



DUKE GLOBAL HEALTH INSTITUTE

2012 DIRECTOR'S REPORT

COLLABORATION

INNOVATION

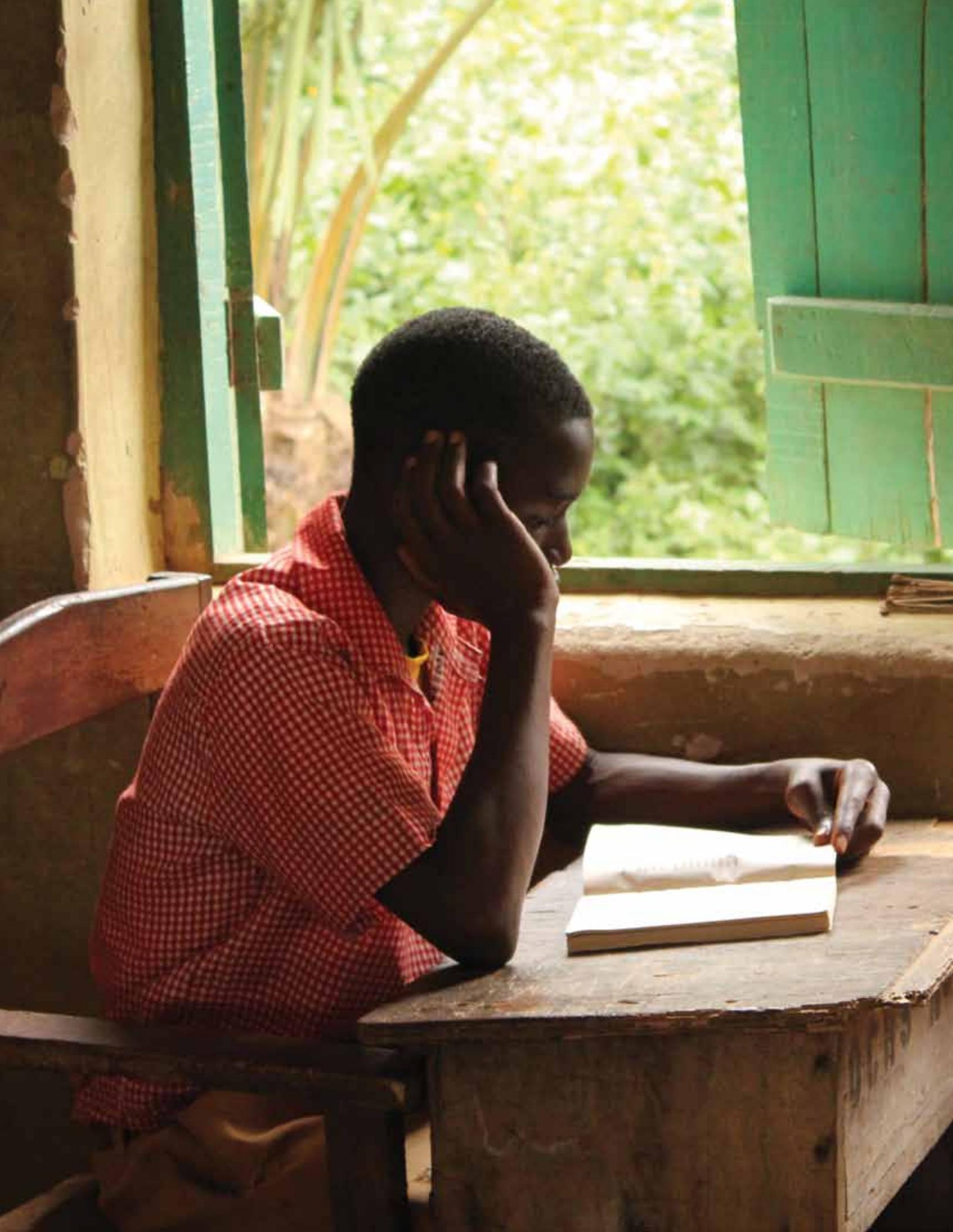
DISCOVERY

RESEARCH

CAPACITY-BUILDING

EVALUATION





## DIRECTOR'S MESSAGE

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One of Duke University's core values is the notion of putting knowledge in service to society. Nowhere is that value more evident than the Duke Global Health Institute.

Our faculty are bringing a fresh perspective to an array of global problems. From training health workers to keep mothers and babies safe during childbirth to addressing the world's rapidly growing aging population, DGHI faculty are addressing health challenges across the life span. We are also tackling often overlooked issues like global mental health.

This report highlights a few of the areas in which our faculty are engaging in innovative research. It also illustrates how a thriving Institute made up of creative and diverse individuals who learn from one another can produce important and innovative discoveries that involve and build the capacity of our international partners while improving the lives of people around the world.

DGHI faculty are developing new biomedical and social-behavioral innovations and testing their efficacy in rigorously controlled trials. They are also evaluating the effectiveness and efficiency of existing interventions in real world settings (often referred to as implementation research), carrying out studies to strengthen health systems, and undertaking research to improve policies that bear on successful implementation of health programs. In addition, they are developing new, innovative ways of educating and teaching our students and trainees.

DGHI is filled with change makers, and through their research our faculty and students are using the best science and creative thinking to inform, improve and save lives.

As we look to the future, I encourage you to contribute your time and resources to the work of DGHI. Join us as we seek to eliminate health disparities around the world. You will not be alone. Hundreds of faculty, students, trainees, partners and volunteers are already hard at work. 🇺🇸

**Michael Merson**

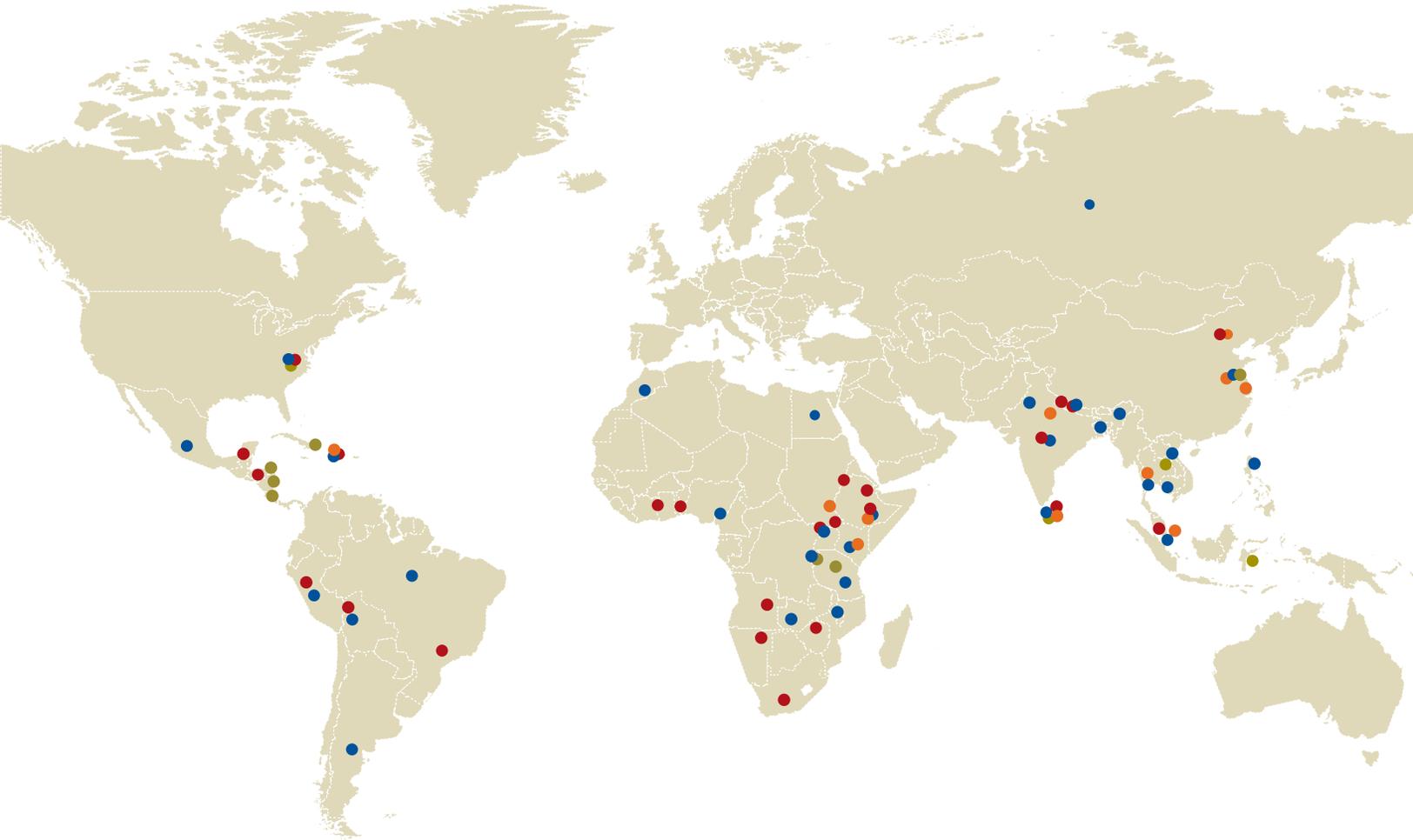
Wolfgang Joklik Professor of Global Health  
Director, Duke Global Health Institute



Merson met with Ugandan physician and DGHI Master of Science in Global Health student Nixon Niyonzima during a visit to Kampala, Uganda in 2011.



