, have helped shape U.S. approaches to expanding access to tuberculosis, COVID-19, and other essential diagnostics. And drone-enabled medical delivery systems first scaled in Rwanda have since been implemented in U.S. health systems to improve access to essential medical supplies in rural regions. Together, these examples demonstrate that investing in global health research strengthens both global and domestic preparedness.

"America First" does not mean "America alone." The health of Americans is inseparable from the health of the world. And some of the best ideas for improving U.S. health will continue to come from our partners abroad. By embracing reciprocal innovation and designing global health research with mutual benefit at its core, Fogarty can help lead the way toward a future where scientific collaboration makes America—and the world—healthier, safer, and more resilient.

Fogarty International Center

National Institutes of Health

Department of Health and Human Services

November/December 2025 Volume 25, Issue 6 ISSN: 1938-5935

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The Fogarty International Center is dedicated to advancing the mission of the National Institutes of Health by supporting and facilitating global health research conducted by U.S. and international investigators, building partnerships between health research institutions in the United States and abroad, and training the next generation of scientists to address global health needs.

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Rehnuma Haque studies blood lead levels among textile workers

## Bangladesh, home to 168.7 million people, is a lower-middle-income country striving to become a middle-income country.

To accomplish this shift, it is industrializing rapidly. Rehnuma Haque, MBBS, PhD, says, "Everywhere different contaminants are present."

"We're consuming or absorbing heavy metals and pesticides through food, consumer products, air and water.

And arsenic contaminates our water," adds Haque. Concerned by the potential health effects, she focused her PhD research on environmental toxicants and pesticide exposure. Once

she completed her PhD, she searched for a postdoc opportunity to continue her research in this area. She reached out to Dr. Mahbubur Rahman, Lead, Environmental Health and WASH, at icddr,b, a world-renowned public health research institute located in Dhaka, Bangladesh. He collaborates

#### Rehnuma Haque

MBBS, MPH, PhD

Fogarty Fellow 2020-2021

U.S. institution
Stanford University

Foreign institution

icddr, b (formerly the International Center for Diarrheal Disease Research, Bangladesh)

#### Research topic

Assessing the prevalence of elevated Blood Lead Levels (BLLs) and possible sources of exposure among women of reproductive age in Bangladesh

**Current affiliation** icddr,b

with Dr. Stephen Luby, a professor of medicine at Stanford University. "Rahman and Luby found lead chromate contamination in turmeric, a South Asian spice that is widely used in curry," says Hague.

With Luby's mentorship, Haque won a Fogarty Fellowship, which allowed her to study blood lead levels among reproductive age female garment workers.

#### An adult population

Bangladesh's textile industry, which employs four million workers, is the country's largest GDP sector, explains Haque. A majority of textile workers are women of reproductive age. Since these women carry the next generation, the worry is that any lead they possibly absorb at work could be passed onto their children. (Young children are particularly vulnerable to the build-up of lead in their bodies, which can severely affect how they grow and how their brains develop.)

"This is the first study on reproduc-

tive age women for lead contamination. Before, we had some studies that focused on children, but this is an adult population," says Haque.

Her Fogarty project revealed that all participants had some contamination from lead, while a substantial proportion, about 50%, had elevated blood lead levels that exceed the CDC reference value of 3.5 microgram per dl. "Our hypothesis was this is caused by multiple sources of contamination in the garment factories," says Haque. To verify this, her team examined different dyes, buttons and colored threads.

Surprisingly they found negligible lead contamination among these potential sources. "We also visited the participant households and collected floor dust, all the makeup that participants used (face powders, eyeshadows, nail polishes), their spices, and a range of consumer products," says Haque. Here, the team's analysis showed high lead contamination levels in house dust (and soil)—95% of house dust samples showed lead contamination.

"If garment manufacturing is not the primary source of contaminants, there must be other environmental sources, which may include other nearby industries," theorizes Haque.

#### **Deceptive appearances**

In 1997, when Haque was a student, a team of researchers from Tokyo University visited her hometown, a remote village in Bangladesh, to study possible arsenic contamination in water. "We always think contaminated water will look dirty, but our water looks so clean, so transparent. Still they told us, 'Don't drink this water!"



Rehnuma Haque (right) works with a colleague to collect and test a blood sample of a textile worker (middle).

She felt compelled to understand the invisible toxins that affect human health.

"My father, who is a doctor, wanted me to become a doctor, so I completed my MBBS degree at Dhaka University," says Haque. A medical internship and master's in public health followed, after which she started working at icddr,b. Wanting to continue learning, she applied to the environmental health department in Japan's Kagoshima University and received a Monbukagusho scholarship to fund her PhD studies. "With that, my career shifted from clinical doctor to public health doctor."

Returning home from Japan, Haque resumed working at icddr,b and soon earned a spot in the 2020-21 cohort of Fogarty Fellows. Haque faced an obvious challenge during her Fogarty year. "It was 2020 and 2021 so the pandemic created substantial obstacles." The lockdown prevented her from going to Luby's laboratory at Stanford, collecting data from her own urban and peri-urban research sites, and ordering a reagent for blood lead testing. "The whole project got paused."

Yet Haque gained access to Stanford IT and its library, including a prime IT resource for graduate students. "ArcGIS was free for me during that time, which was a huge opportunity to learn the different apps and software. I learned how to do GIS mapping and conduct spatial analysis."

#### A surprising year

Soon, Haque discovered a silver lining. "The pandemic created an opportunity for me to focus on COVID-related research. I wrote grant proposals and conducted three SARS-CoV-2 environmental surveillance projects with funding from UNICEF and the Rockefeller Foundation." One of her projects, which aimed to detect and assess levels of the COVID delta variant in wastewater, helped identify community infection rates.

When the lockdown lifted, Haque quickly restarted her stalled Fogarty project. "I've completed data collection and built up a good rapport with the garment factory workers and already submitted a paper that's soon to be published," she says. Haque adds that she received invaluable support from Dr. Rubhana Raqib, icddrb; Dr. Jenna Forsyth and Dr. Erica Plambeck at Stanford University.

A Fogarty fellowship has led to many rewards, says Haque, who is now an assistant scientist leading her own team of researchers at icddr,b. "The experience and skills I gained have been instrumental in helping me get subsequent funding."



