Background Shigella is a bacteria that causes diarrhea, bloody stools, and stomach cramps, occurring worldwide, including the US. Shigella historically was termed dysentery or “the bloody flux,” causing sporadic infection and food or water-borne illness outbreaks. An estimated 165 million cases occur annually with the greatest number in children under the age of five. Two recent studies have found Bangladesh to have the highest rates of Shigella infections making this locale an opportune area for study of this infection.

FCDP Supported Study “Identifying Transmission Routes for Shigella” is an essential foundation for developing appropriate intervention strategies. Because there has been little work done to identify environmental and clinical transmission factors for shigellosis infection among family members and household contacts of shigellosis patients, Dr. George and her colleagues at the International Center for Diarrheal Diseases, Bangladesh, conducted a study to identify such risk factors for acquiring infection. For this study, a group of household contacts of shigellosis patients were matched with families in the community without infection and both followed prospectively. Stool and drinking water samples were tested for Shigella. Dr. George found that household contacts of shigellosis patients were 44 times more likely to develop a Shigella infection than were control contacts. The majority of household contacts of shigellosis patients were infected with the same or closely related strain as the patient. In addition, latrine area fly counts were significantly higher in patient households compared with control households.

Research Impact Through this work Dr. George demonstrated that family members of Shigellosis patients were at a high risk of a Shigella infection and that high fly counts were an important association for transmission. These findings highlight the essential need for improved household hygiene practices to reduce Shigella transmission in rural Bangladesh.

Recently, there have been major outbreaks of Shigella across the US, including in California and New York. High shigellosis rates have also been observed in both rural and Native American communities residing on reservations. Both settings typically have limited access to treated municipal water supplies and sanitation infrastructure. Understanding Shigella infection in Bangladesh should translate into improved disease prevention practices also applicable in the US.

Additional Research Dr. George has found her Fisher Center supported funding invaluable for next steps in advancing research into diarrhea as well as her professional development. The research has led to six publications, with other articles under preparation, in addition to numerous poster and oral presentations. Data gathered in this Fisher Center supported study lead to Dr. George receiving a prestigious NIH Career Development Award and two USAID (United States Agency for International Development) grants. Recently she received the Johns Hopkins University Catalyst Award for early career faculty. Per Dr. George, “The FCDP has allowed me to build training that has been extremely valuable during my current transition to an independent investigator. This is a wonderful program. I am truly grateful for this support.” Dr. George will continue her efforts in implementing interventions to reduce exposure to intestinal pathogens such as Shigella.
Just over forty years ago, a group of convention attendees in Philadelphia developed severe and often lethal pneumonia. I remember reading about this still mysterious illness as a teen during the family vacation that summer when Time magazine had on its cover story: “Tracing the Philly Killer.” Originally called “Broad Street Pneumonia” for the location of the hotel used for the meeting, it quickly became known as Legionnaires’ disease as most of the afflicted were older American Legion members who had significant smoking histories or other major health problems. In December 1976, a Centers for Disease Control (CDC) scientist, Dr. Joseph McDade, isolated the cause by inoculation of guinea pigs, the bacteria that was later named Legionella pneumophila.

In the years since, we now know that there are over 60 species of Legionella that can cause human disease. It is fairly common in the environment including streams and ponds but is thought to be most threatening when in warmer water sources. The infection is usually acquired by people inhaling aerosols of contaminated water. Examples include the droplets that might come from mists of industrial air conditioning chillers, large hot water systems such as in hotels or hospitals, and even municipal water supplies.

There has been a steady increase in the number of Legionella cases in the past decade for unclear reasons. Some higher profile outbreaks include Flint, Michigan when the municipal water supply changed sources resulting in 78 infections over two years with 14 deaths as well as the recent outbreak this summer on the Upper East Side of Manhattan that remains without a clear source.