## WHERE WE WORK



### ● Priority Locations

DGHI allocates its resources to building capacity and partnerships in key areas of the world. These partnerships facilitate faculty research, student projects, and education and training opportunities, and are based on a bi-directional, mutually-beneficial relationship with other institutions. While these locations are a priority for DGHI today, we anticipate additional partnerships in the years ahead.

### ● Student Projects

Each year, dozens of Duke undergraduate, graduate and medical students conduct global health research and service projects around the world. These experiences complement their time in the classroom and provide life-changing opportunities to learn.

### ● Research Projects

Faculty-led research is at the heart of DGHI. Topics range from cervical cancer in Haiti and cardiovascular disease in China, to sanitation in rural India and mental health and HIV in North Carolina. DGHI faculty are exploring many facets of global health in an effort to inform health practice and policy around the world.

### ● Education and Training

DGHI is training the next generation of global health leaders, whether they are in Durham, Moshi, Beijing or elsewhere in the world. Education programs range in level and focus, from the popular undergraduate global health certificate to the training of medical professionals in Rwanda.

# DISCOV

## THE SILENT KILLERS: UNCOVERING THE TRUTH BEHIND FEVER

Fever is one of the most common symptoms among people seeking medical care in sub-Saharan Africa, yet health care providers often lack the tools and knowledge to diagnose it. While health providers and drug retailers continue to diagnose and treat most patients with a fever for malaria, Duke researchers are urging caution.

Building on years of groundbreaking fever research across multiple countries, a growing group of Duke faculty and trainees, many of whom work with DGHI faculty member John Crump, have determined that fever is often misdiagnosed, and therefore the true causes go untreated. In collaboration with international partners, their research draws attention to the growing importance of bacterial infections, arboviruses and zoonoses which are causing fever and claiming lives. Taken collectively, these discoveries are helping to inform how care is delivered in these low-resource settings.

### MORE THAN MALARIA

Duke researchers John Bartlett, John Crump, Thomas Holland, Wendy O'Meara, Truls Ostbye, Elizabeth Reddy and Chris Woods are making new discoveries about what causes fever in Africa and Sri Lanka, while also building the capacity of local health care providers to improve care. In Tanzania, Duke is working with hospital clinicians at the Kilimanjaro Christian Medical Centre (KCMC) to ensure patients receive the appropriate treatment for their illness. Previously, a study of 500 children hospitalized for fever had revealed that 62 percent were treated for malaria, yet only two percent tested positive for it.

"Malaria over-diagnosis is a major problem in many low- and middle-income countries, and patients who receive antimalarial drugs have worse health outcomes if they don't actually have malaria," said Crump, who worked on the study with Reddy and partners from KCMC. "With more knowledge and better diagnostic testing, we believe this growing line of Duke research could lead to better care for patients with fever in the developing world."

Common but often overlooked causes of fever include invasive bacterial infections such as typhoid fever, HIV-associated conditions like cryptococcal disease and tuberculosis, animal-related infections like leptospirosis, as well as arboviruses

like dengue and chikungunya. In fact, a review of studies across a dozen countries concluded that bacterial infections rival malaria as a common cause of fever, illness and death. Bacterial or fungal bloodstream infections were identified in 13 percent of patients with fever and seven percent of patients overall.

This research has laid the foundation for a number of other studies that further investigate the prevalence of typhoid fever, HIV co-infections, and more recently, bacterial zoonotic diseases.

Research by Duke Infectious Diseases Fellow and former Global Health Resident Holly Biggs found that leptospirosis was a common but unrecognized cause of fever among adults and children, but was often misdiagnosed as malaria or pneumonia. Transmitted by animals, this zoonotic disease is common among livestock farmers and agricultural workers. 🇺🇸

In Northern Tanzania, pathogens from animals cause **11 times more fever cases than malaria.**



### DISEASE RISK IN RURAL COMMUNITIES

Zoonotic diseases are common in rural Tanzania, where many people live in close proximity to livestock. In the northern part of the country, zoonotic pathogens account for 11 times more fever cases than malaria. But, little is known about how these pathogens are transmitted from animals to humans, or the social, economic and behavioral factors associated with human disease risk in pastoral settings. Crump is leading a groundbreaking study of the impact and social ecology of bacterial zoonoses in Africa, where communities depend on livestock for food security and income.

The \$1.74 million four-year project funded by the National Institutes of Health Fogarty International Center and the National Science Foundation uses hospital records, household surveys, human-animal epidemiological studies and other resources to track three bacterial zoonoses in three agricultural communities of Tanzania. The three most common zoonoses are leptospirosis, Q fever and brucellosis, which are responsible for a substantial burden of disease among humans and livestock. The innovative surveillance project brings together experts in human infectious diseases, veterinary infectious diseases, environmental health, disease modeling, and social sciences, with collaborators from Duke and KCMC, the University of Glasgow and Sokoine University of Agriculture in Tanzania.

"Diagnostic tests for zoonotic diseases are often unavailable in low-resource areas, which increases the likelihood of patient misdiagnosis, improper treatments, health complications and even death," said Crump. "This new research is important because it highlights major neglected diseases and begins to develop the knowledge base needed to inform prevention strategies, such as the role of animal vaccination." 🇺🇸

## THE PERFECT BACKDROP

Duke's growing portfolio of research on emerging infectious diseases in a global context provides the perfect backdrop for O'Meara, a DGHI faculty member and epidemiologist based in Eldoret, Kenya, who also studies fever with an emphasis on increasing accurate diagnosis and treatment for malaria in health centers and dispensaries.

"Our work was definitely inspired by John Crump's study," said O'Meara, "but his work focuses on hospitalized patients, and we wanted to look at children in the outpatient setting."

O'Meara is concerned about the number of children with fever being treated with antimalarials from local dispensaries or drug retail shops, but who don't have malaria. At a typical rural health center in Kenya, roughly 70 percent of people with fever who test negative for malaria still receive antimalarial drugs.

"This puts the patient at risk because they are not being treated for the real cause of fever," said O'Meara. "It also puts future patients at risk because it can accel-

erate the spread of drug resistance, making these antimalarials ineffective."

O'Meara and Holland, a former Global Health Fellow now in the Duke Department of Medicine, along with global environmental health expert William Pan, are trying to understand how non-malarial pathogens like strep throat and respiratory viruses contribute to fever among children admitted to the Webuye District Hospital. If not properly treated, strep throat can cause rheumatic fever, and eventually death from rheumatic heart disease.

With start-up funding from DGHI, O'Meara and her team were able to help the Webuye District Hospital set up a small pediatric laboratory where they have successfully diagnosed children with rheumatic fever.

Duke's research on the causes of fever is on the leading edge of addressing emerging infections in the developing world. The hope is that these important discoveries will shed light on the silent killers that are plaguing so many people throughout the world. 🇰🇪

**70%** of people with fever who test negative for malaria still receive anti-malarial drugs.



DGHI faculty involve students and trainees at all levels in their research.

John Crump has become internationally-recognized for his discoveries related to animal-associated infections and the causes of fever in East Africa.

## Groundbreaking Infectious Disease Research Involves Trainees

One of the mainstays of the Duke's global health work is the opportunity for Duke students and trainees to work alongside faculty on important research that helps to build their knowledge and experience as global health scholars.

With support from DGHI, Duke third year medical students Andrew Bouley, Julian Hertz and Scott Nabity are undertaking research in Tanzania and Brazil on typhoid fever, arbovirus infections, leptospirosis and brucellosis. Duke Master of Science in Global Health students Ufuoma Akoroda, Winston Gong, Sarah Lombardo and Andria Smith also completed fever-related research in Kenya, Sri Lanka and Singapore over the past year.

In an effort to build capacity for skilled health professionals in low-resource settings, Duke has also engaged Tanzanian trainees in fever-related projects through the Fogarty International Clinical Research Scholars Program and AIDS International Training and Research Program.

"Our students are gaining important research experience that will inform their future work and develop them as global health clinicians and researchers," said John Bartlett, associate director for research at DGHI. "The ability to have Duke trainees work alongside trainees from our in-country partner organizations is a special characteristic of DGHI and one that I am most proud of." 🇰🇪



A Kenyan trainee demonstrates her new skills on Duke Global Health Fellow Thomas Holland before joining the fever study team.