# RESEARCH ROUNDUP

JANUARY-DECEMBER 2025



#### FOCUS | RESEARCH ROUNDUP

FOGARTY SCIENTISTS IN ITS DIVISION OF INTERNATIONAL EPIDEMIOLOGY AND POPULATION STUDIES CONDUCT ORIGINAL RESEARCH IN EPIDEMIOL-OGY AND MATHEMATICAL MODELING OF DISEASES, GENOMIC EVOLUTION OF PATHOGENS, IMPLEMENTATION SCIENCE, AND POPULATION STUDIES.

Their work includes developing modeling techniques to enhance preparedness and improve response to pandemics and emerging health threats, all of which directly benefits the health and safety of Americans, explains David J. Spiro, PhD, the division's director. "Fogarty researchers tackle a broad spectrum of global health challenges, from advancing influenza forecasting and HIV genomic surveillance to exploring innovative solutions for air pollution impacts, underscoring their pivotal role in addressing both domestic and international health issues."

The following studies were published between January and December, 2025.



#### Enhance data streams to advance infectious disease research

Mobility data can help to reconstruct infectious disease dynamics and tailor control and elimination measures, according to the authors of this study. Using computational models, they describe three challenges and opportunities to improve understanding of human mobility for infectious disease research. They conclude by making a case for increased modeling and simulation, more advanced reporting guidelines, and greater investment in data repositories. Fogarty's Chelsea Hansen, PhD, Cécile Viboud, PhD, and Amanda Perofsky, PhD, contributed to this work. Article: Improving mobility data for infectious disease research. **Publication:** Nature Human Behavior

#### This hospital network protects global health

The Global Influenza Hospital Surveillance Network (GIHSN), a worldwide collaboration, tracks serious respiratory illnesses in hospitals. Since 2012, it has collected detailed information on patients, including symptoms, demographics, and virus testing. The network now spans more than 100 hospitals in 27 countries, covering nearly 168,000 patients and identifying tens of thousands of cases of influenza and other respiratory viruses. GIHSN's reliance on public-private partnerships and pre-existing national systems makes it flexible, scalable, and adaptable to new threats like COVID-19. By standardizing data collection and fostering global cooperation, GIHSN guides public health response, improves pandemic preparedness,

and provides insights for disease control strategies. Fogarty's Cécile Viboud, PhD, and her co-authors conclude that GIHSN exemplifies the value of integrating research with public health initiatives through global collaboration and public—private partnerships. *Article: The Global Influenza Hospital Surveillance Network: A Multicountry Public Health Collaboration. Publication: Influenza and Other Respiratory Viruses* 

#### How well did the 2023 flu vaccine work?

Influenza, or the flu, is a common virus that affects young and old alike and causes illness that ranges from mild to severe (requiring hospitalization). The virus changes frequently, so vaccines must be updated each year. This study looked at how well the 2023 southern hemisphere flu vaccine protected people across eight countries, using data from 520 hospitals. Results showed the vaccine reduced hospital admissions by about half; it worked especially well in young children and somewhat less effectively in older adults. Protection against severe disease requiring intensive care was even higher. Vaccine effectiveness varied between countries, likely due to differences in flu strains, timing of vaccination, population health, and

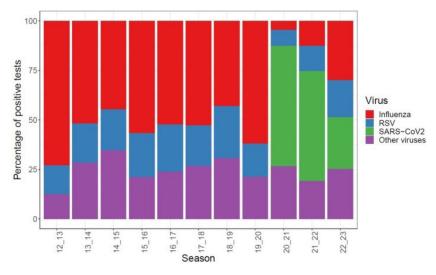


vaccine types. The authors, Fogarty's former director Kathleen Neuzil, PhD, and Cécile Viboud, PhD, state that large multi-country studies help scientists develop better vaccines. *Article:* Harnessing the power of multicountry networks for influenza vaccine monitoring. *Publication:* The Lancet Global Health

#### Tracking flu viruses in Southeastern Asia

Southeastern Asia plays a key role in spreading seasonal flu around the world. Researchers studied flu virus movement in this region from 2007 to 2023, including during the 2009 H1N1 and COVID-19 pandemics. The study showed that COVID-19 greatly disrupted flu spread, stopping the usual waves of influenza virus movement; the 2009 H1N1 pandemic had a smaller effect. The A/H3N2 flu virus persisted more in the region than the B/Victoria virus, while patterns of virus evolution changed depending on the pandemic. Human travel, immunity, and behavior during

#### Data from the Global Influenza Hospital Surveillance Network

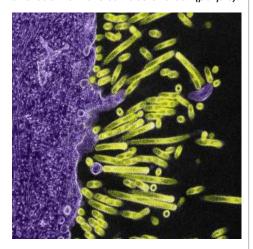


This chart shows the distribution of viral infections by season.

Communications

# pandemics affect flu circulation; understanding these patterns helps improve surveillance, vaccine planning, and preparation for future pandemics, noted the authors, including Fogarty's Cécile Viboud, PhD. *Article: Disruption of seasonal influenza circulation and evolution during the 2009 H1N1 and COVID-19 pandemics. Publication: Nature*

Swine flu virus particles (green) attach to and bud from the surface of a cell (purple).



### What data from Denmark reveals about hospitalizations, deaths linked to respiratory viruses

A study in Denmark focused on three respiratory viruses—RSV, influenza, and COVID-19—and their impact on adults from 2015 to 2024. All three viruses caused significant deaths and hospitalizations, especially among people aged 65 and older. RSV, often overlooked in adults, caused nearly as many hospital admissions as influenza in older adults, with post-pandemic seasons seeing higher RSV activity. Influenza and COVID-19 also caused serious illness, though widespread vaccination helped reduce this. While COVID-19 lockdowns temporarily lowered the spread of all respiratory viruses, RSV and influenza rebounded after restrictions lifted. Fogarty's Cécile Viboud, PhD, Chelsea Hansen, PhD, and their co-authors

### Influenza and COVID-19 caused serious illness, though widespread vaccination helped reduce this.

conclude that enhanced RSV testing, monitoring of respiratory viruses, and ongoing vaccination is needed. Article: Excess mortality and hospitalisations associated with respiratory syncytial virus, influenza, and COVID-19 Publication: The Lancet Regional Health: Europe

