



CHIEF> PAUL FARMER, M.D., PH.D. (2003–2005, 2009–PRESENT)

Division of

GLOBAL HEALTH EQUITY

The Division of Global Health Equity is committed to strengthening healthcare delivery, training, and research; to reducing disparities in disease burden; and to improving treatment outcomes for the most needy, both domestically and abroad. Established in 2001, the division works in close collaboration with the nonprofit Partners In Health (PIH) and the Department of Global Health and Social Medicine (DGHSM) at Harvard Medical School (HMS). Recognizing the complex social determinants of health, division faculty aim to reduce health disparities by undertaking essential research using insights from anthropology, history, sociology, epidemiology, economics, and other social sciences to improve medical care in the world's poorest areas. The division focuses on infectious diseases such as human immunodeficiency virus (HIV), tuberculosis (TB), and Ebola Virus Disease (EVD), as well as non-infectious diseases such as coronary artery disease, diabetes, and addiction. Under the leadership of Division Chief Dr. Paul Farmer, the division works to improve care delivery globally and strengthen health systems.

STRENGTHENING HEALTH SYSTEMS

Domestic Initiatives

Anansi Health

Anansi Health was launched in January 2014 as a collaboration between Drs. Heidi Behforouz and Clemens Hong. Dr. Behforouz previously led the Prevention and Access to Care and Treatment (PACT) project, which provided care through a community health model in the Dorchester neighborhood of Boston. Building on their community health experience, Drs. Behforouz and Hong developed Anansi Health to provide training, consulting, and direct service operations for community-based complex care management for vulnerable populations. By leveraging community health workers (CHWs) and integrating them within healthcare delivery teams, Anansi Health aims to transform health delivery through community engagement and to improve health for high-risk and high-need individuals in the U.S. Under Anansi Health's guidance, projects to establish CHW models as components of Patient Centered Medical Homes are underway in rural Arkansas and in Los Angeles County.

Navajo Nation

Founded in 2009, Community Outreach Patient Empowerment (COPE) is a collaboration among the division, the Navajo Nation Community Health Representative (CHR) Program, the Navajo Area Indian Health Service, and PIH. Led by Dr. Sonya Shin, COPE is based in Gallup, New Mexico.

COPE is committed to eliminating health disparities in American Indian and Alaskan Native populations,

working at the invitation of tribal leadership. COPE establishes partnerships with healthcare providers and community advocates to address structural barriers to good health, to respond to burden of disease, and to fill gaps in the healthcare delivery system identified by patients, families, and providers.

COPE provides technical assistance to a diverse group of local stakeholders working to build more effective healthcare delivery systems and increase food access in Navajo communities. Specific projects include the formation of inter-professional community health teams that meaningfully integrate CHRs in healthcare delivery and case management processes; delivery of robust, community-based outreach; and implementation of multi-level strategies aimed at transforming regional food systems.

This year, with funding from the Centers for Disease Control and Prevention and the Rx Foundation, COPE launched an innovative Fruit and Vegetable Prescription (FVRx) program designed to incentivize consumption of fruits and vegetables and healthy behaviors among vulnerable, young families. The team, under Dr. Sara Selig's leadership, has also made significant strides in formalizing its nascent Cancer Coalition by securing funding for qualitative, community-driven research on the cancer patients' experiences and hosting the first-ever COPE- Navajo Cancer Survivorship Conference in partnership with the Navajo Department of Health.

International Initiatives

Guatemala

Division faculty member Dr. Peter Rohloff co-founded Wuqu' Kawoq | Maya Health Alliance, a nongovernmental health services organization in Guatemala. The organization is a major provider of primary healthcare and related social services in

indigenous Kaqchikel and K'ichee' communities in central Guatemala. Wuqu' Kawoq was founded out of the belief that excellent health care requires attention to the many cultural, linguistic, and logistical barriers that prevent indigenous patients in Guatemala from receiving the services they need. Therefore, most

of their work occurs in Mayan languages, and they work closely with our partner communities to build consensus around joint health projects. All of the services, including physician visits and medications, are provided at no cost.

Haiti

The division, working with PIH, has a long history in Haiti. For over 25 years, the division has collaborated with Zanmi Lasante (ZL), one of the main healthcare providers in the country. ZL's mission is to increase access to health services for the poorest individuals and to improve the health and the overall standard of living for residents of the country's rural central plateau. Today, ZL ranks as the main provider of healthcare in central Haiti and the only provider of comprehensive primary care, regardless of ability to pay. The number of patient visits to ZL's 12 sites grew to more than 725,000 in 2014. Many division faculty began their international work at ZL and continue to be closely involved in the project.

Another focus of division collaborative efforts in Haiti is the Hôpital Universitaire de Mirebalais (HUM). In partnership with Haiti's Ministry of Health, HMS, and other partners, division faculty work with PIH and ZL to provide care and medical education at the hospital in Mirebalais. HUM serves as a regional referral facility and teaching hospital that grew from the near-destruction of Haiti's main teaching hospital in Port-au-Prince in the devastating 2010 earthquake. The 300-bed hospital offers services never before available at a public hospital in Haiti, including computed tomography (CT) scans, advanced surgical care, and endoscopy. HUM has a 24-hour emergency department, a women's health clinic, general medicine clinic, infectious diseases clinic, and specialty clinics for orthopedic surgery, general surgery, non-communicable diseases (NCDs), mental health, internal medicine, pediatrics, urology, oncology, and ear, nose, and throat (ENT) care. A neonatal intensive care unit opened in 2013. Clinical services are supplemented by pharmacy, radiographic services, and clinical laboratories, and the hospital is staffed by over 800 people.

Liberia

Founded by division faculty member Dr. Raj Panjabi and other survivors of Liberia's civil war, Last Mile Health (LMH) is a nongovernmental organization committed to saving lives in the world's most remote villages. Working in outlying jungle communities cut off from even basic health services, LMH is building a health system that reaches everyone – by bringing healthcare to villagers' doorsteps. LMH trains community members to be health practitioners for their villages and then connects them with rural health clinics to offer every person access to the care they deserve. These frontline health workers (FHWs) are able to prevent, diagnose, and treat the ten most life-threatening health conditions.

In light of the ongoing EVD epidemic in Liberia, LMH is implementing infection prevention and control mentorship and support services to each of the 18 health facilities in Grand Gedeh County, and will ensure an FHW is recruited, trained, and supported in every community within each facility's catchment area, for a total of 264 communities and 400 FHWs.

At the national level, LMH will be providing technical support to the Ministry of Health and Social Welfare (Ministry) in Liberia to marshal a comprehensive EVD outbreak and transition response that strengthens the health system. Under the leadership of the Ministry, and in coordination with other partners, LMH will support national plans to strengthen community health systems and to help deploy FHWs in remote communities across Liberia. In addition, LMH is working with PIH to achieve universal access to critical EVD and primary care services. To date, PIH has committed to the staffing and management of multiple EVD treatment units in southeastern Liberia to serve as regional referral centers.

Lesotho

In 2006, building on extensive experience in Haiti and Rwanda, division faculty and PIH launched their second project in Africa, in the nation of Lesotho, in partnership with Lesotho's Ministry of Health. Division efforts in Lesotho, in collaboration with

Partners in Health-Lesotho (PIH-L), focus on bringing HIV/AIDS care and treatment and other health and support services to poor, rural communities in remote mountain villages that are difficult to reach and have been largely neglected. Since 2009, the work has expanded to seven mountain clinics across four districts of Lesotho, serving over 120,000 people. Since the start of the project, PIH-L has tested and counseled over 125,000 people and made anti-retroviral drugs accessible for all HIV patients who need them.

In recent years, the project has focused increasingly on reducing the high rates of maternal and child mortality observed in these remote mountain communities offering community-based and fully integrated health services. In 2009, with support of division faculty, PIH-L began a project to increase services to pregnant women. In consultation with the villages, PIH-L has since selected and trained former traditional birth attendants – as clinical-affiliated maternal health workers, responsible for accompanying women in their villages to the health center for antenatal care, delivery services, postnatal care, and family planning services provided by a skilled nurse-midwife. In 2011, the project began active outreach to all villages in the catchment area to identify and enroll all children under age five in services, delivering immunizations as well as screening, testing, and treatment for malnutrition, HIV, and TB. Additional success markers include increases in facility-based births where maternal mortality was significantly reduced, increase in family planning visits, and reduction in neonatal deaths and under-5 deaths.