In the United States, reported cases of Legionnaires’ disease have increased by nearly four and a half times since 2000. More illness occurs in the summer and early fall but can happen any time of year.

Recent research by the CDC and others suggest that improper maintenance of water and commercial air conditionings systems account for many of the noted outbreaks. Probably most important, is that many buildings do not have a water maintenance routine for buildings. Legionella is famously resistant to typical sterilization strategies, and therefore remains difficult to eradicate without costly interventions.

In hospitals where ill patients are particularly vulnerable, oddly the emphasis to use hand sanitizers means that water spigots are less commonly opened in rooms and hallways leading to stagnation and to an increased risk of not only Legionella contamination but also other organisms such as Pseudomonas aeruginosa, Stenotrophomonas maltophilia and Aspergillus species.

More attention to well-maintained water and cooling systems as well as clean water is now a major focus that falls to the relatively unsexy pending more money on regular and proper maintenance. Environmental pathogens such as Legionella find their niches, and only by good surveillance and sound routines can the trend be reversed given our increasingly large-scale buildings and infrastructure systems that make up modern life for so many. For dwellers and workers in large buildings, you may wish to ask the superintendent if there is a water management practice in place.

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Global Health Program
The federally funded Fogarty International Center, a part of the National Institutes of Health (NIH) supports and facilitates global health research conducted by US and international investigators by facilitating exchange visits, providing training, and supporting research in low-resource settings. Established in 1968, 600 scientists worldwide have received research training through Fogarty programs. Fogarty awards $54 million through 500 grants each year.

The Fisher Center is pleased to offer space to visiting Fogarty Fellows during their stay at Johns Hopkins. While at Johns Hopkins, the majority of Fellows take classes in the Bloomberg School of Public Health, along with personalized mentoring by a Hopkins faculty member, that continues when Fellows return to their home countries. For more information about Fogarty’s mission, please go to their webpage: https://www.fic.nih.gov/Pages/Default.aspx

The Fogarty Global Health Fellows Program here at Johns Hopkins offers competitive fellowships to trainees to return to their home countries. For example, two visiting Fogarty Fellows during their stay at Johns Hopkins. While at Johns Hopkins, the majority of Fellows take classes in the Bloomberg School of Public Health, along with personalized mentoring by a Hopkins faculty member, that continues when Fellows return to their home countries. For more information about Fogarty’s mission, please go to their webpage: https://www.fic.nih.gov/Pages/Default.aspx

The Principal Director, Dr. Yukari Manabe, MD, is the Associate Director of Global Health Research and Innovation at the Hopkins Center for Global Health in the Bloomberg School of Public Health and is the Clinical Director of the John G. Bartlett Specialty Practice (infectious diseases) in the School of Medicine. Her research interests include global health, epidemiology, tuberculosis, and HIV/AIDS, as well as cost-efficient diagnostic innovations for acute febrile illness in low resource settings. She also runs two other Fogarty training programs based in Uganda to train researchers to build research capacity.

Visiting Fogarty Fellow
Dr. Stella Zawedde-Muyanja, MBChB, MPH is a post-doctoral research fellow from Uganda where she works to improve tuberculosis care in public health facilities around the country. In Uganda, despite widespread TB diagnostics, half of all people with TB are not enrolled in the National TB Program. Her research work is focused on strengthening healthcare systems to increase the number of patients entering and completing the TB Cascade of Care. She is supported by the Fogarty International Center D43 (HIV Co-infections) training grant and is attached to the Infectious Diseases Institute (IDI) in Mulago, Uganda.

While visiting Johns Hopkins, Dr. Zawedde-Muyanja found her mentorship with Dr. Richard Chaisson, Director of the Johns Hopkins Center for Tuberculosis Research, to be immensely helpful. Per Dr. Zawedde-Muyanja, “Coming to Johns Hopkins University gave me a unique opportunity to meet and interact with thought leaders in the field of TB clinical care and research. Attending the weekly TB Clinical and Research meetings led by Dr. Chaisson and meeting with him in person greatly enriched my understanding of TB research around the world and helped me refine my research questions and to align them closer to the international TB research agenda.”