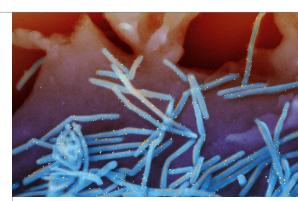
#### New RSV shots could prevent hospitalization of infants and seniors

Could vaccines and antibody treatments for respiratory syncytial virus (RSV) prevent hospitalizations in King County, Washington? RSV can be a serious respiratory infection, especially for babies and older adults. During the 2023-2024 season, new immunizations protected some infants and seniors, preventing about 125 hospitalizations. Infants under 6 months and adults over age 75 saw the biggest benefits. The study predicted that if more people got vaccinated early in the 2024–2025 season, up to 69% of infant hospitalizations, and 30% of hospitalizations in older adults could be avoided. Fogarty's Chelsea Hansen, PhD, Cécile Viboud, PhD, Amanda Perofsky, PhD, and Kaiyuan Sun, PhD, contributed to this study.

Article: Excess mortality and hospitalisations associated with respiratory syncytial virus, influenza, and COVID-19 Publication: The Lancet Regional Health: Europe

### Tracking RSV movement and evolution to protect infants in Pakistan

From 2019 to 2022, researchers studied respiratory syncytial virus (RSV) in children under 2 years old in Pakistan. They tracked how it spread, changed genetically, and evolved over

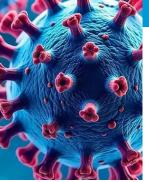


The surface of human lung epithelial cells shedding RSV virions (colorized blue).

time and found that RSV-A was the dominant strain. Nonetheless, influenza infection was more strongly associated with ICU admission than an RSV infection. Infection rates rose and then fell once precautions to control COVID-19 were implemented. Genetic analysis revealed new viral mutations and also showed that RSV often enters Pakistan through travelers from Europe. Multiple viral lineages circulated simultaneously, sometimes quietly spreading outside peak seasons. Understanding these patterns can guide effective treatment and prevention strategies in Pakistan and other countries, suggested Fogarty's Nidia Trovão, PhD, and her co-authors. Article: Evolutionary trajectory and spread of respiratory syncytial virus group A in neonatal cohorts. Publication: Science Reports

#### Predicting interactions between RSV and hMPV

Respiratory syncytial virus (RSV) and human metapneumovirus (hMPV) are viruses that cause lung infections, mainly in children. Scientists noticed that hMPV outbreaks usually follow RSV outbreaks by a few weeks, suggesting that RSV temporarily reduces hMPV's spread. Using mathematical models and



data from Scotland, Canada, and Korea, researchers found evidence for this "suppressive effect," where **RSV** infections lower hMPV transmission.

The study also looked at what could happen if new RSV vaccines and treatments reduced RSV infections. Their models predict that hMPV outbreaks might shift in timing or size, but overall, hMPV cases are unlikely to surpass the original RSV burden. This research, co-authored by Fogarty's Cécile Viboud, PhD, could help guide planning for vaccines and public health response.

Article: Using COVID-19 pandemic perturbation to model RSV-hMPV interactions. Publication: Nature Communications

#### Understanding hMPV: How a virus spreads in Côte d'Ivoire

Researchers studied human metaneumovirus (hMPV) in Côte d'Ivoire by examining samples collected from 3,899 children under age 5 between January 1, 2013 to December 31, 2015. They found that about 6% of the children had hMPV, which causes respiratory infections and circulates year-round, peaking during the dry season. Genetic analysis revealed two main virus groups (A and B) with multiple lineages; analysis also showed repeated introduction of the virus into the country, often from Asia. Most infections were mild. Results indicate that hMPV contributes to the high rates of respiratory illness in young children and that continuous monitoring is necessary to track new strains, guide vaccine development, and improve public health response. Fogarty's Nidia Trovão, PhD, and Josh Cherry, PhD, contributed to this report. against SARS-CoV-2.

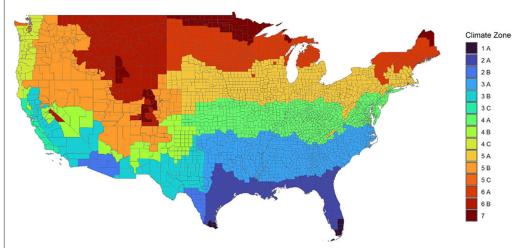
Article: Repeated introductions and widespread transmission of human metapneumovirus in Côte d'Ivoire. **Publication:** BMC Infectious Diseases

#### Lessons for a future hMPV vaccine

This study looked at human meta-pneumovirus (hMPV), a respiratory virus that can cause coughs, runny noses, and fever, especially in young children and older adults. Examining Seattle data collected between 2018 and 2022, the researchers found that the group most likely to test positive were children under age 5, while people with lower household incomes or recent international travel showed higher risk of infection than others. During the COVID-19 pandemic, infection rates dropped overall, though areas of lower socioeconomic

status showed higher rates compared to other neighborhoods. Genetic testing revealed that multiple virus subtypes circulated before the pandemic, with the mix altered after the pandemic. Fogarty's Cécile Viboud, PhD, Amanda Perofsky, PhD, and their co-authors recommend that developers of vaccines target parts of the virus shared across all subtypes. **Article:** Epidemiology of Human

Metapneumovirus Infection in a Community Setting, Seattle, Washington, USA. Publication: The Journal of Infectious Diseases



This colored map segments the U.S. into 15 unique zones based on temperature and moisture levels.

#### Floods, dust storms & rising lung disease across the U.S.

Nontuberculous mycobacteria (NTM) are bacteria found in soil and water that can cause long-lasting lung infections, especially in people with lung problems or cystic fibrosis. This study looked at NTM cases across the U.S. and compared them with weather patterns and severe events like floods and dust storms. The researchers found that NTM infections have been rising and that certain weather conditions—such as high temperatures, heavy rain, cloud cover, and changes in air pressure—are linked to higher infection rates. Floods in the Southeast and dust storms in mid-latitude regions were especially strong predictors. The timing between weather events and later increases in infections varied by region. The authors, including Fogarty's Samantha Bents, highlight the need for better testing, reporting, and awareness. Article: Factors predicting incidence of nontuberculous mycobacteria in an era of altered ecosystems in the United States, Publication: The Science of the Total Environment

#### Why tracking MERS requires multiple methods

This study looked at transmission of the Middle East Respiratory Syndrome (MERS) virus and how well different scientific tools can track its spread and

#### VIRUSES CHANGE MOST RAPIDLY WHEN IMMUNITY IS NEITHER TOO WEAK NOR TOO STRONG—THIS IS CALLED THE "PHYLODYNAMIC CURVE."