# CAPACITY

## SAVING LIVES: ONE MOTHER AND CHILD AT A TIME

### TRAINING AFRICAN HEALTH WORKERS TO PREVENT PREGNANCY COMPLICATIONS

Every 90 seconds, a woman dies during childbirth. In Rwanda, women in rural villages have little or no access to emergency services such as Cesarean deliveries, which are only offered in the district hospitals. In Tanzania,

four out of 10 deliveries take place at a health facility, but only five percent of the health centers provide emergency obstetric services.

This disparity is caused by a lack of health providers trained in emergency obstetrics. With more training, health care workers, nurses and midwives can often prevent or treat the causes of maternal death, like postpartum hemorrhage, eclampsia, sepsis and obstructed labor.

Since 2008, Duke physicians and fellows have trained more than 500 health workers in Rwanda and Tanzania. The Advanced Life Support in Obstetrics (ALSO) program was

pioneered by Duke physicians and is now led by collaborators from Kilimanjaro Christian Medical Centre and Kigali University Teaching Hospital.

Duke Global Health OB/GYN Fellows Ayaba

Worjolah and Ruchi Puri have provided on-site training in Tanzania, and Nathan Thielman and medical students Shahrzad Joharifard and Nazaneen Homaifar have assisted with monitoring and evaluation in Rwanda.

Evaluations show that participants learn the skills they need to deliver healthy babies and keep mothers safe.

Since the training began three years ago in Dodoma, Tanzania, maternal deaths have dropped from 17 to four.

Plans are under way to expand the life-saving training to more rural areas and integrate the training into medical school curricula. 🇹🇼

**4 out of 10 deliveries take place at a health facility, but only 5% of Tanzania's health centers provide basic emergency obstetric care.**



Duke Global Health OB/GYN Fellow Ayaba Worjolah trains Tanzanian health providers on how to perform emergency obstetric procedures.

### TACKLING COMPLICATIONS OF CHILDBIRTH

For women who have a successful pregnancy, many still face risks that could determine whether they live or die. Obstetric fistula is a complication caused by obstructed labor that damages the soft tissues of the vagina. While more hospitals and clinics offer fistula repair surgery across low- and middle-income countries today, DGHI researchers warn it is not enough.

Obstetric fistula is a painful and traumatic experience both physically and emotionally. Women can lose their baby and experience problems like infertility and leakage of urine and feces, as well as fear, worry, stress and shame.

DGHI researchers Kathleen Sikkema and Melissa Watt and DGHI Doctoral Scholar Sarah Wilson are working with KCMC collaborators to identify and treat the psychological impacts of Tanzanian women with obstetric fistula. Through the Studying Obstetric Fistula and Trauma (SOFT) study, the research team found a large majority of fistula patients screened positive for either depression or post-traumatic stress disorder (PTSD). Women with fistula also had significantly less social support. The Duke research team is working with KCMC to develop and test a targeted mental health intervention that involves group therapy at the hospital. They anticipate promising outcomes among the women, and the treatment could be integrated into care across other low-resource settings.

Duke researchers are also taking an innovative and creative approach to address another common complication of childbirth, which is the transmission of HIV from mother to child. Recognized by USAID's Saving Lives at Birth Grand Challenge, an innovative ketchup packet-like pouch is being used to stop the spread from HIV-infected mothers to newborns. Developed by Duke's Pratt School of Engineering and DGHI faculty Robert Malkin, the plastic-lined foil pouch holds a pre-measured dose of antiretroviral medication for newborns that has an extended shelf-life.

When newborns receive anti-retroviral drugs shortly after birth, their chances of contracting HIV are cut significantly. Without a low-tech, high-impact innovation like the ARV pouch, many babies who are born at home may not get access to the life-saving medicine in time. 🇹🇼

# Y-BUILDING

## CHILDREN TOUCHED BY HIV

Children's lives are being saved as a result of innovative technologies like the Duke ARV pouch. But, the reality is more than 50 million children in sub-Saharan Africa have lost one or both parents to HIV/AIDS. They are part of an estimated 153 million orphaned and abandoned children living across the world who face tough odds.

Concerned about how best to care for these children, researchers from the Duke Center for Health Policy and Inequalities Research (CHPIR) are undertaking one of the largest known studies to examine the health and well-being of 3,000 orphans across five countries - Cambodia, Ethiopia, India, Kenya and Tanzania.

The groundbreaking research has challenged the policies of children's rights organizations on a global scale. While organizations like UNICEF and UNAIDS have held that orphanages should only be a last resort, CHPIR research suggests orphanages are viable options for children. Findings show that children in orphanages have the same, or better, physical and emotional health as children living with extended family or neighbors.

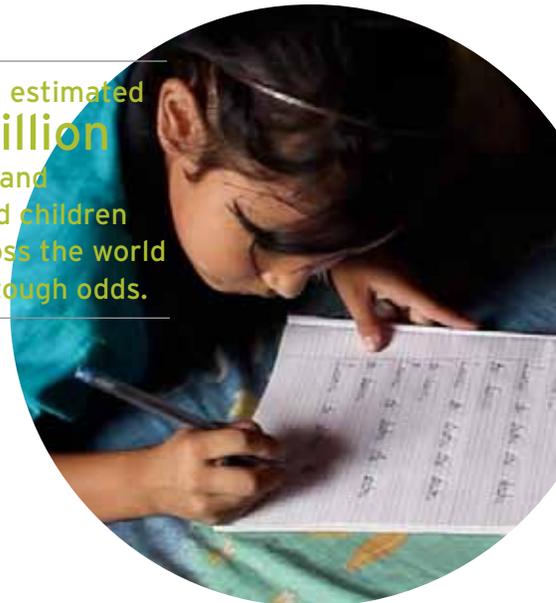
"This is not the time to be creating policies that shut down good options for kids. Our research just says slow down and let's look at the facts," said Kathryn Whetten, who leads the Positive Outcomes for Orphans (POFO) research. "It's assumed that

the quality of caregiving is a function of being institutionalized, but you can change the caregiving without changing the physical building."

The POFO team, which also includes Duke researchers Lynne Messer, Karen O'Donnell, Jan Ostermann, Brian Pence, Nathan Thielman, Rachel Whetten and international grassroots organizations, is working with UNICEF to update its caregiving policies. Duke researchers are also proposing new criteria for defining institutional care, with the hope that global policies can more closely align with differences in care between cultures and countries.

In addition to important policy changes, Whetten's research has found that nearly all orphans have experienced physical and sexual abuse or family violence. Translating this research into service, Whetten and her team are scaling up a childhood traumatic stress and grief intervention, which is helping orphans and their guardians cope. The Cognitive Behavioral Therapy program supports more than 300 orphans ages 7-13 in two East African countries. The novel program is also building capacity among local lay counselors to provide the training and support these children need. 🇵🇰

There's an estimated **153 million** orphaned and abandoned children living across the world who face tough odds.



## Training the Trainer: A Success Story



Dorah Mrema had been a practicing midwife at KCMC in Tanzania. A turning point in her life came when she was trained in emergency

obstetrics by Duke physicians in 2008. Mrema is now equipped with advanced skills to teach other nurses and midwives in emergency obstetrics and address a huge need in her country.

"We previously didn't have the skills to handle obstetric emergencies like postpartum hemorrhage and eclampsia, but our collaboration with Duke made it possible for us to learn those advanced skills," said Mrema. "I can tell you 100 percent that maternal mortality has been decreased in Moshi and surrounding areas, so lots of good things have resulted from the Duke-KCMC collaboration."

Today, Mrema continues to work as an instructor in the ALSO program and with Duke physicians and trainees on Duke-KCMC maternal health research. She is also excited about expanding her medical expertise to respond to another challenge facing a growing number of women in Africa: cervical cancer.

As scores of nurses and health care providers like Mrema are trained in emergency obstetrics in Tanzania, it has the potential to produce a ripple effect on the lives of women and their newborn babies. Giving birth doesn't have to mean death; it can mean new life. 🇵🇰



98% of orphaned or abandoned children experience one or more traumatic events like physical and sexual abuse or family violence, in addition to the loss of their parent.

## THE DUAL CHALLENGE OF MENTAL HEALTH AND HIV/AIDS

Many experts argue the world's most neglected disease is mental health. Regardless of social class, gender, race or national origin, people with mental illness experience a worse quality of life and live fewer years. Mental health is frequently interwoven with other debilitating diseases, but an individual's mental health has often gone unnoticed, ignored or untreated by health professionals.

As more academic researchers and advocacy organizations put mental health in the spotlight, the numbers start to tell the story. Ninety-five percent of the research dollars in mental health are spent on five percent of the world's population. In some developing countries, nine out of 10 people who need mental health care lack access to treatment. In Tanzania, for example, there are six psychiatrists for 40 million people. There is a great need in developing countries for trained mental health specialists and the science to inform future treatment and prevention programs.