In 2013, the government of Lesotho, impressed with the results of the PIH-L program, began working to develop a plan to scale up this model for care throughout the country. In particular, the goal of this model is to provide high-quality, accessible care to the most vulnerable (women and children) in the rural areas of Lesotho.

Beginning in 2014, PIH-L began providing operational support to the Ministry of Health to implement National Health Reform through a three-phased process over five years. To date, PIH-L has assisted in training village health workers in the four districts.

PIH accompanies the Ministry in scale up; implements training, supervision, and data collection; monitoring and evaluation; and local capacity building.

Madagascar

Division faculty member Dr. Michael Rich has established health system strengthening efforts in the Ifanadiana district of Madagascar through the global health nongovernmental organization PIVOT. The mission of PIVOT is to work in partnership with communities and to combine accessible and comprehensive healthcare delivery with rigorous scientific research saving lives and breaking cycles of poverty and disease. Under Dr. Rich's leadership, PIVOT is providing an evidence-based, research-supported health system model for rural Madagascar. PIVOT collaborates directly with Madagascar's Ministry of Health (Ministry) to develop health centers, a district hospital, and community resources. PIVOT also engages in poverty-alleviation initiatives, conducts monitoring and evaluation of health system strengthening activities, and supports research.

During the last year, the PIVOT team launched efforts in four health centers and the district and referral hospitals, serving a population catchment of 65,000 people. PIVOT created the district's first-ever ambulance-referral system, which refers patients from communities to health centers and hospitals. In addition to facility renovation, personnel training and supervision, PIVOT has implemented a financial system to provide essential medicines and supplies at no cost to patients. Consultation rates in these health centers have more than tripled since beginning these efforts, and PIVOT is engaged in joint recruiting with the Ministry to bring all supported facilities to norms and keep them fully staffed and properly trained.

PIVOT has initiated a full-scale monitoring and evaluation system to inform and complement its research agenda while generating information for dissemination on best practices in global health delivery. The dashboard integrates Ministry facility data and tracks health system and intervention outputs and its impact in real time.

Malawi

In January 2007, at the invitation of the Ministry of Health in Malawi (Ministry), division faculty and PIH began working in Neno, Malawi. Malawi is the world's fourth-poorest country and also has one of the world's highest mortality rates at 55 years of age. This country of 16 million has one of the world's highest prevalence rates of HIV/AIDS (11%). Malawians also have one of the highest ratios of maternal mortality globally – an estimated 680 maternal deaths per 100,000 live births.

Division faculty are committed to strengthening the health system and improving outcomes in Malawi. The Malawi project, called Abwenzi Pa Za Umoyo (APZU), has made significant progress in Neno since its launch. Within the first few years, both a district hospital and a community hospital were constructed. Today, APZU supports healthcare delivery at these hospitals, as well as at 11 health centers. In 2013, the first-ever surgical suites were opened at both hospitals. In 2014, the hospital began operating the only publicly available oxygen plant in Malawi, and a 70-bed maternity ward opened in early 2015. Additionally, early 2015 saw the opening of Dambe Health Center, a facility serving one of the most remote areas of Malawi. With the help of division faculty, APZU supports the Ministry in running 13 HIV clinics, with over 6,000 HIV patients actively enrolled. The HIV program offers comprehensive treatment including nutritional support, socioeconomic support for the most vulnerable patients, and a network of over 923 CHWs to provide accompaniment to all HIV patients. Due to the comprehensive and decentralized HIV program, the APZU's survival and retention numbers are some of the best in Malawi.

Given the strength of the HIV model, currently the APZU team is working with the Ministry to integrate care for HIV and common noncommunicable diseases, initiating an "integrated chronic care clinic" that will combine the current HIV, TB, chronic care, and palliative care clinics into one model for comprehensive primary care at all health facilities in Neno. Patients with Kaposi's sarcoma (KS) continue to receive chemotherapy and palliative care at Neno District Hospital, through an innovative program supported

by the division and the Dana-Farber Cancer Institute (DFCI), which is the only provider of second-line chemotherapy for KS in Malawi. In addition, APZU is shifting its CHW program to support broader health issues in the district. Kicking off this effort is a maternal health focus, and CHWs are currently being trained to work with pregnant women in the community and accompany them to health facilities for prenatal care and delivery. Learning from Lesotho's experience, this project is supported by the construction of maternal waiting homes at two health facilities. APZU is focusing on building the next generation of healthcare providers by developing Neno as a rural primary care training site. This year saw the first cohorts of Malawian medical students rotating in Neno for their family medicine electives.

Mexico

In 2011, division faculty helped to launch Partners in Health/Compañeros En Salud (PIH/CES), a sister organization of PIH. Under leadership including division faculty members Drs. Daniel Palazuelos, Hugo Flores, and Patrick Elliott, PIH/CES revitalizes rural government clinics in the Sierra Madre de Chiapas – one of the most marginalized regions in the country – to transform health outcomes and clinician education.

While Mexico's health system has been celebrated for reaching near "universal coverage" by expanding government health insurance, accessing high-quality care remains elusive for the rural poor. In partnership with the Ministry of Health, PIH/CES currently operates in ten rural, public clinics providing over 30,000 patient consults yearly to vulnerable people who previously had no reliable health services. PIH/CES designed this service footprint as a learning laboratory for effective and innovative primary care methods. Among the notable results to date, the organization has surpassed national benchmarks in chronic disease detection and outcomes, and pioneered rural access to mental healthcare; for example, in any one of the 10 communities, CES records show that all known hypertensive patients have been diagnosed and up to 80% are on treatment and clinically controlled.

PIH/CES also educates Mexican and international medical trainees in global health delivery, both in the classroom and in the field. PIH/CES recruits top Mexican social service physicians to participate in a career-defining training experience so that they will be “agents of change” in creating a more equitable health system. They receive an accredited certificate course in global health equity, monthly onsite supportive supervision, and intensive mentorship from visiting residents. The majority of PIH/CES social service graduates to date have continued in global health, either pursuing graduate education, joining PIH/CES as a manager, or joining another global health group. PIH/CES offers elective rotations and in-depth collaborations for international medical residents and attending physicians.

PIH/CES is also spearheading high-impact implementation research that builds Mexican research capacity and tests clinical innovations with relevance across Mexico. The site has established a research committee that promotes equitable access to research leadership opportunities for staff, and mentorship in all aspects of the research process. As of spring 2015, the site is managing a pipeline of four potential investigations, three ongoing research investigations, and three concluded studies in manuscript.

Nepal

Division faculty member Dr. Duncan Maru co-founded Possible, a nonprofit healthcare entity in rural Nepal that offers high-quality, low-cost healthcare integrating government hospitals, clinics, CHWs, and referral care. The organization's innovative public-private partnership leverages the Nepali government, external development partners, and philanthropic funds to deliver durable healthcare to one of the poorest regions in South Asia.

Since its founding in 2008, Possible has treated over 275,000 patients. These patients walk an average of five hours to receive care and make on average \$332 USD per year. This past summer, a five-year contract was signed with the Nepali government so that Possible can continue delivering care within its infrastructure. The contract was accompanied by a

\$1M USD matching agreement to expand Bayalpata Hospital into a rural teaching hospital.

Dr. Maru was recently awarded a five-year “high-risk high-reward” grant by the National Institutes of Health (NIH) to further develop an implementation research program through his Healthcare Systems Design Group. Global health equity residents Drs. Dan Schwarz and Ryan Schwarz, together with other research team members, have recently published a study on strengthening Nepal's Female Health Volunteer Network.