Researcher examines DNA output.

movement between cases. Researchers analyzed more than 600 virus genomes collected from 2012 to 2024. All methods confirmed that MERS mainly spreads from infected dromedary camels to humans, mostly in Saudi Arabia and the United Arab Emirates. However, the tools did not always agree on how often these "spillover" events happened—some estimated as few as 15 while others estimated as many as 34. The researchers recommend using fast tools for quick outbreak detection and a multi-method review for long-term planning. Continued genomic monitoring of both camels and humans is essential for catching new MERS threats early. Fogarty's Nidia Trovão, PhD, contributed to this article. Article: EA scalable maximum-likelihood framework for near-real-time monitoring of MERS-CoV evolutionary and zoonotic dynamics.USA. Publication: Microbiology Spectrum

#### Predicting how viruses outsmart immunity

Viruses change most rapidly when immunity is neither too weak nor too strong—this is called the "phylodynamic curve." Here, Fogarty's Cécile Viboud, PhD, and co-authors develop a new framework to better understand how viruses evolve to escape immunity in a population. The framework shows how

factors like partial immunity, vaccination, seasonal outbreaks, travel, and public health measures affect the risk and timing of the emergence of new virus variants. For example, partially protective immunity and the lifting of interventions (such as mask mandates) can influence when and where immune-evading variants appear. By understanding these dynamics, public health officials can better prevent outbreaks of dangerous viral variants, improve vaccine strategies, and reduce the risk of immune escape. Article: Eco-evolutionary dynamics of pathogen immune-escape: deriving a population-level phylodynamic curve. **Publication:** Journal of the Royal Society Interface

#### Dengue in Saudi Arabia: Tracking a virus across borders

A recent study of dengue virus (DENV) in Saudi Arabia analyzed 20 full virus genomes collected between 2021 and 2023. Researchers found three types of dengue co-circulating there— DENV-1, DENV-2, and DENV-3—the most common being DENV-2. The viruses were repeatedly introduced from countries in South and Southeast Asia and East Africa. Some strains had been circulating in Saudi Arabia undetected for years, showing both ongoing local spread and the country's role as a hub for regional transmission. Mass gatherings, international travel, and labor migration increased the risk of dengue spread. The study highlights the urgent need for better virus monitoring, stronger mosquito control, and regional cooperation to track outbreaks and reduce disease impact. Fogarty's Nidia Trovão, PhD, co-authored this study. Article: Molecular evolutionary insights into the repeated introductions and cryptic transmission of dengue virus **Publication:** The Journal of Infectious Diseases



Pigs on a farm

#### From import to outbreak: The story of PRRSV-2 in Costa Rica

Porcine Reproductive and Respiratory Syndrome Virus (PRRSV-2) is a serious disease that harms pigs' health and costs farmers millions. In Costa Rica, the first outbreak appeared in 1995-1996, causing piglets' deaths, breathing problems, and skin lesions. Research shows that the virus likely arrived through imported pigs from the U.S. and possibly Japan, spread between farms, and evolved over decades. A study of the virus's genetic material revealed its history, movement, and changes. Vaccines introduced in 2021 reduced infections and improved pigs' health, but PRRSV-2 still persists. The study highlights the risks of global livestock trade and shows how animal diseases can spread internationally and impact food security and economies. Fogarty's David Spiro, PhD, and Nidia Trovão, PhD, contributed to this research. Article: Integrating phylodynamics and historical records reveals decades-old introductions of PRRSV into Costa Rica **Publication:** bioRxiv (preprint)

#### Age shapes our defenses against respiratory viruses

This study looked at how people's immunity to common respiratory viruses changed during and after the COVID-19 pandemic. Because many viruses barely circulated during lockdowns, people missed normal exposures that help keep immunity strong. Using blood samples

from Seattle and older data from South Africa, researchers found that children under age 5 lost antibodies much faster than adults but also gained them more quickly once viruses returned. Adults showed little drop in immunity. When these age-based patterns were added to a disease-spread model, they helped explain why influenza came back so strongly in 2022-23 and why more older children needed medical care. Overall, age plays a major role in how immunity builds and fades, conclude Fogarty's Cécile Viboud, PhD, Amanda Perofsky, PhD, Chelsea Hansen, PhD, Samantha Bents, and their co-authors.

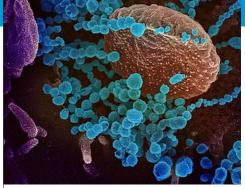
**Article:** Multiplex serology reveals age-specific immunodynamics of endemic respiratory pathogens **Publication:** medRxiv (preprint)

#### This overlooked gene may make COVID-19 worse

ORF10 is a tiny and often overlooked gene found only in SARS-CoV-2, the virus that causes COVID-19. Researchers examined millions of virus samples and found that ORF10 has barely changed since the start of the pandemic, suggesting that it plays an important role in virus survival. Mutations in ORF10 were rare, but when they did occur, a few were linked to milder COVID-19 symptoms, none were linked to worse symptoms. Lab tests showed that ORF10 expression can disrupt how human cells produce energy in their mitochondria, which weakens early immune defenses. These effects may help the virus survive longer and could play a role in severe illness or long COVID. Fogarty's Nidia Trovão, PhD, and her co-authors recommend studying ORF10 more extensively. Article: Importance of De Novo Gene **Evolution to Emerging Viral Threats Publication:** Molecular Biology Evolution

#### Tracking COVID-19 spread using virus genetics

Researchers analyzed over 114,000 SARS-CoV-2 virus genomes collected in



SARS-CoV-2 (round blue objects) emerges from the surface of cells; the virus depicted here was isolated from a patient in the U.S.

