

A Trans-University Center for Global Health

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Abstract

Can the challenge of improving health engage university faculty and students across all disciplines to more deeply understand the world and its people in order to make it a better place? Faculty and staff at the University of Virginia's (UVA) Center for Global Health (CGH) think it can. The authors argue that by working to understand, teach, and improve the human condition, universities *can* engage multiple disciplines, help reverse the "brain drain," and even change perspectives.

The transuniversity Center for Global Health (CGH) at UVA employs three components for addressing global health

issues: (1) *scholars*: sending UVA students abroad to conduct international fieldwork focused on global health, (2) *fellows*: inviting international colleagues selected by collaborating institutions abroad to work and train at UVA and return to become leaders in their home institutions, and (3) *curricula*: supporting and developing global health-related curricula throughout the university.

UVA's CGH is associated with sister CGHs in Fortaleza, Brazil; Hefei, China; Manila, Philippines; Accra, Ghana; and Thohoyandou, South Africa. Work with international colleagues in these centers provides opportunities for bilateral

training of the next generations of leaders in global health around the world.

Universities are uniquely positioned to enlist multiple disciplines to unravel the complex causes of health disparities, sustain international collaborations, and change students' outlook on the world through overseas experiences. A university that actively supports global health becomes increasingly internationalized, grounded in scientific excellence, and committed to addressing the most pressing issues humanity faces today.

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One of the most universal human values is *health*. Health transcends all our cultural, geographic, and political barriers to provide a fundamental base for human dignity. In seeking to understand and address complex global health problems and solutions, at the University of Virginia (UVA) we have

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learned that formulating the right questions is as important as crafting good answers. The following question has served to ground and shape our global health mission:

Can the challenge of improving health engage university faculty and students across all disciplines to better understand the world and its people in order to make it a better place?

We think it can. By doing what universities do (or should do) best, working to understand, teach, and improve the human condition, we argue from experience at UVA, that indeed universities *can* engage multiple disciplines in global health, help reverse the "brain drain" phenomenon that occurs when educated individuals leave their underserved home communities to pursue opportunities in developed nations, and even change who we are.

History

UVA's Center for Global Health (CGH) began in 1978 as the division of geographic medicine in the UVA School of Medicine. Founded by Richard L. Guerrant, MD, its mission was inspired by his personal experience with international health efforts in Congo

in 1967, Bangladesh in 1970 and 1971, and Brazil in 1973, and by encouragement from his mentors. The division of geographic medicine was part of the Rockefeller Foundation's Great Neglected Diseases Network, which launched such units at a dozen top universities in the United States and abroad and was sustained by subsequent UVA School of Medicine deans.

The division of geographic medicine's major focus was to address the diseases of the poor through scientific research collaborations, first in northeast Brazil and subsequently with colleagues in Ghana, the Philippines, China, and South Africa. Guerrant's first faculty recruits to the division helped build collaborations in Brazil at the Universidade Federal do Ceará in Fortaleza, the Universidade Federal do Rio Grande do Norte in Natal, and the Universidade Federal da Bahia in Bahia. These collaborations have been extended with collaborations with the International Centre for Diarrhoeal Disease Research in Dhaka, Bangladesh; with Makerere University in Kampala, Uganda; and with colleagues in Haiti. In 2001, UVA's division of geographic medicine became one of the country's first university-wide centers for global health.

Besides research collaborations, another focus of this early global health work at

UVa was providing opportunities and financial support for international rotations for fourth-year medical students. Starting in 1978, our Dean's Geographic Medicine Scholarship supported two UVa medical students to work abroad; this expanded in 1984 to sending between six and eight medical students each year in a collaborative Health and Human Rights elective with Columbia University. More than 150 fourth-year medical students worked in 23 countries between 1978 and 2000.

Funding for global health research, training, and scholarships during this time came from the Rockefeller, Kellogg, and Clark Foundations and from the National Institutes of Health (NIH) (from the Fogarty International Center for training programs and from the National Institute of Allergy and Infectious Diseases [NIAID] for international collaborative research). UVa's president, provost, and deans also provided support from university funds, and individual donors contributed as well. Since then, the Ellison Medical Foundation, NIH NIAID and Fogarty International Center (FIC) programs, and the Pfizer Foundation have also been critical to sustaining and growing our CGH.

A turning point for UVa's approach to global health education occurred in 2001, when UVa President John Casteen's 2020 Commission envisioned internationalizing the university and recommended that the CGH expand to become university-wide.