Peru

Socios En Salud (SES) is the division's partner organization in Peru. SES focuses on patient care and clinical research. SES delivers multiple allied community-based projects centered on mental health, child development, and micro financing in a number of impoverished communities in Lima and Pisco/Chincha. SES collaborates with the division and the DGHS at HMS on research funded by NIH and other agencies. Areas of focus include TB, HIV, infection control, maternal health, and early child development. With support from HMS, SES has implemented a research core to evaluate incoming research proposals for their relevance to the SES strategic priorities, potential impact on the populations served, and the impact on capacity building at the site.



Mobile Clinic, Carabayllo District, Lima, Peru
Photo by William Castro Rodriguez/Socios En Salud

Current work builds on the division's longstanding relationship with SES, facilitating the change of the World Health Organization (WHO) standards for treatment of multidrug-resistant tuberculosis (MDR-TB) using second- and third-line drugs. In 1996, with SES support, the Peruvian Ministry of Health expanded MDR-TB treatment and care to hundreds of patients throughout the country, and today focuses on the management of MDR-TB as well as patients with extensively drug-resistant tuberculosis (XDR-TB).

Russia

From a base in Tomsk Oblast, Siberia, division faculty and PIH have been working since 1998 in collaboration with the Russian Ministry of Health to combat one of the world's most severe epidemics of MDR-TB. The project has focused on improving clinical services for MDR-TB patients in Tomsk, while undertaking training and research to catalyze change in the treatment of MDR-TB across the entire Russian Federation. Key components of the clinical effort include improving diagnostics in order to detect cases earlier, developing a comprehensive strategy to strengthen the adherence to treatment among patients, and enhancing infection control in hospitals.

In the fall of 2014, division faculty conducted a four-day training in Tomsk, “DR-TB Patient Management, Experience from the Last Decade: Challenging Patients, Effective Approaches, New Drugs.” Later that fall, a major conference in Dubai, UAE, “Stemming the Tide of DR-TB: Best practices from GFATM TB grants in Eastern Europe and Central Asia,” included multiple presentations by division faculty and Russian colleagues. Decreasing transmission of TB through early diagnosis, separation, and timely treatment in congregate settings – known as the FAST strategy – was the focus of one session. It was reported that after implementation of this strategy in the Voronezh and Vladimir Oblasts of Russia, a decrease in disease transmission in closed TB institutions was observed.

Rwanda

In 2005, division faculty and PIH launched their first project in Africa through an innovative partnership

with the Rwandan Ministry of Health, the Global Fund to Fight AIDS, Tuberculosis, and Malaria, and the Clinton Health Access Initiative (CHAI). Together with PIH's Rwandan sister organization, Inshuti Mu Buzima (IMB), the project has brought high-quality healthcare to three rural districts that previously had some of the country's worst health outcomes. Working closely with the Ministry of Health, the project provides direct services to a population of over one million people at three hospitals and 45 health centers, with the help of approximately 7,200 CWHs.

With funding from the Jeff Gordon Children's Foundation and technical assistance from the Dana-Farber/Brigham and Women's Cancer Center (DF/BWCC), the Rwandan Ministry of Health (Ministry) and IMB opened the Cancer Center of Excellence at Butaro Hospital (CCEBH) in 2012.

Building on IMB's previous work in diagnosing and managing chronic conditions such as HIV and tuberculosis, IMB has continued to develop an innovative platform for delivery of services for noncommunicable diseases (NCD), such as hypertension, heart failure, diabetes, chronic respiratory diseases, and cancer. Led by division faculty members Drs. Neil Gupta and Paul Park, IMB is supporting a scale up of district hospital based NCD services throughout the country. The CCEBH serves as a national referral facility, offering preventive care, pathology-based diagnosis, chemotherapy, surgery, referral for radiotherapy, and palliative care, as well as social and economic support. IMB supports the Ministry with national policy and implementation, and seeks to translate policy successes via NCD Synergies, a collaboration of African countries supporting NCD policy and innovation, established by division faculty member Dr. Gene Bukhman. In 2015, the CCEBH's services expanded through the Butaro Ambulatory Cancer Center, a facility newly built through support from the Cummings Family Foundation.

IMB has also made gains in the quality of care delivered by nurses, who provide the majority of primary care in rural clinics throughout Rwanda. Initiated in 2010, the Mentorship, Enhanced

Supervision, and Quality Improvement (MESH-QI) Program aims to improve quality of care through intensive training, mentoring, and supervision of health center nurses across many types of care. The Rwandan government, with the support of IMB mentors, has scaled the program across the country in the areas of HIV/AIDS, maternal, neonatal, and child health (MNCH), and NCDs, and IMB has supported implementation across PIH sites globally.

In the area of MNCH, the Ministry and IMB have prioritized innovations in improving neonatal survival. Division faculty member Dr. Hema Magge has led a team at IMB to develop innovative neonatal care units, including the introduction of bubble continuous positive airway pressure, at several rural district hospitals, and to design National Neonatal Care Protocols to guide the care of newborns across the country. Furthermore, IMB successfully concluded the intensive phase of the All Babies Count Initiative, a combined clinical mentorship and quality-improvement approach at all health system levels, which resulted in a 33% reduction in neonatal mortality. With support from the USAID "Saving Lives at Birth" program, this model will be scaled to eight additional catchment areas in the coming year.

In a training initiative made possible through the division partnership, IMB's Center for Training and Operational Research in Rwinkwavu hosted a third session of the HMS course in Global Health Effectiveness in March 2014. Global health leaders from across Rwanda and the U.S. gathered to learn from each other and leading academics from Harvard University and the Rwandan Ministry of Health. Division faculty based at IMB continue to host, train, and mentor visiting BWH internists, pediatric fellows from Boston Children's Hospital (BCH), residents from the BWH Howard Hiatt Residency in Global Health Equity, and HMS students.

The Human Resources for Health (HRH) Program, launched by the Government of Rwanda in 2012 with support from division faculty, entered its fourth year of successful training future specialists in the country. BWH and HMS are partners in a consortium of 23 U.S. universities and academic medical centers

participating in the program, which aims to support Rwanda's growing medical and educational capacity and help establish a world-class, self-sustaining national healthcare system. Division faculty, led by Dr. Corrado Cancedda with support from Drs. Devon Hale, Marla McKnight, and Gene Bukhman, helped to conceptualize and implement the HRH Program.

Division and other U.S. faculty members are working with local institutions, colleagues, and trainees to train the next generation of doctors, clinicians, medical educators, nurses, and midwives across the main specialty and subspecialty areas over the course of seven years.

Sierra Leone

Under the leadership of Dr. Corrado Cancedda, PIH trained and deployed over 200 expatriate doctors, nurses, and other professionals. PIH hired approximately 2,000 Sierra Leone nationals, including EVD survivors, as support staff, community health workers, and orphan caregivers.

The Global Health Delivery Project

The Global Health Delivery Project (GHD), under the leadership of Dr. Rebecca Weintraub, is based at BWH and HMS. GHD is generating new knowledge and professional networks in healthcare delivery through research, education, and virtual collaborations. GHD's web-based platform, GHDonline, comprises professional virtual communities designed specifically for global health professionals worldwide. GHDonline now hosts nearly 16,500 members representing over 5,100 organizations from 185 countries. Members engage across 14 public and over 100 private communities of practice, each of which is focused on a common challenge in healthcare delivery and guided by one of 30 expert moderators. The most recent community was opened in September 2014 to support our members and colleagues responding to the EVD epidemic in West Africa.

GHDonline continues to partner with UpToDate, a leading, peer-reviewed, clinical-information resource. Through this partnership, GHD manages the UpToDate International Grant Subscription Program on

GHDonline and has provided over 1,200 free UpToDate subscriptions to over 500 institutions in 95 countries.

GHD's library of more than 30 teaching cases and companion teaching notes explore how leaders implement value-based principles. In 2014-2015, GHD developed six new cases and accompanying teaching notes. In 2014, the cases were downloaded over 4,000 times in 120 countries.

EDUCATION

The division is committed to the education and training of future physicians through the Doris and Howard Hiatt Residency in Global Health Equity at BWH, residencies, and administrative fellowships at our partner site Hôpital Universitaire de Mirebalais (HUM) in Haiti, collaborations in education with colleagues at sites globally, and through courses, cases and online communities.