The Duke Global Health Institute is on the leading edge of setting mental health as a global priority, with projects that target a range of populations, health issues and geographic locations. One group being studied is the mental health of people who are at risk of contracting, or are living with, HIV/AIDS.

### DOUBLING THE IMPACT

Increasing access to treatment, building capacity among health care workers

In the Central African country of Cameroon, where depression is rarely managed and there's little known about mental illness and HIV/AIDS, DGHI research finds that one in five HIV-infected patients had experienced depression, and one in 14 was depressed in the past year. Led at Duke by DGHI researcher Brian Pence at the Center for Health Policy and Inequalities Research, the ADEPT project, or Adaptation of a Depression Treatment, is one of the largest interventions to explore the prevalence of clinical depression among any population in Cameroon.

The two-pronged study has screened hundreds of Cameroonian patients for mental illness and enrolled dozens in a novel treatment program that equips local health care providers with the skills to become depression care managers. With just five neurologists and three psychiatrists in a country with 19.5 million people, the training program is filling a severe shortage of trained mental health specialists who can work with physicians to manage the diagnosis and treatment of mental illnesses.

"As an extension of our work, we want to

build capacity in mental health so Cameroonian health care providers can effectively address depression," said Pence, whose collaborators include the University of North Carolina at Chapel Hill and the Center for the Study and Control of Communicable Diseases in Cameroon.

The research team is following a group of HIV-positive individuals whose depression is now being jointly managed by a depression care manager and their HIV clinician. The depression care manager has contact with each patient every two weeks until the depressive illness is stabilized and provides suggestions to the HIV clinician for a treatment plan. An off-site psychiatrist provides clinical supervision to the depression care manager, ensuring quality of care.

The preliminary findings look promising—all of the HIV patients are returning for follow-up; they are showing substantial improvements in their depression with moderate antidepressant doses; and few side effects have been reported.

Just 5 neurologists and 3 psychiatrists in a country with 19 million people.

This work has the potential to influence policy in Cameroon on multiple fronts. With access to only one antidepressant for the study, Pence suggests the country

invests in additional drug options that are safe and inexpensive. He also anticipates the depression care manager model is one that could be tailored to other African countries where mental illness is prevalent among HIV-infected individuals.



# VATION

## THE TRIPLE THREAT

Home to more HIV-infected individuals than any country in the world, South Africa is the setting of a five-year DGHI study examining the triple threat of mental health, hazardous drug and alcohol use, and traumatic experiences including partner violence and childhood abuse. DGHI researchers warn these risk factors are contributing to risky sexual behaviors that may make individuals vulnerable to HIV.

While most research studies are conducted in traditional environments like a clinic, hospital or home visit, a unique aspect of this research is its strategic targeting of high-risk individuals who frequent informal bars and taverns. With a team of collaborators from the University of Stellenbosch and University of Connecticut, DGHI faculty Kathleen Sikkema, Melissa Watt and Christina Meade have found that bar-goers have high levels of traumatic experiences and mental health problems.

Half of the bar-goers in the study had signs of depression, and one-third had post-traumatic stress disorder (PTSD). Mental health disorders were more common among

individuals who had experienced rape, child abuse or physical violence by a sex partner. They also consumed more drugs and alcohol and engaged in more unprotected sex.

With a greater understanding of the interconnectedness of these issues, the research suggests mental health be addressed as a component of HIV prevention programs, and that alcohol-serving venues can be effective locations for targeting those programs.

“Our response to the HIV epidemic must address the synergy of co-occurring risk factors,” said Sikkema, professor of psychology and neuroscience and global health. “Only when we address the larger context that pre-disposes people to HIV risk will we begin to curb the spread of the epidemic.”

A research team led by Meade and African collaborators plan to continue this research by studying South Africa’s rapid rise in methamphetamine use in order to develop programs that integrate HIV prevention, substance abuse treatment and mental health. 📌

## MAKING SCIENCE COUNT

Only when research is translated into policy and practice is it helpful for reducing health disparities and improving the health of populations around the world. To address the complex set of mental health issues and risky behaviors among South Africans in particular, Duke researchers have simultaneously focused on testing programs that may help people cope with their circumstances, reduce risky behaviors, treat addictions and improve overall health and well-being.

Coping interventions have been shown to reduce traumatic stress among people living with HIV/AIDS and others who have experienced sexual abuse as children. Support groups may also be effective for pregnant women who recently tested positive for HIV.

In the US, a similar program is being hailed as a global model for researchers, clinics and community-based organizations because it integrates HIV prevention and mental health. Developed by Sikkema, The Living in the Face of Trauma (LIFT) interven-

tion targets people with HIV and a history of child sexual abuse. After their involvement in the program, participants engaged in significantly less unprotected sex and substance use, and they experienced fewer traumatic stress symptoms, such as nightmares or avoiding their feelings associated with the trauma.

**LIFT has been recognized as an effective intervention by multiple US agencies.**

Sikkema. “When they develop adaptive coping skills, they are able to reevaluate harmful behaviors like sexual risk behaviors and substance abuse. In addition, the group setting helps to reduce stigma and shame, therefore having the potential to improve self-esteem and overall quality of life.”

**95%** of research dollars are spent on **5%** of the world’s population.



The positive results from the study led to its identification as a Best-Evidence Intervention by the US Centers for Disease Control and Prevention. In 2011, the program was also added to the Substance Abuse and Mental Health Service Administration’s National Registry of Evidence-based Programs and Practices (NREPP), resulting in the availability of the LIFT manual as a free resource.

The LIFT program has since been implemented at Duke Hospital and several other sites in the US. The program is also being considered in Russia and South Africa.

It is targeted, evidence-based programs like this that can fuel advancements in mental health and the care of people living with HIV around the world. 📌

# IMPLEMENT

## FIGHTING OBESITY AT HOME AND AROUND THE GLOBE

By 2030, it is estimated that nearly half of the adults in the US will be obese—or about 33 percent more than current levels. That’s according to new research by DGHI faculty member Eric Finkelstein, who warns the rise could increase health care costs by as much as \$513 billion over the next two decades. If this forecast holds true, it would further hinder efforts to contain health care costs because more money would be needed to manage chronic conditions like diabetes, heart disease, cancer, high blood pressure and high cholesterol.

There are growing efforts to prevent and manage the consequences of obesity, including social marketing programs, worksite health promotion programs, and new drugs and technologies. If implemented on a larger scale, Finkelstein says these efforts can lower obesity rates, although this may not lower health care costs.

### DISPARITIES AMONG THE OBESE

While the market is flooded with weight-loss programs, most are not tailored to specific ethnicities. Studies by DGHI faculty show that African Americans, for example, are more likely to have high blood pressure—or hypertension—than any other racial or ethnic group in the US.

The Be Fit, Be Well study followed 360 obese, low-income African American and Hispanic patients with hypertension in Boston community health centers. One of the lead researchers on the study is DGHI faculty member Gary Bennett, who says this is the kind of model that works because it uses inexpensive technologies to deliver a high quality intervention. Designed to help people lose weight with a routine blood pressure medication regimen, lifestyle changes in diet and physical activity, self-monitoring and social support, the pilot intervention shows promise. Study participants had lost weight within six months, and kept the weight off two years later. Due to better self-monitoring and drug adherence, their high blood pressure was also better managed.

African Americans are more likely to have high blood pressure than any other ethnic group in the US.

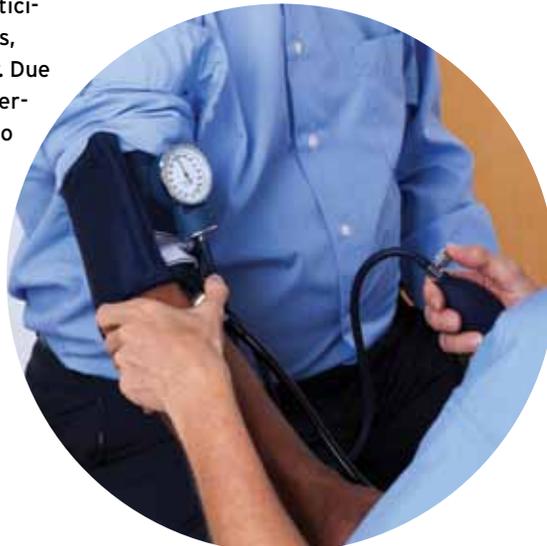
“Be Fit, Be Well was one of the largest and longest studies of its type. The study shows that we can improve cardiometabolic risk factors in medically-vulnerable populations who have the highest disease risk,” said Bennett, associate professor of psychology and neuroscience and global health, who also leads an obesity prevention program at North Carolina community health centers targeting African American women. “We hope to transform the primary health care system so that it is better equipped to address obesity, particularly in high-risk populations.”