Washington State to better understand how COVID-19 spread between people, places, and age groups. They focused on pairs of identical virus sequences, enabling them to trace how infections moved across counties and communities. This new method, which entails quick analyses of large datasets of virus genomes, reveals hidden transmission networks that traditional approaches might miss. The study showed that most transmission occurred locally, with some unusual patterns linked to male prison facilities acting as hubs for virus spread. Human movement patterns (commuting and travel) strongly explained the geographic spread of the virus. Insights derived from this study can help health officials plan interventions, such as testing, vaccination, or travel guidelines, to prevent or limit future outbreaks, suggest Fogarty's Cécile Viboud, PhD, Amanda Perofsky, PhD, and their co-authors. Article: Fine-scale patterns of SARS-CoV-2 spread from identical pathogen sequences. Publication: Nature

#### Mental health improves after **COVID-19 pandemic in Costa Rica**

A study in Costa Rica tracked the mental health of 1,459 people from mid-2021 to late 2023 to see how COVID-19 affected psychological distress. During the pandemic, about 14% of participants reported distress, but this dropped to under 9% after the pandemic, when improvements in overall mental health scores were seen—14.5% of people showed large improvements, though 5.3% experienced deteriorating symptoms. Improvements were seen in both men and women and in most age groups, except teenagers (12-17 years). The pandemic increased stress due to fears of infection, social isolation, economic troubles, and loss of loved ones. This study highlights community resilience and the importance of monitoring and supporting mental health during global crises. Fogarty's Kaiyuan Sun, PhD, contributed to this research. Article: Trends in psychological distress during and after the COVID-19 pandemic: a Costa Rican cohort study. **Publication:** Public Health

#### The power (and limits) of using genomes to track outbreaks

Scientists use pathogen genome sequences to study how diseases spread between groups of people or animals. These sequences change over time as the pathogens mutate: the speed of mutation compared with the speed of disease transmission affects how much scientists can learn. Fast-mutating pathogens can reveal more detailed movement patterns, while slow-mutating ones may show only broad trends. The number of samples also matters—more samples give a clearer picture of how a disease spreads. This study introduces a framework to understand the limits of what genome data can reveal, while strategies like grouping populations, analyzing longer genome segments, or using deep sequencing may improve accuracy. Fogarty's Amanda Perofsky contributed to this work

Article: Characterizing the informativeness of pathogen genome sequence datasets about transmission between population groups. Publication: medRxiv (preprint)

Output from a DNA sequencer



#### **NEWS&**Updates





### Applicant news—research security training required in 2026

#### Heads up, Fogarty grant applicants!

Currently, research security training is optional for extramural researchers funded by the National Institutes of Health. In the coming year, completion of this training will be required for all applications submitted on or after May 25, 2026.

Research security training (RST)

Research security training helps ensure compliance with the CHIPS and Science Act of 2022, the National Security Presidential Memorandum-33 (issued on January 14, 2021), and other federal requirements.

The CHIPS Act provides funds to support the domestic production of semiconductors and authorizes various programs and activities of the federal science agencies. The National Security memo aims to safeguard U.S. government-supported research endeavors against foreign government interference and exploitation. The intentions of both are to maintain an open environment fostering scientific discoveries and innovation that benefit both the U.S. and the world, while protecting intellectual capital, discouraging research misappropriation, and ensuring responsible management of U.S. taxpayer dollars.

To comply with federal requirements, new hires and international visiting scholars need to disclose foreign contracts, affiliations, and involvement with foreign talent recruitment programs during the onboarding process. Any foreign

affiliation disclosures are then routed to the Research Compliance and Regulatory Affairs office for security risk assessment. For some new hires and international scholars, a management plan may be a condition for collaboration.

A scientist works with the NSF Secure Center condensed RST module.

**QUESTIONS?** Please direct your inquiries to: NIH Office of Policy for Extramural Research Administration (OPERA) operaleadership@NIH.gov.

#### Here's a list of need-to-know information

#### **RST REQUIREMENT**

The new RST requirement stipulates each covered individual on a grant application must certify that they have completed their training within 12 months of the application submission date. Covered individuals are defined as senior and/or key personnel employed by the institution and listed on the application.

#### EFFECTIVE DATE OF THIS REQUIREMENT

Completion of RST and the individual and institutional certifications will be effective for applications with deadlines on or after **May 25, 2026.** 

#### **CERTIFICATION PROCESS**

**Applicant institutions need to certify** that each senior/key personnel employed by the institution and listed on the application has completed RST. The Authorized Organization Representative (AOR), via their signature on the face page of the application, will certify the applicant institution's compliance with this requirement.

#### **COMPLETION DATE FOR TRAINING**

**All senior/key personnel** listed on an NIH grant application must certify that they have completed RST within 12 months of the date of application submission.

#### **COLLECTION PROCESS**

NIH will collect individual certifications at the time of the application submission, **through the Biographical Sketch in SciENcv.** 

#### TRAINING MODULES

The National Science Foundation (NSF), in partnership with the National Institutes of Health (NIH), the Department of Energy (DOE), and the Department of Defense (DOD), provided four online RST modules as a resource to the extramural community. Subsequently, the NSF Secure Center, a site where members of the U.S. research community can manage security requirements, developed an updated and **condensed RST module** that is compliant with government-wide RST requirements. The condensed module is here: <a href="https://www.secure-center.org/ctm">https://www.secure-center.org/ctm</a>

# Q&A

#### Doing what seems useful—a Q&A with Art Reingold



Arthur L. Reingold, MD, recently retired from his position as a professor of epidemiology at the University of California, Berkeley School of Public Health. His previous experience includes working for eight years at the U.S. Centers for Disease Control and Prevention and serving as director (or co-director) of the CDC-funded California Emerging Infections Program since 1994. His research interests comprise vaccine-preventable diseases; respiratory infections; bacterial meningitis; disease surveillance; and outbreak detection and response. He's published more than 400 related research papers. In 2003, he was elected to the Institute of Medicine of the National Academy of Sciences. In November, the UC Berkeley School of Public Health announced the launch of its Reingold Institute for Global Health to honor his work in the field.