The Doris and Howard Hiatt Residency in Global Health Equity

With a commitment to increasing the number of young physicians who aim to dedicate their careers to improving health of impoverished people in the U.S. and abroad, the division, the Department of Medicine, and BWH created a unique residency program to address this growing interest. In 2004, The Doris and Howard Hiatt Residency in Global Health Equity and Internal Medicine was established as a comprehensive program that includes training in internal medicine, coursework in research methods, public policy, global health advocacy, and research and patient care experiences in impoverished settings at PIH sites around the world. The program adds an additional training year to traditional Medical and Med-Peds residencies. The residency program honors division co-founder Dr. Howard Hiatt and his late wife, Doris.

Residents in the program maintain a demanding training schedule in Boston and are engaged in lifesaving efforts around the world. Their projects target the deadliest treatable diseases – AIDS, TB, and malaria – in some of the world's poorest countries.

The GHD team works with The Commonwealth Fund to crowd source, discuss, and evaluate breakthrough opportunities in healthcare involving health IT to support patient engagement and innovative incentive models. GHD has also received support from the Bill & Melinda Gates Foundation to host a virtual expert panel on expanding access to global diagnostics, which has generated significant interest and engagement from the community.

Response to the residency has been enthusiastic, attracting attention from universities and teaching hospitals throughout the world. Interest among young physicians is strong, and program enrollment has grown from two residents in 2004 to 14 in 2014. To date, of the 39 graduates of the residency, 85 percent have built careers in global health, while others have focused on primary care, health policy, research, and innovation in care delivery.

Accomplishments of recent residents include:

- Improving district-level health services in a rural district of Malawi
- Improving healthcare delivery in a district hospital in rural Nepal
- Co-directing medical services across three districts in Rwanda
- Training community health workers in Chiapas, Mexico
- Helping support the Ministry of Health for Guinea
- Developing and implementing oncology treatment protocols in rural Rwanda
- Documenting successful efforts in Haiti and Rwanda to prevent the transmission of HIV from mother to child
- Building a graduate medical education program in Haiti, in collaboration with the Haiti Ministry of Health

- Strengthening a community health worker program in Navajo Nation
- Assessing health service coverage in Liberia
- Developing protocols for Ebola-treatment units
- Education Initiatives at Hôpital Universitaire de Mirebalais

Over the past 30 years, the affiliation among BWH, PIH, and HMS has leveraged expertise and resources to establish training programs for Haitian health professionals to generate new knowledge in care delivery health-system strengthening and implementation. At the core of these training and research collaborations is the goal of strengthening health-service delivery for poor and underserved patients.



Dr. Dan Palazuelos with trainees in the Introduction to Social Medicine course, Chipas, Mexico.

Photo by Cecille Joan Avila/Partners in Health

Education Initiatives at Hôpital Universitaire de Mirebalais

Dr. Michelle Morse serves as deputy chief medical officer at HUM and has been instrumental in the implementation of the residencies offered at HUM, which include general surgery, internal medicine, obstetrics, and pediatrics. In 2014, the country's first emergency-medicine residency program was launched with collaboration from the division and BWH faculty members Drs. Shada Rouhani and Regan Marsh. Emergency medicine is a new specialty in Haiti, and the residency will save lives and impact patient care in dramatic ways, ideally expanding these critical skills across the country.

Dr. Morse leads the HUM Department of Medical Education and Research to standardize academic training across HUM, as a leading facility for training and research for the country. Her department seeks to train an adequate number of Haitian health providers dedicated to vulnerable rural populations and to establish a locally relevant research strategy that promotes Haitian-led research in health systems strengthening, implementation science, and clinical care.

In 2015, the division launched the David Walton Administrative Fellowship to develop the managerial and leadership skills of healthcare administrators working at PIH Haiti. In its first year, two members of ZL's finance team spent six weeks in Boston rotating through BWH and Partners HealthCare departments to gain a rich understanding of the functional areas and operations that might be transferable to their own. The fellowship will culminate with a month spent in Boston to develop a capstone project that is authentic and practical, while building internal administrative leadership capacity.

University of Global Health Equity – Rwanda

Dr. Peter Drobac leads efforts to establish the University of Global Health Equity (UGHE) in Rwanda. UGHE is a private institution designed to leverage expertise and resources from the government of Rwanda, BWH leadership, HMS, and key partners to create a forum for delivery-focused teaching, research, clinical care, and implementation.

UGHE's academic programs aim to harness the best ideas in higher education and integrate cutting-edge technology platforms with immersion in complex healthcare delivery systems. Programs will be fundamentally rooted in innovative pedagogy, with a focus on team-based and problem-based techniques, and will train the next generation of African and international leaders. International and local experts in global health delivery, including DGHE faculty Drs. Joseph Rhatigan, Joia Mukherjee, Michelle Morse, and others, will teach UGHE's first courses. UGHE enrolled students in its first academic degree program in September 2015.

Center for Global Health Delivery – Dubai

Dr. Salmaan Keshavjee led efforts to develop the Harvard Medical School Center for Global Health Delivery Dubai, which will house research for delivery methods of healthcare treatment. The center will focus on the Middle East region and North Africa, as well as projects in India, Pakistan, Indonesia, and other places that have large populations of people working in the United Arab Emirates. Dr. Keshavjee will direct the center, which will work with care providers and academics to conduct research on how they can optimize systems for care delivery, and improve their treatment delivery and patient outcomes. The center, located within the Mohammed Bin Rashid Academic Medical Center in Dubai Healthcare City, will also facilitate research opportunities for faculty, HMS students, and Harvard undergraduates.

Global Health Delivery Intensive Course

The Global Health Delivery Intensive Summer Program is a concentrated three-week session with classes in epidemiology, management science, and healthcare delivery. Now in its eighth year, the program has trained over 250 practitioners from around the world and serves as the foundational course to a two-year Master's of Medical Science in Global Health Delivery at HMS. The 2015 cohort included 43 students representing 16 countries, and diverse professionals including clinicians and providers, managers, supply chain and logistics professionals, and medical students.

RESEARCH

Among the tenets of the division's mission is to address inequalities in disease burden and treatment outcomes through research. Research activities range broadly, from HIV/AIDS and multi-drug-resistant TB, to cholera vaccines, surgery, cardiology, health system benefits of community health workers, school-based community trials, and high-tech innovations in remote rural settings, all as they relate to poverty and health. The division has seen growth in cross-disciplinary, biosocial research on diseases of the poor; in AY15 total divisional research expenditures exceeded \$10M.

Tuberculosis

The division has an active TB research program focused on optimizing treatment outcomes in patients with multidrug-resistant tuberculosis. This ongoing work is a collaboration with PIH and the DGHSM at HMS. Division faculty Drs. Salmaan Keshavjee, Mercedes Becerra, Carole Mitnick, Michael Rich, KJ Seung, Joia Mukherjee, Serena Koenig, Sonya Shin, Dylan Tierney, and Ed Nardell are conducting retrospective studies that apply novel analytic methods to clinical data from Peru, Russia, and Haiti. This group has produced multiple peer-reviewed publications that provide evidence that patients with MDR-TB who receive at least five likely effective drugs have significantly lower risks of death and recurrence, and significantly speedier response to therapy, compared to patients who receive less than five likely effective drugs. This group of investigators is also engaged in translating these results into practice through active participation in numerous global technical, policy, and program advisory boards.

Dr. Megan Murray completed an NIH-supported project that links three different studies focused on drug-resistant tuberculosis and one on the epidemiology and transmission dynamics of MDR/XDR tuberculosis in Lima, Peru, in collaboration with Dr. KJ Seung. Division faculty, Socios En Salud, and the Harvard T.H. Chan School of Public Health (HSPH) embarked on this research project to evaluate the risk of infection in people exposed to different strains of TB in order to inform new

strategies to reduce the spread of the disease. This landmark study, which included over 4,500 patients and 14,000 of their household contacts, was completed in August 2014; results are forthcoming. While this study was underway, SES erected a state-of-the-art biosafety level-3 (BSL-3) laboratory, now certified both nationally and internationally. The BSL-3 laboratory supports research protocols, including the HiRIF study (a Trial of High-Dose Rifampin), the Center of Excellence for Translational Research (CETR) on the integrated discovery and development of innovative TB diagnostics, the Opti-Q study (Study Levofloxacin for the Treatment of MDR-TB), and the NIH-Fogarty-funded study seeking innovative interdisciplinary approaches for infection control and TB risk reduction in hospitals in Lima. In addition, Dr. Murray received two major NIH grants totaling more than \$45M for work in Lima. Dr. Murray was the sole principal investigator (PI) on a five-year grant based at the CETR at HMS, and is focused on developing TB diagnostic tools for MDR and childhood TB. A seven-year grant based in the Division of Rheumatology, Immunology, and Allergy with co-Principal Investigator Branch Moody is focused on lipidomic, immune, metabolic, and allelic determinants of TB risk.