Bennett’s research team uses an innovative and interactive web-based weight-loss application that has proven effective in his obesity studies. The application, [iotaplan.com](http://iotaplan.com), will soon be released to the general public. 🇺🇸



### THE GLOBAL PICTURE

While obesity is a growing problem in the US, it is also on the rise globally and has the potential to reach epidemic proportions if not addressed. Working with collaborators from Peking University, Bennett and DGHI faculty member Sara Benjamin Neelon are testing a similar weight-loss program in Beijing, China, where obesity has increased dramatically, along with rates of hypertension and type 2 diabetes. The six-month program for overweight Chinese adults tracks their daily progress on individual diet and physical activity goals and offers them group support sessions. What makes the program unique is the use of daily text messages for participants to enter their progress and then receive tailored feedback about their progress. If successful, interventions of this type can be used to reach very large numbers of affected individuals. 🇺🇸



# ENTERTAINMENT

## NEEDS FOR EXPANDED SCOPE OF CARE

It's no secret that sub-Saharan Africa has the largest number of HIV-related illnesses and deaths of any region in the world. But, the global disease burden is shifting as non-communicable diseases like diabetes and high blood pressure now account for more deaths than HIV, malaria and tuberculosis combined. As program leaders, researchers and policy makers address this disease shift, Duke researchers have found more of an overlap than a divide.

New research led by Duke cardiologists and DGHI faculty Gerald Bloomfield and affiliate Eric Velazquez has found that HIV-positive individuals in Eldoret, Kenya are increasingly fighting obesity and high blood pressure, highlighting the importance of integrating cardiovascular risk into existing HIV care.

The study of more than 12,000 Kenyans participating in a large HIV treatment program found that one in ten HIV-positive



men had high blood pressure, and men with more disease-fighting white blood cells also had high blood pressure. Among Kenyan women, one in four HIV-positive patients were overweight or obese.

While cardiovascular diseases are widely recognized as complications of HIV, this study is among the first to quantify cardiovascular disease risk among HIV patients in sub-Saharan Africa.

"There is a mismatch between aggregate spending for global health and overall disease burden, whereby the least amount of spending goes toward non-communicable diseases despite contributing the largest share of illnesses and death," said Bloomfield, assistant professor of medicine and global health and a former global health fellow in cardiology. "Programs in sub-Saharan Africa that focus solely on HIV care are missing a major opportunity to improve population health

status at a substantial future cost."

In 2009, Moi University in Eldoret, Kenya, was designated as a Cardiovascular and Pulmonary Diseases Center of Excellence by NIH's National Heart, Lung, and Blood Institute to combat chronic diseases. The Hubert Yeargan Center for Global Health is spearheading the development of a self-sustaining cardiac care unit as part of its commitment to training future Kenyan cardiovascular clinical researchers.

With collaborators from Moi University and Brown University in Kenya, Bloomfield and Velazquez are now taking steps to further compare cardiovascular risk factors and the effects of HIV. They hope to estimate the impact of uncontrolled blood pressure, with the goal of influencing Kenyan policy makers to better address non-communicable diseases. The treatment program in Eldoret has already taken steps to expand HIV care to include the identification and management of high blood pressure. 🇰🇪

## ALTERING THE COURSE

One way to stop the obesity epidemic from further penetrating the lives of Americans and people worldwide is to reach children early, before bad habits are formed. Neelon, a licensed nutritionist, argues that obesity prevention begins at birth—or sooner—and requires a multi-pronged approach.

In the US, 10 percent of children up to age two and 20 percent of children ages two through five are overweight or obese – twice the rate of the 1980s. The problem is worse in North Carolina, where a third of the children under age five are overweight or obese. These children are at a higher risk of developing diabetes, hypertension and cardiovascular disease, and could lead to other problems like depression or bullying at school.

"Excess weight gain in infancy puts children at risk for obesity and other health problems later in childhood," said Neelon, assistant professor of community and family medicine and global health. "If we focus our efforts in the early years, we can help prevent obesity later in childhood. Target-

ing multiple caregivers, such as parents, grandparents and child care providers, helps ensure that

children receive consistent messages about living a healthy lifestyle."

An ideal setting to promote healthy eating and physical activity is at child care and preschool, where children consume a large percentage of their daily calories. Neelon's research shows North Carolina preschoolers do not eat the recommended amount of fruits and vegetables. She has also studied government-sponsored child care centers in Mexico, where young children are served high-calorie foods, sugar-sweetened beverages and insufficient whole grains.

Addressing the need for healthier diets, Neelon launched a farm-to-preschool gardening program in two North Carolina counties, where preschool children

**20% of US children age 2-5 are overweight or obese.**



are learning to grow their own fruits and vegetables. Neelon hopes to reach more children with a statewide launch of this innovative program next year.

With new research and effective interventions, today's youth will alter the course of an otherwise swelling global obesity epidemic. 🇺🇸

## PROMISING RESEARCH AHEAD: WHAT TO WATCH AT DGHI

With the growth of DGHI faculty over the past five years, there is a wealth of new research and training initiatives that address global health. From the broader study of health systems, to intellectual property rights and training programs that build capacity in the developing world, DGHI faculty are at the forefront of emerging global health priorities. Here is a look at a small sample of promising global health research currently under way that will bring important new findings and outcomes in the future.

### IMPROVING THE HEALTH WORKER SHORTAGE IN RWANDA

Rwanda has made strides toward meeting the health-related Millennium Development Goals set forth by the United Nations, achieving declines in child mortality and malaria while improvements in the prevention and treatment of HIV/AIDS. Yet, with only 633 physicians for a population of over 10 million people, the country still has a severe shortage of highly-skilled health care workers to continue this progress.

Only **633** physicians for a population of over **10 million** people.

Working with collaborators from DGHI, the Hubert Yeargan Center for Global Health, the Duke School of Nursing, the US Government, the Rwandan Ministry of Health, the Clinton Health Access Initiative (CHAI) and a consortium of US universities, the Rwanda Human Resources for Health (HRH) Program aims to build a strong and sustainable infrastructure through education and training for Rwandan clinicians, physicians, nurses and midwives, and other health specialists. The scale-up of trained workers over the next seven years is possible with support from the US and Rwandan governments and assistance from CHAI.

The consortium of US universities will initially send 42 faculty to train and mentor a new cadre of health care workers. In the first year, Duke will send nurses, pediatricians and internists, with the

aim of expanding to other specialties in subsequent years. The time-limited program aims to leave behind hundreds of well-trained Rwandan medical specialists and faculty who are equipped to continue providing top-notch education to Rwandan medical trainees.

While addressing the health worker shortage, the HRH Program also takes steps to upgrade the infrastructure, equipment and management of Rwanda's teaching hospitals, health care and educational facilities. Duke faculty will also train health managers to direct Rwanda's hospitals and district health units, enabling clinicians to focus on providing optimal patient care.

This collaborative international effort shows great promise in transitioning Rwanda from a low- to middle-income country in a relatively short amount of time, enabling Rwanda to better care for its people. 🇷🇼

Deaths due to acute and chronic illnesses like pneumonia and lung cancer can be prevented with the adoption of clean burning cookstoves.

### IF CLEANER COOKSTOVES CAN SAVE LIVES, WHY AREN'T MORE PEOPLE USING THEM?

Nearly two million people, mostly women and children, die each year due to the environmental effects of cooking with fuels like wood or charcoal on poorly functioning stoves or open fires. Deaths due to acute and chronic illnesses like pneumonia and lung cancer can be prevented with the adoption of clean-burning cookstoves.

Researchers from the Duke Cookstoves Initiative, a cross-campus collaboration led by DGHI faculty member Subhrendu Pattanayak, are addressing the benefits of improved cookstoves and what it takes for people in the developing world to adopt them. Pattanayak, DGHI faculty member Marc Jeuland and colleagues are studying whether and how improvements in health, time savings, preservation of forests and reduced emissions can be realized. In a very sparse literature on the drivers of adoption of cleaner cooking technologies, researchers have previously found that the most important factors that determine whether people adopt cleaner fuel are socioeconomic status and fuel prices.

With support from the USAID, Pattanayak and his colleagues are working with partners in India to examine incentives that promote the purchase of clean cookstoves. The team plans to develop and test interventions on

how best to introduce new stove technologies and influence people's attitudes about cleaner cooking technologies.

The Duke initiative is a model for researchers working across disciplines to address an emerging global health concern in low-income nations, with the goal of saving lives and improving the health of people through the use of cleaner cooking technologies. 🇷🇼



# EVALUATION



DGHI faculty are evaluating the cost-benefit and effectiveness of health care programs and government policies.

## A MORE SYSTEMATIC APPROACH TO IMPROVING HEALTH

Many developing countries are affected by a host of system-wide setbacks that impact health care delivery, like shortages of highly-trained health workers and limited institutional and financial capacity to develop and implement effective and affordable programs. DGHI health systems researchers Manoj Mohanan and Shenglan Tang are investigating the barriers that may be impeding, rather than strengthening, the effective delivery of health care on a global scale.