#### What part of your education was most influential/beneficial?

Do you know who Berton Roueche was? He was a writer for The New Yorker magazine and his stories are collected in books; "The Medical Detectives" is about outbreak investigations. After reading his work, I decided I wanted to concentrate on infectious diseases, and the pathway that made sense was to stay with the CDC's Epidemic Intelligence Service (EIS) program.

Basically I fell in love with the "medical detective" aspect of the CDC. I spent my first year in the Connecticut State Health Department, where I did some interesting investigations and then I moved to Atlanta for my second year. There I became one of the world's leading male experts on tampons when I investigated toxic shock syndrome. (Toxic shock syndrome is a complication of Staphylococcal infections linked to skin wounds, surgery, and use of

tampons and other vaginal products.)
I also investigated Legionnaires' disease and other outbreaks in the U.S.,
Canada and the Netherlands.

I had my first global health experience looking at the effectiveness of a vaccine against meningitis for CDC. Every meningitis season I would go to Ouagadougou, which is the capital of what was then Upper Volta (now Burkina Faso) in West Africa. Upper Volta was one of the half-dozen poorest countries in the world, so I came face-to-face with what real poverty looks like and I came to understand the challenges experienced by low-income countries. I also went to Nepal to work on meningitis for the World Health Organization and saw more of the global picture there.

#### How did you come to work with Fogarty?

Soon after I joined the faculty of Berkeley's School of Public Health,

Fogarty put out a request for applications for the AIDS International Training and Research Program (AITRP). We had a very good group of AIDS researchers in the San Francisco Bay area and I convinced my colleagues at University of California, San Francisco to let me be the P.I., even though that's not the usual approach. So UC Berkeley-UCSF became one of AITRP's first funded programs and continued receiving funds until AITRP ended in 2011.

#### How do you judge UC Berkeley's work with AITRP?

The main reason for the program was to train people from low-income countries heavily burdened by AIDS and then help them return home and establish themselves there. So, how successful was that?

Pretty much all of our Brazilian trainees went home. I can think of only a couple who stayed in the U.S., but they almost all went back. Brazilians like Brazil, frankly, and there's a good reason for that. Almost all of our trainees from Uganda went back to Uganda and the ones that didn't are either in Rwanda or other nearby countries with few exceptions. But almost nobody went back to and stayed in Zimbabwe. Sitting in my nice house in California with a wellpaid job, I can't blame them. I always thought, Who the hell am I to tell somebody to go back to Zimbabwe where they wouldn't be able to use their skills and wouldn't be able to afford to send their kids to school?

Still most of our trainees did return to their countries and have become leaders in their fields and done phenomenal things. AITRP changed the lives of many, and I believe we contributed to the global public health infrastructure.

#### Do you see any new trends in global health research?

I think the work to decolonize global health is important. I also want people to be energized and encouraged to do great things, so we need to do a better job of making sure our students have the right skill sets.

Those skill sets are getting more complicated all the time and this reality complicates what the future looks like in terms of funding, priorities, etc.

Today we have funding for some global health work from industry.

This is new. We're fortunate to have a partnership with Gilead, which makes lenacavapir, the shot that you only need twice a year to not get HIV. I have a lot of former students



Art Reingold speaks with a former trainee, Akila Govindarajan Venguidesvarane of Sri Ramachandra Institute of Higher Education and Research

who work at Gilead, and they've been quite generous in supporting our global health work over the past few years. So for some people—people who make new drugs, new vaccines—a career in the private sector is how they can best contribute. We should be doing more partnerships with the private sector than we've done in the past and I say that fully recognizing the downsides and challenges.

#### Is there anything else you'd like to share with our readers?

I sort of bumbled through the last 40 years doing things that seemed useful, without focusing on a particular pathogen or a particular disease as many of my academic colleagues have. So maybe that's why I didn't win the Nobel Prize! But I like to think that I've had an impact and if I have, support from Fogarty was a major contributing factor.

Art Reingold entertains trainees at home



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PUBLIC HEALTH INFRASTRUCTURE.

#### **NEWS&**Updates

### How a 'practical' career path led to unexpected fulfillment

Bruce Butrum, Fogarty International Center's Chief Grants Management Officer, will retire in January 2026.

"Bruce combined unmatched technical expertise with extraordinary generosity of spirit, becoming the beating heart of Fogarty's grants operation for nearly a quarter century," said Fogarty's Acting Director Peter Kilmarx, MD. "He leaves a lasting legacy in the systems he developed and the colleagues he inspired at Fogarty, across NIH, and around the world."

#### Heartfelt work wanted

Butrum's earliest government jobs included six years working as an auditor for the U.S. Army and Navy. Although he learned a lot, something more was needed.

"I interviewed at the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) and they asked if I wanted to be a grants management specialist—I had no idea what that is, still I said, 'Sure!'" says Butrum. He soon learned that a grants management specialist means "working as a team with the program officer to manage the grant. In other words, the program person's the science piece and you're the administrative money person plus the compliance person."

At NIDDK Butrum met his most influential mentor. Tom Turley, well on his way to becoming NIDDK's chief grants management officer (CGMO), took Butrum under his wing and showed him the ropes of reviewing grant applications. "Tom was very inclusive." Turley followed Butrum's recommendations, working closely with him to develop procedures and establish terms and conditions for the grants.

Later, when Turley became CGMO at the National Heart, Lungs and Blood Institute (NHLBI), he suggested Butrum transfer with him to continue their systemic improvements together. Eventually, Turley transferred to NIH's Office of the Director. Butrum stayed put, but continued to work with his mentor. The NIH-wide procedures they devised became some of the standards still in use today. Meanwhile, Butrum led NHLBI's clinical trials review committee; "I worked on some seminal heart trials, such as bypass versus angioplasty."

Still, Butrum felt compelled to continue growing. In 2001, he landed the position of CGMO at Fogarty.

#### A different ICO

"Fogarty didn't have a real grants office, so they hired me to develop one," recalls Butrum. "I hired people, trained people, established all the procedures and checklists, and created terms and conditions."