Drs. Rich and Seung are co-leaders in an innovative effort to expand access to new TB drugs, called endTB. endTB is a four-year, \$60M grant funded by UNITAID to find shorter, less toxic, and more-effective treatments for multidrug-resistant TB (MDR-TB), through expanded access and analysis of two new anti-TB drugs, bedaquiline and delamanid. endTB is a collaboration between PIH, Médecins Sans Frontières, and Interactive Research and Development (IRD). The project will include a large observational study to generate evidence on the use of the drugs, trainings to build clinical and programmatic capacity at the country level, and advocacy at the global level to change WHO recommendations around the use of bedaquiline and delamanid. Ultimately, endTB aims to reshape the market for MDR-TB treatment by discovering an effective, shorter, and more user-friendly treatment regimen.

Dr. Shin and SES are in the final year of the Community-based Accompaniment with Supervised Antiretrovirals (CASA) project, which is exploring the use of the directly observed treatment short-course (DOTS) framework for HIV patients living in extreme poverty in the outlying communities of Lima. Also NIH-funded, this study follows 356 patients receiving community-based accompaniment and support to gain independence of the management of their disease and improve their long-term antiretroviral drug adherence and well-being. Health promoters, health professionals, and treatment supporters are being interviewed to understand the benefits of directly observed therapy with highly active antiretroviral therapy (DOT-HAART) and expected findings to include improved HIV outcomes, increased drug adherence, and psychosocial and socioeconomic stability are among the cohort. Now in its 18th year, the division faculty, SES, and HMS partnership is stronger than ever and has developed a robust and sustained research infrastructure supporting epidemiological, clinical, and psychosocial interventions.

In Russia, studies led by Dr. Keshavjee focus on treatment outcomes, risk factors for treatment failures, and community-based care-delivery models. Recent publications describe the role of alcohol use in patients with MDR-TB and hepatotoxicity related to treatment.

In South Africa, Dr. Nardell continues his work at the experimental Airborne Infection Research (AIR) facility in Witbank to study innovative inter-disciplinary approaches to sustainable airborne infection control, based upon a human-to-guinea pig transmission model. In 2015, he completed a study, funded by the Bill & Melinda Gates Foundation, that used the natural-transmission model to test Bacillus Calmette-Guéri immunization as a prototype vaccine in guinea pigs infected with MDR-TB to determine if it can significantly prevent infection and/or TB disease progression.

Dr. Nardell's current projects, supported by the National Institute for Occupational Safety and the NIH/Fogarty Center, focus primarily on ultraviolet germicidal irradiation (UVGI). His upper room UVGI work led to the proposal of new application

guidelines for dosing upper room UVGI in hospitals, clinics, and other facilities, taking into account for the first time the actual UV output of fixtures. An existing commercial lighting computer-assisted design program has been adapted to UV use and is now available free to anyone in the world wanting to use evidence-based dosing of upper room UV air disinfection. This work was the basis for an international conference in Washington, D.C., in May 2015, which produced a draft of international guidelines for the design, development, use, and maintenance of UVGI in resource-limited settings.

Human Immunodeficiency Virus

The division's HIV research agenda spans multiple countries and sites with a common theme of improving care to those with the least access and greatest need.

In Haiti, Dr. Louise Ivers is completing an NIH-funded study that assessed the impact of a pilot nutritional intervention on HIV-positive individuals, and Dr. Serena Koenig is the primary investigator for an NIH-funded randomized trial evaluating the effectiveness of same-day HIV testing and treatment, compared to standard care. Dr. Koenig is co-investigator for a proposal to improve the management of depression among HIV-infected patients. Dr. Koenig, along with division colleagues, has also demonstrated that HIV outcomes have improved over time, while treatment costs have significantly decreased. In addition, she has evaluated the impact of gender on HIV treatment outcomes, and evaluated the rates and risk factors of attrition at every step from HIV testing to antiretroviral-therapy initiation.

Dr. Sonya Shin and SES colleagues in Peru continued their collaboration with investigators at HSPH, HMS, and Tulane University to complete a five-year NIH-funded cluster randomized trial of CASA. The goal of the study is to assess the impact of community-based direct supervision of antiretroviral therapy in Lima, Peru, in terms of clinical outcomes, social capital in the community and health utilization.

In Lesotho, Dr. Hind Satti is studying the diagnosis and outcomes of patients co-infected with HIV and MDR-TB.

In Rwanda, Dr. Michael Rich and several division colleagues have studied HIV treatment programs and their outcomes, including clinical outcomes and high retention in care among adults in a community-based HIV treatment program in rural Rwanda; clinical outcomes of a comprehensive, integrated program for HIV-exposed infants; a three-year experience promoting HIV-free survival in rural Rwanda; and improved retention associated with community-based accompaniment for antiretroviral-therapy delivery in rural Rwanda. In 2013, Dr. Rich, in collaboration with Doctors Without Borders, published a 300-page book, part of a clinical guideline series, that addresses drug-susceptible TB, MDR-TB, TB/HIV and TB of all forms in children.

Domestically, Dr. Bisola Ojikutu's research focuses on the challenges faced by at-risk women and immigrant populations. She recently completed a large, cross-sectional study to determine barriers to HIV testing among black U.S.-born and non-U.S.-born individuals in Massachusetts. Internationally, she has worked extensively throughout sub-Saharan Africa developing programs to improve health systems and is the founder of the Umndeni "Family" Care Program, which promotes HIV testing and linkage to care in rural South Africa.

Cholera

Cholera has presented a persistent humanitarian crisis in Haiti since October 2010, having infected more than 700,000 people, and claiming the lives of nearly 10,000. PIH continues to provide urgent care, treatment, and prevention activities in response to the widespread cholera outbreak. Dr. Louise Ivers currently works with a team from PHS and HMS on several NIH-funded studies related to the epidemiology of cholera in Haiti, and the use of oral cholera vaccine. These include a case control study to evaluate the field effectiveness of oral cholera vaccine piloted in the Artibonite and expanded in the Central Plateau. Dr. Ivers also is engaged in several studies on immune responses in vaccinated Haitians. Using results of her research work, Dr. Ivers is also involved in national and international advocacy efforts to draw continued attention to the cholera epidemic.

She is co-conference organizer of the Coalition for Cholera Prevention and Control. Her research has been disseminated through this forum as well as in peer-reviewed publications. She is part of the WHO's global task force for cholera control that works on updating WHO policy on cholera.

Health System Strengthening

Division faculty are implementing and evaluating health system strengthening programs in rural southeastern Rwanda. Co-led by Drs. Peter Drobac and Lisa Hirschhorn, this multi-year project, the Rwanda Population Health Implementation and Training Partnership, was established in 2009 with support from the Doris Duke Charitable Foundation's African Health Initiative. The partnership endeavors to improve the capacity and performance of the health system in two rural districts with targeted financial and technical investments focused on health centers, coupled with quality-improvement initiatives designed to improve service delivery and to strengthen monitoring and evaluation systems. Aspiring to create a replicable, evidence-based road map for district-level primary healthcare delivery, the partnership has developed an integrated model of implementation, operational research, and impact evaluation to facilitate refinement and rigorous evaluation of the intervention.