At the heart of Mohanan's research is evaluation of the effectiveness of innovative policies and technologies in health services delivery in India, from telemedicine facilities and social franchising networks to health care provider incentives and voucher programs for obstetric care. His research focuses on behavioral responses that impact the effectiveness of policies and innovations. For example, despite state policies that provide subsidies to deliver babies at private hospitals for free, a large share of rural Indian women prefer to deliver their baby at home.

Tang, who previously led a team at the World Health Organization to make health system reform recommendations to the Chinese government, brings to Duke a wealth of knowledge and experience. His previous research focused on disease control, health care financing and health system reform across China and other Asian countries and Africa. As one of DGHI's newest faculty members, he is beginning new work on the assessment of health system reform and tuberculosis control in China and Southeast Asia with a focus on equity, efficiency and sustainability. He is also keen to facilitate the research collaboration between China and African countries in a rapidly changing context of global health partnerships.

With large-scale projects under way and others getting started, taken collectively, the work of Mohanan and Tang shows promise to influence policy makers on a global scale about what works, what doesn't, and the possible solutions that may raise the standard of care and improve health of entire populations. 🇺🇸

## GLOBAL CANCER TO RISE BY HALF BEFORE 2020

With the shift in the global disease burden from infectious diseases to chronic diseases, an emerging concern is the overwhelming rise in cancer cases across the globe. The World Health Organization estimates global cancer cases could increase by half to 15 million by 2020.

This sobering reality has made global cancer a growing priority for DGHI. In partnership with the newly-formed Duke Cancer

Institute, DGHI is exploring global research collaborations to investigate the causes and spread of various types of cancers, including risk

**WHO estimates global cancer cases to reach 15 million by 2020.**

factors like diet, lifestyle, smoking, aging and the environment. DGHI is also working with international partners to educate communities about the importance of preventive health care, routine checkups, early detection and access to treatment.

Cervical cancer research is currently under way in Haiti, Kenya and Tanzania. DGHI faculty are also working with collaborators around the world to examine the links between cancer and HIV/AIDS.

Cancer researchers at Duke believe that overcoming barriers to cancer research requires partnerships that are both sensitive and responsive to local and global needs. Working together across departmental, discipline and geographical boundaries, Duke stands ready to become a leader in the fight against global cancer. 🇺🇸

## MICROFINANCE, POVERTY AND HEALTH

**Erica Field**

**Associate Professor, Economics and Global Health**

There has been an immense growth of microfinance programs in the developing world, which is thought to be an important entry point to reducing poverty, promoting development and uplifting communities. But it is not well understood how these financial services for low-income clients impact their health. Economist Erica Field, who leads microfinance evaluation projects in India, brings a wealth of knowledge and experience to DGHI that enables her to unlock the complex intricacies between microfinance, poverty and health.

Unlike most existing microfinance research which uses subjective and potentially unreliable health measures, Field is evaluating the health outcomes of microfinance, group lending and social networks in India using measurable indicators of physical and mental health.

"No studies have assessed how access to credit influences important indicators of health, like blood pressure, weight and nutrition.

We also have almost no knowledge on whether—and even in what direction—microfinance influences stress and psychological wellbeing," said Field.

"The size and breadth of the global health research community make Duke an ideal environment in which to pursue these questions. Topics such as stress and health are interdisciplinary in nature, so I will benefit enormously from interactions

with DGHI colleagues in a range of disciplines."

Field came to Duke in 2011 from Harvard. In addition to her faculty positions in economics and global health, Field also serves as a faculty research fellow for the National Bureau of Economic Research. Working on poverty and development issues across Central and South Asia, Africa and Latin America, Field has other projects under way involving property rights and housing policy, marriage and family law, and health care policy.

"There is a critical connection between poverty and poor health," said Field, "and expanding access to health solutions for the poor can significantly improve their health and reduce contributors to chronic poverty."

DGHI faculty members, like Field, are doing groundbreaking work that has the potential to influence public health and microfinance policies in developing countries, ultimately taking important steps toward the goal of improving human health and uplifting impoverished communities. 📌



## DETERMINING THE COMPLEX INTERPLAY BETWEEN HEALTH AND THE ENVIRONMENT

**William Pan**

**Assistant Professor, Global Environmental Health**

From teaching a graduate course on health, population, and environmental change to researching malaria in the Amazon, William Pan is engaging in innovative and important work on a local and global scale.

Pan came to Duke from Johns Hopkins University in 2011 because he was attracted to the collaborative and

interdisciplinary nature of DGHI. "There is this true feeling of collaboration here," said Pan, who has already begun working with Duke researchers in medicine and public policy. "Everyone seems so involved and love what they do."



In a research lab located along the banks of the Amazon River in northern Peru, Pan studies the dynamics of environmental change, population growth and human health. As people continue to encroach upon the tropical wilderness, Pan is studying the demographic, ecological and entomological drivers of malaria, particularly their relationship with migration and land use changes like deforestation.

He argues that people are the main drivers of environmental change including land, climate and water and he is helping policy makers make those connections. In 2009, Pan served on the panels of the United Nations Population Fund and the International Institute for Environment and Development to evaluate population linkages to climate change as a prelude to the 2011 Copenhagen Climate Change Conference. He also helped prepare a report for the UN Environment Programme's Fifth Global Environment Outlook (GEO-5) to keep governments and stakeholders informed of global environmental issues, which will be presented at the 2012 Earth Summit in Rio de Janeiro (RIO+20) in June.

"Disease itself does not have limits, and environments do not have borders," said Pan, whose doctorate degree in biostatistics from UNC-Chapel Hill focused on demography and spatial analysis. "To some extent, policies and behaviors may differ, but there is always a link between environmental change and health."

Pan's approach is particularly innovative because he is studying chronic disease alongside infectious diseases, like malaria and dengue. As most low- and middle-income countries are rapidly developing, a dual burden of disease is developing. Pan's project in the Madre de Dios region of Southern Peru has enrolled 600 families living near the Interoceanic Highway in both rural and urban settings where he is collecting data related to migration, fertility, employment and biometric measures for malaria, dengue, anemia and obesity.

This multidisciplinary approach to understanding health problems among vulnerable populations makes Pan a promising leader in his field, and squarely places him at the forefront of discovering the complex interplay between human health and the environment in which we live. 📌

# RATION

## EXPLAINING OBESITY IN INDIA

**Harris Solomon**

**Assistant Professor, Cultural Anthropology and Global Health**

India is one of the fastest-growing economies in the world, yet it still suffers from extreme poverty and widening health disparities. While these realities paint a picture of a diverging country, one issue that afflicts both the affluent and poor is obesity. Duke cultural anthropologist and DGHI faculty member Harris Solomon argues the scope of the problem is broader than modernization and consumerism.

"To fully understand the problem, we need to learn who puts food in circulation? How is it priced? Who has access? You can't just frame obesity in terms of personal indulgence or a society becoming wealthier," said Solomon, assistant professor of cultural anthropology and global health. "Cultural anthropology offers a compelling vocabulary for how we talk about disease. It can show us where other possibilities might lie that we haven't talked about, and the connection between culture and health. It's an essential and integral part of how we deal with the global health problems of our generation."



Solomon came to Duke in 2011 from Brown University, where he received his doctoral training in cultural anthropology and global health. Early in his career, Solomon worked on HIV policy and global reproductive health issues in Atlanta and Washington, DC. That work led him to India, where he began exploring access to health care and medical tourism issues. It was not long before he noticed the growth of weight-loss clinics and advice columnists writing about how to lose weight.

That's when he decided to investigate the issue further.

Attracted to Duke and DGHI because of its strong reputation for working across disciplines to solve complex problems, Solomon believes it was an ideal fit for his diverse research and teaching interests in medical anthropology, South Asian studies, food studies, science and technology studies, and gender and sexuality studies.

Solomon's research explores the everyday politics of food in Mumbai, from fried street foods to home cooking, and then traces how such foods become valued differently when they are blamed for damaging health. His work sheds light on the many factors that influence India's rising obesity rate, including access to preventive care, food pricing, food distribution and availability.

"The story of obesity's rise in India is one that deserves telling not only because of its global health implications," said Solomon, "but also because it more broadly calls into question what counts as an epidemic and what counts as a cause or consequence of chronic illness." 🇺🇸

## USING RESEARCH TO INFLUENCE GLOBAL HEALTH POLICY

**Shenglan Tang**

**Professor, Medicine and Global Health**



With more than 25 years of international health systems and policy research experience, Shenglan Tang is known for his significant contributions to China's ongoing health reform. Tang brings this extensive experience to DGHI where he says he has found a niche for continuing his research, teaching and working to develop a global health research center in China.

Much of Tang's research has shed light on China's changing health system, exposing the need for more equitable, accessible and affordable health care services for all citizens. Most recently as senior health policy advisor at the World Health Organization (WHO), he made policy recommendations that have since been implemented by the Chinese government. Among these recommendations, Tang and his team called for greater attention to public health as an option for care, greater use of essential drugs to promote affordability and improvement of cost-effectiveness of health interventions.