Dr. Chaisson received funding last year from the Fisher Center for his Zika virus research in Brazil.

Funding International Research
Why fund international research? It is a good question in these times of budgetary constraints. As a reminder from the Fogarty International Center, infectious diseases know no borders. Local Experts Programs that develop and mentor scientific expertise in developing countries will help ensure that future pandemics may be detected and managed earlier, hopefully at the point of origin, thereby containing and minimizing their impact. Strengthening the local response can protect other countries by preventing the spread of disease across international borders. As the dynamics of human and animal health change with increased globalization, more new infections and outbreaks are now occurring. Training local healthcare workers and policy makers and linking them to a global network of experts can reduce costs as compared to an external response managed solely by the United States. Accelerating Discovery For diseases more prevalent in a foreign country than in the US, there may be better conditions for research such as a greater number of available cases and providers sensitive to local culture. This may result in accelerating discoveries and providing more conclusive research outcomes, the results of which may be applicable to public health measures in the US.

Drug Development Trials Academic institutions and pharmaceutical companies often conduct research in low and middle-income countries. Clinical trials provide medical care, local jobs and training, reduced operational costs, and local infrastructure improvements. However, there is the risk of exploiting those in financial need and possibly exposing them to unknown safety issues and side effects. To ensure research is conducted in a safe and ethical manner, local and US academic review boards evaluate research proposals for safety, efficacy, and ethical protection of human subjects. Protecting Americans As expressed by Dr. Richard Chaisson, “Global infectious diseases have an outsized impact on our welfare here in the US. For example, two-thirds of all tuberculosis cases in the US occur in people born elsewhere. If we don’t learn how to control TB globally, we can never control it at home. Major public health threats like Zika and Ebola cost the nation millions of dollars for surveillance and control, even when few cases land on our shores. Understanding how to manage these types of outbreaks is essential for our national health and security.” Adds Dr. Zawedde-Muyanja, “The world is increasingly a ‘smaller’ place. Epidemic prone diseases and the emergence of antimicrobial resistance, prove that health research funding in the developing world is beneficial to us all. By funding research into the development of vaccines or effective cures for diseases the US decreases the likelihood of facing these threats.”
Recent Publications


Recent Presentations

Characterization of Borrelia burgdorferi-Specific T-Cell Subpopulations Recruited During Acute Lyme Disease. Maria G. Gutierrez, Alycia Curlee, Aarti Vadalia, John Aucoutt and Mark Soloski. Poster Session: Lyme Disease in the Era of Precision Medicine Conference, Mount Sinai School of Medicine, NY, October 4, 2016

Cost-Effectiveness of an Outpatient Parenteral Antimicrobial Therapy (OPAT) Care Coordination Service. Aleksandra Mihailovic, ScM; Zhenchun Jiang, BS; Shanshan Wang, BS; Komal Kumar, BS; Daniel Timko, PharmD; William Padula, PhD; Sara Keller, MD, MPH, MSHP. Poster Session: ID Week, New Orleans, Louisiana, October 28, 2016

Lyme Disease, a complicated tick borne disease. Mark Soloski, PhD. Seminar: College of Mount Saint Vincent, Bronx, N.Y, November 8, 2016.


More of Everything: Characteristics of Those Seeking Opinions Regarding Lyme Disease. Takaaki Kobayashi, Yvonne Higgins, Sarah Salter, Gayane Yenokyan, Paul Lantos, Michael Melia, Paul Auwaerter. Poster Session: Mid-Atlantic Tick Summit VI, Maryland Department of Health and Mental Hygiene, Laurel, MD, February 22, 2017 and JHU Department of Medicine Research Retreat, Johns Hopkins University School of Medicine, Baltimore, MD, March 7, 2017