Dr. Sonya Shin was awarded support from the Patient Centered Research Outcomes Institute (PCORI) to evaluate the impact of the Community Outreach and Patient Empowerment (COPE) Program in Navajo Nation. COPE is engaged in ongoing qualitative interviews and compilation of content for data analysis as part of its ongoing PCORI-funded grant. The goal of this work is to understand the impact of COPE's standardized trainings on CHRs' self-reported efficacy, clinical teams' coordination and cooperation, patients' ability to make informed healthcare decisions, and better control of their diabetes.

School-based Interventions for Child Health

Dr. Mary Catherine Arbour is committed to reducing disparities and interrupting intergenerational

poverty transmission by designing, evaluating, and disseminating interventions that optimize the healthy development of young children in disadvantaged families. She directs the health component of a randomized controlled trial of a preschool-based child- development intervention in Chile, leading the integration of continuous quality improvement (CQI) methods in an expansion phase of the project to schools serving 10,000 children in two regions of the country. Investigators are examining the impact of intensified case management within schools on outcomes including asthma frequency and school absenteeism. In addition, Dr. Arbour was funded to evaluate the benefits of home visits on early childhood development also in Santiago, Chile.

Dr. Arbour's research methodology is to integrate CQI and traditional research methods to improve the impact of interventions that, despite a strong evidence base in small-scale experiments, often obtain only partial positive outcomes in children's health and development when applied at scale. In the U.S., Dr. Arbour leads the adaptation of quality-improvement methods for the first national quality-improvement collaborative in home visiting (HV CoIN).

Dr. Shin and SES researchers finished piloting a community-based strategy to screen children 6-24 months of age for developmental delay, and deliver early interventions to at-risk children and their parents. Funded by Grand Challenges Canada, this study has involved collaboration with Boston Children's Hospital,



Dr. Paul Farmer, Dr. Raj Panjabi, and Dr. Joia Mukherjee in Zwedru, Liberia as part of the Partners in Health Advance Ebola Response team. Photo by Rebecca E. Rollins/Partners in Health

Boston University's SPARK Center, HMS, and the University of California in San Francisco. This cross-disciplinary team has worked closely with Peruvian colleagues to develop an intervention that is tailored to the local context. Preliminary findings suggest that the community-based intervention (termed "CASITA") improves child development and positive parenting behavior, compared with control families. A grant that seeks matched funding to scale up this project across Carabayllo, Lima, Peru, was submitted in September 2015. They have also begun exploratory qualitative research to understand how community-based early interventions could be potentially adapted and deployed in other PIH sites, including Mexico and Rwanda.

Global Health Economics

Global health economics research in the division focuses on developing research tools to track, measure, and analyze healthcare financing at the individual, local, national, and global levels. The ongoing projects include evaluating the impact of global health aid on health system strengthening and population health outcomes in developing countries at both the macro- and micro-levels, designing and assessing community-based health financing approach in achieving universal health coverage in developing countries, measuring the economic burden of diseases, and developing survey instruments and statistical algorithm to address measurement errors in data. Dr. Chunling Lu collaborates with colleagues at PIH and the DGHSM at HMS to conduct research projects in Rwanda and China. For example, tracking financial data for rural health facilities is difficult in low-income countries and hinders monitoring and evaluation of local health-facility performance. Collaborating with colleagues in the Rwandan Ministry of Health, Dr. Lu's team developed a five-step procedure for gathering quality financial data in rural health centers in Rwanda. This framework will be integrated into the Rwandan national-level health-information system and can be easily adopted for other facilities such as hospitals, pharmacies, and other programs such as curative care and preventive care in other developing countries.

Mental disorders are a leading cause of the global burden of disease, and the provision of mental health services in developing countries remains very limited and far from equitable. Dr. Lu's recent studies are the first to investigate the level and patterns of development assistance for mental health between 2007 and 2013. The study identified the gap between mental health expenditure in low-income countries and the estimated minimum costs for scaling up a basic mental healthcare package. The study delivered a pressing message that mental health should receive more attention from donors and policy makers with emphasis on integrating a basic mental health package into the public health sector.

Ebola Virus Disease

Drs. Ivers and Murray provided direction and support to the Harvard Global Health Delivery Partnership Research Core's (Core) efforts on EVD research. The Core team contributed to the design of a data management system for clinical EVD data, and the design of a study on Ebola survivors. Ultimately, the EVD epidemic was less devastating than had been anticipated and clinical studies were not undertaken. Dr. Ivers also contributed to a forthcoming guideline on the management of EVD that is based on PIH's experience. The team published a major study in the *Lancet* on a new POC EVD Diagnostic and has a second article under review now.

Drs. Mukherjee and Stulac led the division's overall efforts to establish EVD treatment units in Sierra Leone and Liberia. Dr. Cancedda led the implementation of the PIH Ebola response in Sierra Leone by partnering with the Government of Sierra Leone and the Wellbody Alliance to set up and operate 16 EVD health facilities (including a large 100-bed EVD-treatment unit, 12 smaller community care centers, and three hospital-affiliated holding units) in four of the most EVD-affected districts in the country, by launching community-outreach efforts and leveraging a network of 900 community health workers and 800 EVD survivors, and by developing a strategy that will allow PIH to pursue long-term health system strengthening in the aftermath of the EVD epidemic.

Future Directions

The division will undertake the following new and expanded initiatives in the coming academic year:

- Dr. Paul Farmer is completing a book for publication on EVD reflecting his own field work on Health Systems Strengthening Framework.
- COPE will continue to collaborate to improve the lives of Navajo people with additional research funding addressing nutrition as well as chronic diseases. COPE will also continue discussions to expand its successful model of training, education and health systems integration to other underserved tribal (and non-tribal communities) across the U.S. With foundation funding COPE will launch an initiative with the Rosebud Sioux tribe in South Dakota in 2016.
- Dr. Gene Bukhman will convene and lead the Lancet Commission on Non-Communicable Diseases (NCDs) and Injuries of the Poorest Billion with the goal of shifting the global framework of NCDs for those living in extreme poverty. Between 2015 and 2017, the Commissioners will develop this critical report for publication in September 2017. In the intervening years, country leaders and disease experts will collaborate, and commentaries are anticipated in advance of the release of the report.
- In Haiti, division faculty will continue to play a critical role in the planning and implementation of a long-term strategy for strengthening healthcare infrastructure, and provide healthcare and support services to those patients most in need. Focus will increase on collaboration with the government on health system financing and on cost analysis within the ZL system.
- As HUM, the national teaching hospital in Haiti, becomes fully operational, faculty will work towards providing primary care services to a catchment area of 185,000 people in Mirebalais and two nearby communities serving 500-700 outpatients per day. The newest residency programs in obstetrics and gynecology, and emergency medicine, began in October 2014, providing specialty-training programs for Haitian clinicians in an environment that allows them to have the resources they need to provide the highest quality of care possible.
- With funding from the Rx Foundation, GHDonline will develop an information clearinghouse and connection hub where U.S. providers working with underserved populations can learn about innovative care delivery models and discuss timely issues in the field. While historically this knowledge has been disseminated through numerous academic journals and professional society meetings, GHDonline will develop a more open, accessible, and immediate solution. GHDonline will collaborate with professionals – ranging from clinicians and organizational leaders to researchers and policymakers – to share healthcare delivery questions, successes, and lessons learned with each other.
- In Madagascar, PIVOT will continue to track progress closely with its monitoring and evaluation system generating information for dissemination on best practices. PIVOT plans to upgrade the district hospital, expand to more health centers, and launch a comprehensive malnutrition program working at all levels of the health system including with a network of trained community health workers.
- In Malawi, APZU plans the opening of new infrastructure projects, supporting the Ministry of Health in district strategic planning, integrating primary healthcare services, expanding the CHW program, and expanding programs in academic training and mentorship.