"We need to look at health development in low- and middle-income countries from both disease control and health system strengthening," said Tang, who believes building a stronger health system requires a synergy of improved human resources, infrastructure, information management, money and governance.

Over the past decades, Tang says the focus of health system reform has shifted from efficiency to equity in financing and provision of health care. To address this shift, as has been done in Mexico, Thailand and Ghana, Tang believes political will is key.

"We need concerted actions by all stakeholders," said Tang. "We as academic researchers need to generate robust evidence on health policy and health system issues. Civil society must use this evidence to advocate for these health agendas. Governments also must use this evidence to inform policy and increase their engagement with universities and civil societies."

After spending six years at WHO, Tang came to Duke in 2012. "I love teaching, working with students, and doing research in Asian countries where I share my cultural background," said Tang, who has a joint appointment at DGHI and the School of Medicine. "I chose Duke because it has invested lots of time and energy into promoting global health as a priority. Also, DGHI has a very clear global strategy about how to support low- and middle-income countries to achieve Millennium Development Goals."

In addition to his research, Tang will direct the new Global Health Research Center at Duke Kunshan University in China. He is also teaching a graduate-level course called "Implementation Research for Effective Health Interventions," a perfect complement to his extensive experience of translating evidence into policy recommendations to improve health equity on a global scale. 🇺🇸

## YEAR IN REVIEW

### PRESIDENT BRODHEAD TRAVELS TO AFRICA

In July, a delegation of university leaders, including Duke President Richard Brodhead, visited DGHI partner locations in Tanzania and Uganda. The visit marked the first time a Duke University President has traveled to Africa while in office. While there, President Brodhead saw Engineering World Health students repairing medical equipment, visited Kilimanjaro Christian Medical Centre and visited faculty and student-led projects. A blog chronicled each step of the journey to discovering Duke's strong and growing presence in East Africa.

Brodhead was joined by DGHI Board of Advisors chair Thomas Gorrie and his wife Meg, to see firsthand how DGHI faculty and students are leading efforts to improve health in East Africa.



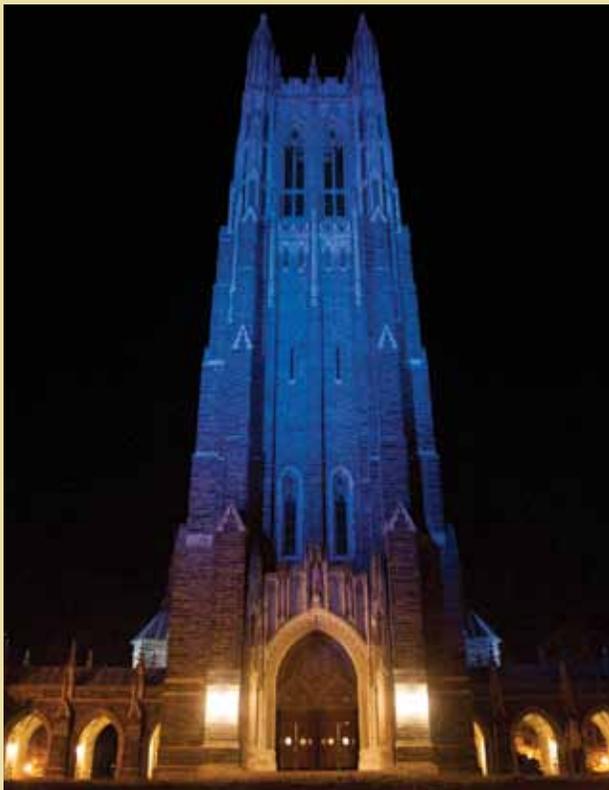
### FIRST MSC-GH STUDENTS GRADUATE

In May, DGHI awarded its first Master of Science in Global Health (MSc-GH) degrees to nine students. Thirty-nine students received a Global Health Certificate, which has become the second largest certificate program on campus. The students represented 17 majors and many are now pursuing careers or graduate education in global health-related fields.



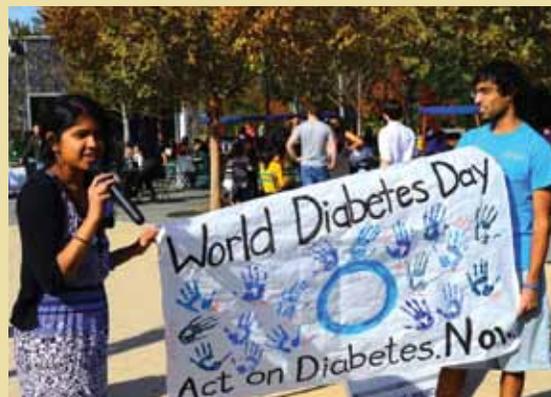
## DGHI CELEBRATES FIVE YEARS

In October, more than 300 people helped DGHI celebrate its fifth anniversary. The day-long event featured a symposium titled "Global Health 2020: Acting Today to Improve Tomorrow" and was moderated by ABC News' Senior Health and Medical Editor Richard Besser. Peter Piot, director of the London School of Hygiene and Tropical Medicine, was the keynote speaker. An evening reception provided an opportunity for faculty, students, trainees, staff and friends to reflect on the Institute's achievements and look ahead to the future. In addition to student poster presentations, a highlight of the evening was a special video featuring ABC News Anchor Diane Sawyer.



## WORLD DIABETES DAY

In November, Duke students paid special tribute to World Diabetes Day by lighting the famous Duke Chapel in blue, the signature color of diabetes awareness. The chapel lighting was one of several events coordinated by 15 cultural and global health student groups to raise awareness about the rising global prevalence of diabetes and other chronic diseases, such as heart disease and cancer.



# DGHI AT A GLANCE (as of January 1, 2012)

## FACULTY

Total number of DGHI faculty: 48  
 Total number of DGHI affiliates: 46

## DGHI-SUPPORTED EDUCATION AND TRAINING PROGRAMS

U= undergraduate, G= graduate, M= medical

- Global Health Focus Cluster (U)
- Global Health Certificate (U, G)
- Global Semester Abroad (U)
- Student Research Training Program (U)
- Master of Science in Global Health (G, M)
- Global Health module in the School of Medicine curriculum (M)
- Third-Year Study Program in Global Health (M)
- Global Health Residency and Fellowship Pathway (M)
- Global Health Doctoral Scholars (G)
- Postdoctoral Fellowship
- Duke-Peking University Global Health Diploma
- Duke-Mahidol University Global Health Diploma (Thailand)

## STUDENT FIELD PROJECTS

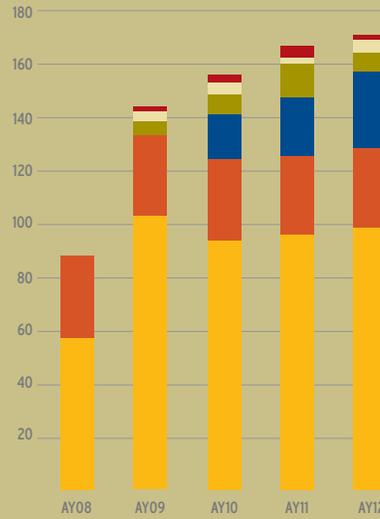
Total number of student project placements in Academic Year 11:  
 74 in 24 countries  
 DGHI provided funds to support the projects of 38 students

## PRIORITY LOCATIONS

- Beijing, China
- Kunshan, China
- Shanghai, China
- Leogane, Haiti
- Delhi, India
- Eldoret, Kenya
- Singapore
- Galle, Sri Lanka
- Moshi, Tanzania
- Bangkok, Thailand
- Kampala, Uganda

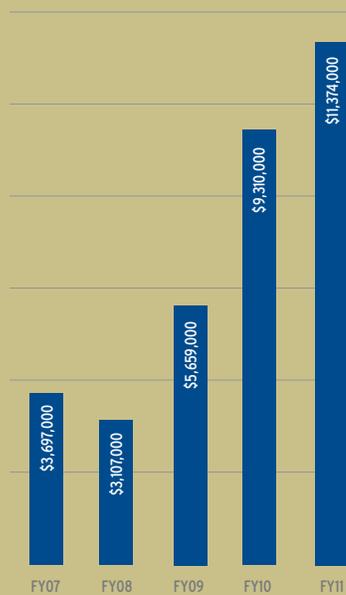
## RESEARCH

138 active global health research projects in 30 countries  
 275 peer-reviewed academic publications in 2010-11;  
 35% include a co-author from a low- or middle-income country