Butrum discovered that, as CGMO, he could provide critical input regarding Fogarty programs. "For example, I suggested that we launch a small R01 program for our trainees and that became the Global Research



Bruce Butrum

Initiative Program for New Foreign Investigators (GRIP)." He took full advantage of Fogarty's peculiarities when making suggestions, including the fact that the D43 (an international research training grant) was a mechanism created by Fogarty itself. "So with the LAUNCH Program, I said, 'Let's use the D43, because it's ours, and nobody's going to argue with us about it." Another triumph: Butrum devised the unique model of the GeoHealth program: two separate grants that work as a pair—one at a foreign institution, another at a linked U.S. institution.

Butrum also became involved with many cross-cutting NIH policies and systems. He helped create and develop the SNAP process and the Modular Grant Pilot; he also helped design and launch the foreign tracking system (now called the FACTs system) that operates between the State Department and divisions within the Department of Health and Human Services. He gives credit to his team—Mollie Shea, Vicki Tran, Satabdi Raychowdhury, and La Bria Williams—for enabling this work.

Butrum recognizes the rare privilege of working at Fogarty, which has, undoubtedly, changed the lives of millions of people worldwide. "I believe God put me in this position as Fogarty's CGMO for the past 24-plus-years so that I could do the most good."

### Global HEALTH Briefs

#### HPV vaccine: single shot proves non-inferior to double shot

A single HPV vaccination could be as effective as two shots to prevent the virus that causes cervical cancer. A National Cancer Institute (NCI)-funded study enrolled more than 20,300 girls between ages 12 and 16 and randomly assigned each to receive one or two doses of a bivalent HPV vaccine or one or two doses of a nonavalent HPV vaccine. The bivalent vaccine protects against HPV types 16 and 18 that cause most HPV cancers; the nonavalent vaccine protects against HPV types 16 and 18 as well as additional, lower-risk HPV types. The study tracked the girls to see if they developed a new HPV type 16 or 18 infection between months 12 and 60 that persisted for at least 6 months. Vaccine effectiveness measured at least 97% in each of the four trial groups. The New England Journal of Medicine published this study.

#### Case fatality rate of 50% in Ethiopia's first ever Marburg virus outbreak

As of December 3, 2025, Ethiopia has reported 13 laboratory confirmed cases of Marburg virus disease (MVD), eight of which were fatal, according to the U.S. Centers for Disease Control and Prevention. This is Ethiopia's first outbreak of MVD; originally reported by the Ministry of Health on November 14, it affects the South Ethiopia and Sidama regions. Minister Mekdes Daba said Ethiopia is working with countries that previously experienced Marburg outbreaks to exchange expertise and to access investigational treatments and experimental vaccines that have yielded positive results. MVD is a rare but highly fatal viral hemorrhagic fever caused by infection with one of two viruses, Marburg virus or Ravn virus, both within the *Filoviridae* family, which includes Ebola virus.

#### Diet quality linked to risk of depression during pregnancy in Nepal

New research published in *Maternal and Child Nutrition* explores the association between overall diet quality and risk of depression during pregnancy among women in Nepal, a lower-middle-income country with high rates of nutritional deficiencies and unmet mental health needs. The study found that 22.3% of pregnant women in their third trimester showed elevated depressive symptoms. Higher intake of whole fruits, vegetable oil, and refined grains was associated with a lower risk of depression, while frequent consumption of processed meats, sweets, fried foods, sweetened drinks, fish, beans/pulses, and whole grains was linked to a higher risk of depression. Shaun Ranade, a medical student and Fogarty-Fullbright awardee, contributed to this work.

#### Can data science improve sustainability of health research?

Fogarty's Laura Povlich, PhD, Amit Mistry, PhD, and Gifty Dankyi, MS, co-authored a research paper on the Data Science for Health Discovery and Innovation in Africa (DS-I Africa) initiative. DS-I Africa includes 38 projects that use tools, such as artificial intelligence, big data, and genomics, to address major health challenges, including cancer, malaria, and air pollution. To foster strong partnerships, DS-I Africa runs Networking Exchange events where people can meet and form multidisciplinary collaborations across countries and regions. The program, which is supported by Fogarty, the NIH Common Fund and other NIH institutes, nears the end of its first funding phase in 2026 and has begun planning for long-term sustainability, according to the report published in *Data Science Journal*.

#### Experimental vaccine shows strong protection against typhoid, salmonella

University of Maryland researchers tested a new vaccine that may protect against both typhoid fever and dangerous non-typhoidal Salmonella infections, significant health concerns globally. In an early phase clinical trial for safety, 22 healthy U.S. adults received either the vaccine or a placebo. Those who received the vaccine, which showed no safety concerns, developed strong immune responses. The National Institute for Allergies and Infectious Disease supported this study published in *Nature Medicine*.







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#### **Fogarty International Center**

#### Community



#### Dieffenbach joins Fogarty as a senior advisor

Carl Dieffenbach, PhD, has joined Fogarty International Center as senior advisor to the director. Previously, Dieffenbach served as director of the Division of AIDS (DAIDS) at the National Institute of Allergy and Infectious Diseases, where he oversaw a global HIV/AIDS research portfolio of more than \$1 billion. In 1984, he earned a PhD in biophysics (with a focus on virology, specifically human responses to viruses including the production of interferon and interferon-induced genes) from Johns Hopkins University. Following completion of his postdoctoral research at Uniformed Services University of the Health Sciences, he was promoted to assistant professor and his lab worked on flu, coronavirus, and HIV. In 1992, he joined DAIDS as the chief of the preclinical therapeutics group, where he spearheaded initiatives that accelerated the progress of basic research on HIV pathogenesis and directly resulted in new clinical studies of novel AIDS therapies. In 1996 he was promoted to director of the DAIDS Basic Sciences Program, and in 2008 he earned a promotion to division director.



#### **Binagwaho receives Cameron Award**

The Royal College of Surgeons in Ireland University of Medicine and Health Sciences has presented the Cameron Award for Population Health to Agnes Binagwaho, MD, PhD, professor at, and co-founder and former Vice Chancellor of, the University of Global Health Equity in Rwanda. The Cameron Award for Population Health recognizes leaders who have made outstanding contributions to public health. Binagwaho returned to Rwanda in 1996 following the 1994 Genocide against the Tutsi and helped rebuild the country's health system. Between 2002 and 2011, she served in senior government positions, including executive secretary of the National AIDS Control Commission and permanent secretary of the Ministry of Health. In 2011, she was appointed and then served five years as Minister of Health. Binagwaho, who has authored more than 250 peerreviewed publications, holds appointments at Harvard Medical School and Dartmouth's Geisel School of Medicine.