- Under the leadership of Dr. Barbara Bierer, the BWH Harvard University Multiregional Clinical Trial (MRCT) Center will be fully integrated into the division in AY16. The mission of the MRCT Center is to improve the design, conduct, and oversight of multi-regional clinical trials, focusing on trials sited in or involving the developing world, simplifying research through the use of best practices, and fostering respect for research participants, efficacy, safety and fairness in trans-national, trans-cultural, human subject research.
- In Haiti, educational initiatives will continue to grow with each of the five residencies enrolling their next classes of students in the Walton Administrative Fellowship and Exchange bringing a second cohort to the division to further build the pipeline of future administrative leaders.
- The division will continue to collaborate on the implementation of human resources for the Health Rwanda Medical Education Initiative alongside the government of Rwanda, PIH, and HMS, to dramatically increase the clinical training of Rwanda healthcare providers and specialists.
- In Rwanda, the UGHE flagship Master of Science in Global Health Delivery (MGHD) degree students will begin coursework in September 2015. Over the coming years, UGHE will add programs in undergraduate medicine, nursing, and dentistry, and graduate programs in veterinary medicine and health management.
- In Dubai, a formal opening will be held in October 2015 at the Center for Global Health Delivery, followed by the development of course content to be taught in part by division faculty.
- The division will expand efforts in continuing medical education (CME). Drs. Morse, Mukherjee, Palazuelos, and Rhatigan are planning the first-ever course, "Understanding Global Healthcare Delivery," to be held in the spring of 2016. Dr. Bourdeaux is planning the CME course "Security Actors and Health Systems in Fragile States."
- With support from NIH/NIAID and the Fogarty Center, Dr. Nardell will examine the impact of a refocused administrative approach to TB infection control in Peru, entitled FAST (Find TB cases Actively, Separate safely, and Treat effectively). Working closely with SES, he will lead a team to oversee implementation of FAST in a large urban hospital in Lima over a five-year period beginning in early 2016. Anticipated outcomes include evaluation of the program implementation experience and measurement of the program's impact upon infection conversion rates.
- COPE will pilot a childhood obesity-prevention curriculum (Happy Homes) in the Eastern Navajo area with preschool children and their parents. COPE will work to start a project funded by Con Alma to set up a community garden to promote intergenerational and crosscultural teachings of food traditions. 🌱

FACULTY ROSTER

Professor

David Bangsberg, M.D.*
 Barbara Bierer, M.D.
 Paul Farmer, M.D., Ph.D.
 Howard Hiatt, M.D.
 Megan Murray, M.D., Sc.D.

Associate Professor

Mercedes Becerra, Sc.D.*
 Heidi Behforouz, M.D.
 Araceli Castro, Ph.D.*
 Theodore Cohen, M.D., Ph.D., D.P.H.*
 Lisa Hirschhorn, M.D.
 Louise Ivers, M.D., D.T.M.H.
 Salmaan Keshavjee, M.D., Ph.D.
 Carole Mitnick, Sc.D.*
 Joia Mukherjee, M.D.
 Edward Nardell, M.D.
 Joseph Rhatigan, M.D.
 Sonya Shin, M.D.

Assistant Professor

Gene Bukhman, M.D., Ph.D.
 Ashwin Dharmadhikari, M.D.*
 Andrew Ellner, M.D.
 Hamish Fraser, M.B.Ch.B.
 Lisa Gruenberg, M.D.*
 Serena Koenig, M.D.
 Chunling Lu, Ph.D.
 Bisola Ojikutu, M.D.
 Michael Rich, M.D.
 Rebecca Weintraub, M.D.

Instructor

Omowumni Aibana, M.D.
 Mary Catherine Arbour, M.D.
 Margaret Bourdeaux, M.D.
 Corrado Cancedda, M.D., Ph.D.
 Chadi Cortas, M.D., Ph.D.
 Lisa Cosimi, M.D.*
 Ranvir Dhillon, M.D.
 Peter Drobac, M.D.
 Patrick Elliot, M.D., D.T.M.H.
 Hugo Flores Navarro, M.D.
 Neil Gupta, M.D.
 Jonathan Iralu, M.D.*
 Helen Jenkins, Ph.D.*
 Fernet Leandre, M.D.
 Hema Magge, M.D.
 Duncan Maru, M.D., Ph.D.
 Marla McKnight, M.D., Ph.D.*
 Michelle Morse, M.D.
 Koji Nakashima, M.D.
 Daniel Palazuelos, M.D.
 Rajesh Panjabi, M.D.
 Jonathan Parr, M.D.*
 Jonathan Quick, M.D.*
 Peter Rohloff, M.D., Ph.D.*
 Hind Satti, M.D.
 Andrew Sechler, M.D.
 Sara Selig, M.D.
 Kwonjune Justin Seung, M.D.
 Sara Stulac, M.D.
 Neo Tapela, M.D.
 Dylan Tierney, M.D.
 David Walton, M.D.
 Emily Wroe, M.D.

Member of the Faculty

Katherine Semrau, Ph.D.

*Connotes secondary appointment in the Division of Global Health Equity

SELECT MAJOR FACULTY ACCOMPLISHMENTS

Mary Catherine Arbour, M.D.

- Speaker, Head Start Research Conference, Washington, D.C.
- Speaker, Fifth National Summit on Quality in Home Visiting Programs, Pew Charitable Trusts
- Speaker, Testing and Learning Innovation Summit, Early Learning Labs
- Speaker, Division of Infancy and Childhood, Ministry of Health, Government of Chile
- Published, "Experimental Impacts of a Teacher Professional Development Program in Chile on Preschool Classroom Quality and Child Outcomes," *Developmental Psychology*

Heidi Behforouz, M.D.

- Published, "Bridging the gap: a community health program saved lives, then closed its doors," *Health Affairs*

Margaret Bourdeaux, M.D.

- Published, "A Cross Case Comparative Analysis of International Security forces' Impacts on Health Systems in Conflict Affected and Fragile States," *Conflict and Health*

Gene Buhkman, M.D.

- Member, Global Coordination Mechanism on NCDs, World Health Organization
- Co-chair, A new Lancet Commission on Reframing NCDs and Injuries of the Poorest Billion
- Published, "Food Insecurity and Non-Communicable Disease among the Poorest," *Food Insecurity and Public Health*.
- Published, "Endemic Diabetes in the World's Poorest People," *The Lancet Diabetes & Endocrinology*

Corrado Cancedda, M.D., Ph.D.

- Published, "Maximizing the Impact of Training Initiatives for Health Professionals in Low-Income Countries: Frameworks, Challenges, and Best Practices," *PLoS Med*

Peter Drobac, M.D.

- Awarded, Marshall A. Wolf Award in Social Medicine and Health Equity, BWH
- Published, "Improving district facility readiness: a 12-month evaluation of a data-driven health systems strengthening intervention in rural Rwanda," *Global Health Action*
- Presenter, The Last Mile in Community Health: Reaching the Hardest to Serve, Aspen Ideas Festival Spotlight Health

Andrew Ellner, M.D.

- Presenter, National Ambulatory Practice Summit, Institute for Healthcare Improvement
- Presenter, Board of the American Academy of Pediatrics
- Published, "Implementation of a collaborative care management program with buprenorphine in primary care: A comparison between opioid dependent patients and patients with chronic pain using opiates non-medically," *Journal of Opioid Management*
- Published, "Health systems innovation at academic medical centers: leading in a new era of healthcare reform," *Academic Medicine*
- Published, "An Integrated Approach to Surgery and Primary Care Systems Strengthening in Low- and Middle-Income Countries: Building a Platform to Deliver Across the Spectrum of Disease," *Surgery*

SELECT MAJOR FACULTY ACCOMPLISHMENTS (continued)

Paul Farmer, M.D., Ph.D.

- Lifetime Achievement Award for Social Entrepreneurship, Forbes 400 Summit on Philanthropy
- "Blessed Are the Peacemakers" Award, Catholic Theological Union
- Participant, Panels, Skoll World Forum
- Published, "Global Surgery 2030: evidence and solutions for achieving health, welfare, and economic development," *The Lancet*
- Published, "The global AIDS response can help in fighting hepatitis C," *The Washington Post*

Hugo Flores Navarro, M.D.

- Published, "Towards la clínica de mis sueños: Findings from a needs and assets assessment among rural nurses in Chiapas, Mexico," *Journal of Nursing Education and Practice*

Lisa Gruenberg, M.D.

- Awarded, Fulbright Senior Specialist Project, University of Melbourne's Rural Academic Center
- Appointed Director, New England Student Conference on Global and Refugee Health, Massachusetts Medical Society

Neil Gupta, M.D.