## STUDENTS ENROLLED IN DUKE GLOBAL HEALTH EDUCATION PROGRAMS

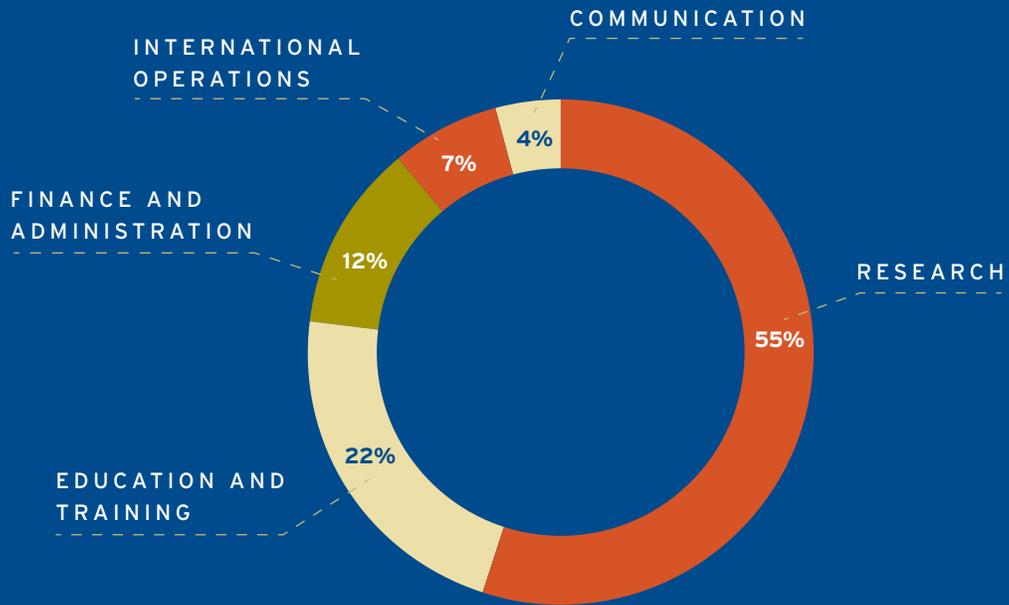
- Postdoctoral Fellowship
- Global Health Residency and Fellowship Pathway
- Third-Year Study Program
- Master of Science in Global Health
- Global Health Focus
- Global Health Certificate



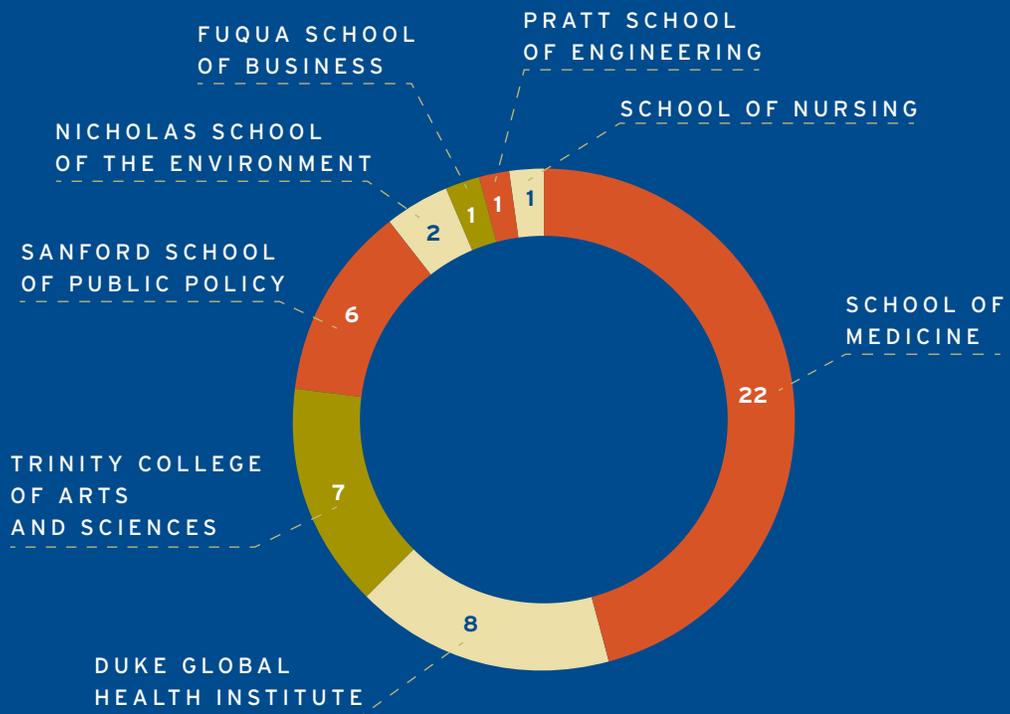
## DGHI-MANAGED GRANTS

DGHI manages a range of domestic and international grants for Duke faculty

## FY 12 ANNUAL BUDGET



## FACULTY BY SCHOOL



# DGHI LEADERSHIP

## DGHI FACULTY

(as of January 1, 2012)

Faculty hold either a primary or secondary appointment at DGHI

Sumedha Ariely (Duke Global Health Institute)  
John Bartlett (Medicine—Infectious Diseases)  
Sara Benjamin Neelon (Community and Family Medicine)  
Gary Bennett (Psychology and Neuroscience)  
Gerald Bloomfield (Medicine—Cardiology)  
David Boyd (Duke Global Health Institute)  
Sherryl Broverman (Biology)  
Dennis Clements (Pediatrics)  
Ralph Corey (Medicine—Infectious Diseases)  
Victor Dzau (Medicine)  
Erica Field (Economics)  
Eric Finkelstein (Duke Global Health Institute/Duke-NUS)  
Michael Haglund (Surgery—Neurosurgery)  
Barton Haynes (Medicine—Immunology)  
Marc Jeuland (Public Policy/Global Health)  
Randall Kramer (Environment)  
Catherine Lynch (Emergency Medicine)  
Robert Malkin (Engineering)  
Joanna (Asia) Maselko (Psychiatry and Behavioral Sciences)  
Christina Meade (Psychiatry and Behavioral Sciences)  
Giovanna Merli (Public Policy)  
Michael Merson (Medicine/Public Policy)  
Lynne Messer (Duke Global Health Institute)  
Manoj Mohanan (Public Policy)  
Wendy O'Meara (Medicine—Infectious Diseases)  
Truls Ostbye (Community and Family Medicine)  
Jan Ostermann (Duke Global Health Institute)  
William Pan (Environment/Global Health)  
Subhrendu Pattanayak (Public Policy/Environment)  
Brian Pence (Community and Family Medicine)  
Rae Jean Proeschold-Bell (Duke Global Health Institute)  
Jen'nan Read (Sociology)  
Elizabeth Reddy (Medicine—Infectious Diseases)  
Kevin Schulman (Medicine/Business)  
Svati Shah (Medicine—Cardiology)  
Kathleen Sikkema (Psychology and Neuroscience)  
Gavin Smith (Duke Global Health Institute/Duke-NUS)  
Anthony So (Public Policy)  
Harris Solomon (Cultural Anthropology)  
Shenglan Tang (Medicine/Global Health)  
Nathan Thielman (Medicine—Infectious Diseases)  
Duncan Thomas (Economics)  
Krishna Udayakumar (Medicine/Global Health)  
David Walmer (Obstetrics and Gynecology)  
Daniel Westreich (Obstetrics and Gynecology)  
Kathryn Whetten (Public Policy)  
Christopher Woods (Medicine—Infectious Diseases)  
Bei Wu (Nursing)

## DGHI STUDENT COUNCIL 2011-12

Cheyenne Allenby (Trinity 2014)  
Manisha Bhattacharya (Fuqua/Medicine 2014)  
Ruvi Chauhan (Pratt 2012)  
Jeanne Cross (Divinity 2013)  
Mark Dakkak (Medicine 2015)  
Lisa Deng (Trinity 2012)  
Jessica Hudson (Medicine 2012)  
Jacob Kirkorowicz (MSc-GH 2012)  
Yee Kwan (Nursing 2013)  
Nimit Lad (Medicine 2014)  
Christopher Lam (MSc-GH 2012)  
Joy Liu (Trinity 2014)  
Rose Brittany Merola (Graduate School Arts & Sciences 2014)  
Christopher Paul (Nicholas 2015)  
Tara Porter (Pratt 2013)  
Braveen Ragunathan (Trinity 2012)  
Victoria Shelus (Nicholas 2012)  
Mukesh Singhal (Fuqua 2012)  
Tara Steinmetz (Sanford 2012)  
Catherine Winn (Nursing 2012)  
Nina Woolley (Trinity 2012)

## DGHI BOARD OF ADVISORS

Thomas Gorrie (chair), T.M. Gorrie & Associates, LLC  
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Global Health Strategies  
Laura Ellen Muglia, T'76, PA'14, Co-trustee,  
The Laura Ellen and Robert Muglia Family Foundation  
Peter Piot, Director and Professor of Global Health,  
London School of Hygiene and Tropical Medicine  
Alan Schwartz, T'72, PA'03, '09, '12, '15, Executive Chairman,  
Guggenheim Partners  
Robert Steel, T'73, New York City Deputy Mayor for  
Economic Development





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