#### Heimburger, former Fogarty Advisory Board member, retires

Douglas Heimburger, MD, has retired from his position as professor emeritus in Vanderbilt University Medical Center's Division of Epidemiology. Heimburger served on Fogarty's Advisory Board from 2004 to 2008, and from 2009 to 2012 co-led the Fogarty International Clinical Research Scholars and Fellows program, a discontinued program for doctoral students. He also led the Vanderbilt-Emory-Cornell-Duke Global Health Fellowship Consortium, part of Fogarty's Fellows & Scholars/Launching Future Leaders in Global Health Research Training Program and served as principal investigator for the HIV-NCD Research Program, an ongoing University of Zambia-Vanderbilt Training Partnership grant that's provided educational opportunities for global health scientists since 1998. For 20 years Heimburger directed the NIH-funded Cancer Prevention and Control Training Program within the Departments of Nutrition Sciences and Medicine at the University of Alabama at Birmingham before he joined Vanderbilt in 2009.



#### Dheda wins Princess Chichibu Memorial TB Global Award

Keertan Dheda, PhD, received the 2025 Princess Chichibu Memorial TB Global Award, which is presented by the Japan Anti-Tuberculosis Association, for his outstanding scientific contributions to anti-tuberculosis activities. Dheda is a professor of mycobacteriology and global health at the London School of Hygiene and Tropical Medicine. He holds a joint appointment at the University of Cape Town, South Africa, where he is the director of the Centre for Lung Infection and Immunity. A National Institute of Allergy and Infectious Diseases grantee, Dheda has published a series of seminal papers on the epidemiology, transmission, and management of drug-resistant TB. He's contributed to capacity building in lower-income countries with programs at New York University and South Western Medical School in Dallas. He serves in an editorial advisory role at *Lancet Respiratory Medicine*.



#### **Sears receives Alexander Fleming Award for Lifetime Achievement**

The Infectious Diseases Society of America (IDSA) honored Cynthia Sears, MD, with the Alexander Fleming Award for Lifetime Achievement. Sears is a professor of medicine and oncology at the Johns Hopkins University School of Medicine and a professor of molecular microbiology and immunology at the university's Bloomberg School of Public Health. Her many scientific discoveries have helped to describe how microbial communities residing in the gut influence immune responses that promote tumor development. Sears' foundational work in understanding the microbiome's role in cancer is critical to identifying biomarkers that can forecast cancer risk and may also lead to the development of therapeutic strategies tailored to an individual's microbial makeup for more personalized treatment. Several institutes at NIH, including the National Cancer Institute, have supported her research. Since 2022, she's been editor-in-chief of *The Journal of Infectious Diseases*.



#### **American Pediatric Society honors Gelb**

Bruce D. Gelb, MD, is the recipient of the 2026 American Pediatric Society John Howland Award. The society bestowed its highest honor on Gelb in recognition of his contributions to advancing child health and the field of pediatrics. Gelb, a long-standing NIH awardee who has received grants from several institutes over the past 35 years, serves as a pediatric cardiologist and geneticist at the Icahn School of Medicine at Mount Sinai. He has characterized the genetic causes of congenital heart disease (CHD) and related disorders and has helped establish the molecular foundations of CHD. His identification of the first genetic cause of Noonan syndrome paved the way for understanding a broader group of developmental conditions known as the RASopathies, and so shaped how physicians diagnose, predict, and treat these disorders.



#### Happi's Sentinel project receives MacArthur Foundation award

The MacArthur Foundation is awarding \$100 million to a private pandemic prevention network across Africa, a joint effort co-led by Pardis Sabeti, MD, PhD, of the Broad Institute and Christian Happi, PhD, of the Institute of Genomics and Global Health, Redeemer's University, Nigeria. Sentinel, which has trained more than 3,000 public health workers from 53 of Africa's 54 countries, builds directly on research conducted by Happi and supported by Fogarty and NIH through The Human Heredity and Health in Africa (H3Africa) program and the Data Science for Health Discovery and Innovation in Africa (DS-I Africa) Initiative. The MacArthur award will help expand Sentinel's geographic reach over the next five years, creating a stronger system capable of alerting local communities — and the world — to previously undetected diseases. During his research career, Happi has investigated human infectious disease genomics and focused on host-pathogen interactions. In 2013, he helped establish the Institute of Genomics and Global Health with funding from the NIH.



#### Tarini tapped for Norman J. Siegel New Member Award

The American Pediatric Society (APS) named Beth A. Tarini, MD, the 2025 Norman J. Siegel New Member Outstanding Science Award recipient for her contributions to pediatric science. Tarini serves as the Richard L. and Agnes F. Hudson Chair in Health Services Research and professor of pediatrics at George Washington University and Children's National Hospital. Tarini's clinical and research interests focus on genetic testing in pediatric care. She holds several leadership roles at her current institutions, including co-director of the Center for Translational Research, director of Resident Research at Children's National, and director of academic development at the Goldberg Center for Community Pediatric Health. Tarini is a principal investigator on several Eunice Kennedy Shriver National Institute of Child Health and Human Development grants as well as one from National Institute of General Medical Sciences.

### **FUNDING**NEWS



On behalf of the Fogarty International Center at the U.S. National Institutes of Health (NIH), the following funding opportunities, notices, and announcements may be of interest to those working in the field of global health research.

Funding Announcement	Deadline	Details
International Research Scientist Development Award (IRSDA) (K01 Independent Clinical Trial Not Allowed) (K01 Independent Clinical Trial Required)	March 9, 2026	https://www.fic.nih.gov/Programs/Pages/ research-scientists.aspx
Mobile Health: Technology and Outcomes in Low and Middle Income Countries (mHealth) (R21/R33 Clinical Trial Optional)	March 20, 2026	https://www.fic.nih.gov/Programs/Pages/ mhealth.aspx
Global Infectious Disease Research (GID) Training Program (D43 Clinical Trial Optional)	August 6, 2026	https://www.fic.nih.gov/Programs/Pages/ infectious-disease.aspx



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