- Published, "The race to the top initiative: towards excellence in health-care service delivery," *Lancet Global Health*
- Published, "Community-based accompaniment mitigates predictors of negative outcomes for adults on antiretroviral therapy in rural Rwanda," *AIDS Behavior*

Lisa Hirschhorn, M.D.

- Published, "Learning before leaping: integration of an adaptive study design process prior to initiation of BetterBirth, a large-scale randomized controlled trial in Uttar Pradesh, India," *Implementation Science*
- Published, "Going beyond the vertical: leveraging a national HIV quality improvement programme to address other health priorities in Haiti," *AIDS*

Louise Ivers, M.D., D.T.M.H.

- Published, "Effectiveness of reactive oral cholera vaccination in rural Haiti: a case-control study and bias-indicator analysis," *Lancet Global Health*
- Published, "Immunogenicity of the bivalent oral cholera vaccine Shanchol in Haitian adults with HIV infection," *Journal of Infectious Diseases*

Salmaan Keshavjee, M.D, Ph.D.

- Published, "Global financing and long-term technical assistance for multidrug-resistant tuberculosis: scaling up access to treatment," *PLoS Med*
- Published, "Blind Spot: How Neoliberalism Infiltrated Global Health" and "Shifting Gears to Control Drug-Resistant Tuberculosis," *Clinical Infectious Diseases*

Serena Koenig, M.D.

- Published, "CD4 deficit and tuberculosis risk persist with delayed antiretroviral therapy: 5-year data from CIPRA HT-001," *International Journal of Tuberculosis and Lung Diseases*
- Published, "Treating tuberculosis in Haiti in the aftermath of the 2010 Earthquake," *Bulletin of the World Health Organization*
- Published, "Knowledge, attitudes, practices, and beliefs about medical male circumcision among a sample of healthcare providers in Haiti," *PLOS One*

SELECT MAJOR FACULTY ACCOMPLISHMENTS (continued)

Chunling Lu, Ph.D.

- Published, "Tracking rural health facility financial data in resource-limited settings: a case study from Rwanda," *PLoS Med*
- Published, "Assessing Development Assistance for Mental Health in Developing Countries: 2007–2013," *PLoS Med*
- Co-author, "Strengthening Primary Healthcare through Community Health Workers: Investment Case and Financing Recommendations," U.N. Secretary General's Special Envoy for Financing the Health MDGs and for Malaria

Hema Magge, M.D.

- Published, "The Development and Implementation of a Newborn Medicine Program in a Resource Limited Setting," *Public Health Action*
- Published, "Clinical Mentorship to Improve Pediatric Quality of Care at Health Centers in Rural Rwanda: a Qualitative Study of Perceptions and Acceptability of Healthcare Workers," *BMC Health Services Research*

Duncan Maru, M.D., Ph.D.

- Published, "Fixing Healthcare Will Require More than a New Payment System," *Harvard Business Review*
- Awarded, Schwab Global Social Entrepreneur of the Year
- Funded, Robert Wood Johnson Foundation

Michelle Morse, M.D.

- Published, "Defining the future of academic medicine globally: How U.S. Universities should step up to the plate," *Harvard Public Health Review*
- Published, "A needs and resource assessment of continuing medical education in Haiti," *Annals of Global Health*
- Published, "Responsible Global Health Engagement: A Road Map to Equity for Academic Partnerships," *Journal of Graduate Medical Education*

Joia Mukherjee, M.D.

- Published, "The Necessity of Social Medicine in Medical Education," *Academic Medicine*

Megan Murray, M.D., Sc.D.

- Speaker, Bogomolets National Medical University
- Speaker, 19th Annual Conference of the Union-North America Region
- Published, "ReEBOV Antigen Rapid Test kit for point-of-care and laboratory-based testing for Ebola virus disease: a field validation study," *Lancet*
- Published, "Time from infection to disease and infectiousness for Ebola virus disease, a systematic review," *Clinical Infectious Diseases*
- Published, "The epidemiological advantage of preferential targeting of tuberculosis control at the poor," *The International Journal of Tuberculosis and Lung Disease*

SELECT MAJOR FACULTY ACCOMPLISHMENTS (continued)

Edward Nardell, M.D.

- Published, "Institutional Tuberculosis Transmission: Controlled Trial of Upper Room Ultraviolet Air Disinfection - A Basis for New Dosing Guidelines," *American Journal of Respiratory Critical Care Medicine*
- Published, "Rapid impact of effective treatment on transmission of multidrug-resistant tuberculosis," *International Journal of Tuberculosis and Lung Diseases*

Bisola Ojikutu, M.D.

- Heroes in Action Award, AIDS Action Committee Massachusetts
- Appointed, Co-Director Health Equities Scientific Working Group for the Centers for AIDS Research (CFAR), Harvard University
- Speaker, United States Agency for International Development (USAID)
- Published, "The association between quality of HIV care, loss to follow-up and mortality among pediatric and adolescent patients receiving antiretroviral therapy in Nigeria," *PLoS One*
- Published, "Barriers to HIV testing in black immigrants to the US," *Journal of Healthcare for the Poor and Underserved*

Daniel Palazuelos, M.D.

- Co-author, "Strengthening Primary Healthcare through Community Health Workers: Investment Case and Financing Recommendations," UN Special Envoy Office for Financing the Health MDGs and Malaria Report
- Presenter, Global Health & Innovation Conference
- Published, "The Health Implications of Deportation Policy," *Journal of the Healthcare of the Poor and Underserved*



SELECT MAJOR FACULTY ACCOMPLISHMENTS (continued)

Rajesh Panjabi, M.D.

- Speaker, HMS Graduation
- Clinton Global Citizen Award
- World's 50 Greatest Leaders, *Fortune*

Joseph Rhatigan, M.D.

- Published, "Rethinking the social history," *New England Journal of Medicine*

Michael Rich, M.D.

- Chief Editor, "Companion handbook to the WHO guidelines for the programmatic management for drug-resistant tuberculosis," World Health Organization
- Speaker, Union World Conference on Lung Health

Peter Rohloff, M.D., Ph.D.

- Published, "Implications of gender and household roles in Indigenous Maya communities in Guatemala for child nutrition interventions," *International Journal of Indigenous Health*

Sara Selig, M.D.

- Research Award, Shore Fellowship, HMS

Katherine Semrau, Ph.D.

- Keynote Address, Maternal and Neonatal Survival Initiative (MANSI) Summit, American India Foundation

Kwonjune Justin Seung, M.D.

- Published, "Treatment outcomes of patients with multidrug- and extensive drug-resistant tuberculosis according to drug susceptibility testing to first- and second-line drugs: an individual patient data meta-analysis," *Clinical Infectious Diseases*

Sonya Shin, M.D.

- Published, "Time to Culture Conversion and Regimen Composition in Multidrug-Resistant Tuberculosis Treatment," *PLoS One*
- Published, "Validation of 2 Spanish-Language Scales to Assess HIV-Related Stigma in Communities," *Journal of the International Association of Providers of AIDS Care*
- Published, "Low rates of recurrence after successful treatment of multidrug-resistant tuberculosis in Tomsk, Russia," *International Journal of Tuberculosis and Lung Diseases*
- Lecturer, Institute for Healthcare Improvement Conference

Sara Stulac, M.D.

- Published, "Capacity building for oncology programmes in sub-Saharan Africa: the Rwanda experience," *The Lancet Oncology*

Neo Tapela, M.D.

- Published, "Diagnosis of cancer in rural Rwanda: early outcomes of a phased approach to implement anatomic pathology services in resource-limited settings," *American Journal of Clinical Pathology*

Rebecca Weintraub, M.D.

- Associate Director, Harvard Global Health Institute
- Published, "Implementation of electronic medical records requires more than new software: Lessons on integrating and managing health technologies from Mbarara, Uganda," *Healthcare: The Journal of Delivery Science and Innovation*

Courtney Yuen, Ph.D.

- Published, "Global and regional burden of isoniazid-resistant tuberculosis," *Pediatrics*
- Presenter, Union World Conference on Lung Health