A Transuniversity Center Established

Guerrant represented the school of medicine on the 2020 Commission on International Activities, constituted by UVa President John Casteen with representatives from across the university, to recommend ways to internationalize the institution. On the basis of recommendations by several commission colleagues outside the medical school, Guerrant proposed a new focus and mission to inspire and support a broader constituency of university faculty, fellows, students, and outside partners devoted to addressing health disparities globally. Early advocates for a university-wide global health center included the university provost, the deans of the college of arts and sciences and the

schools of nursing and medicine, and faculty from the departments of history, politics, and commerce. The diversity of these academic leaders played a key role in the trans-university foundation of the CGH, and their support allowed it to reach across schools and disciplines to articulate an inclusive definition of global health, one that encouraged participation from all students and faculty at UVa in the complex challenges of improving health around the world.

The programmatic vehicles for putting this vision into action are threefold:

1. *Scholars*: sending UVa students abroad to conduct international fieldwork focused on global health;
2. *Fellows*: inviting international colleagues selected by collaborating institutions abroad to work and train at UVa and then return to become leaders in their home institutions
3. *Curricula*: supporting and developing global health-related curricula throughout the university.

Even as it reaches across the university, the CGH relies on a strong foothold in the school of medicine and is based in the division of infectious diseases and international health within the department of medicine. This base in infectious disease has guided the strategic goals and ideals of the center's research agenda and purpose within the larger academic community of UVa. A strong quantitative and biomedical approach has resulted in an impressive number of publications and NIH-funded research projects, which have supported fellow work at UVa. The inclusion of the second and third programmatic vehicles, scholars and curriculum, has allowed the CGH to reach faculty and students throughout the university by supporting curricular development and student-faculty partnerships for global health fieldwork. The scholar and curricular efforts of the CGH also entail important liaising and communication exchange among global health initiatives which tend otherwise to operate in isolation. For example, although the CGH itself does not offer certificates or degrees in global health, CGH faculty and staff were instrumental in creating a minor in global public health within the college of arts and sciences.

Currently, there are 12 faculty members in our CGH; these faculty members are

physicians and an educator based in the division of infectious diseases and international health. They are joined by 10 adjuncts in fields such as in commerce, obstetrics-gynecology, emergency medicine, and nursing, and more than 120 faculty mentors across the university who have guided CGH scholars.

Changing Who We Are: UVa Student Scholars Working Abroad to Reduce Health Disparities

In our opinion, much of the enormous interest in global health at UVa since establishing the university-wide CGH in 2001 can be attributed to the success of our CGH scholar program. Many new global-health-related courses have been developed, and they are filled to capacity each semester, which suggests that students are hungry to make a difference, learn about health disparities, and contribute in some way toward reducing them. From student scholar feedback, we have learned that new applicants are inspired by their peers' global health initiatives to pursue fieldwork opportunities.

History of the scholar award

In 2001, the first CGH University Scholar Award opportunity was announced. Although the inspiration for this award came from the successful Dean's Geographic Medicine Program, it is a departure from the observational rotations of fourth-year medical students. The CGH University Scholar Awards require the integration of research and service foci into successful, multidisciplinary projects. Students in all schools at UVa are eligible to apply for the CGH University Scholar Awards. The Dean's / CGH Scholar Award in Medicine (the direct descendent of the Dean's Geographic Medicine Awards), also administered by the CGH, continues for fourth-year medical students.

Applying for a scholar award

The design of our CGH scholar award application has been integral both to the increased student interest in global health opportunities that we have witnessed and to the quality and rigor of the student projects that result from the awards. Although there are no academic or experiential prerequisites for application to our scholars program, we do mandate

a multidisciplinary core both to the proposed project and to the student's faculty mentoring team. Students across the university at both the undergraduate and graduate levels are encouraged to take advantage of the international network of established collaborations of the CGH, but projects may be based anywhere, provided there is documentation of strong local support for the student and his or her project. The CGH application requires letters of recommendation from faculty sponsors, a letter of support from the host country sponsor, a detailed project proposal, a detailed budget, documentation of ethics training, and a resume. Once an application is selected for funding, rather than requiring adherence to a predestined framework, each project is executed uniquely with the guidance and support of the award recipient's faculty mentoring team. Applications are reviewed by a selection committee and are rated according to cultural competence, quality of proposed mentoring, and project quality and feasibility. The selection committee comprises CGH faculty, representatives from the international studies office and the institutional review board for social and behavioral sciences, and international faculty at UVa. Two current UVa students also sit on the selection committee; one is a former CGH scholar, and the other is the president of the Global Public Health Society, an undergraduate student club.

Students are required to identify at least one mentor at the project site in addition to two UVa faculty mentors, including one from the student's home department. These student-identified mentors work together to provide key guidance at every level of the project, including logistical support, fieldwork design, and integration of project findings within the student's current academic course at UVa. The mentoring by student-identified faculty members is complemented by the guidance of administrative faculty within the CGH and UVa's international studies office and institutional review boards to ensure successful execution of student projects.

Preparing for the fieldwork experience

Framing each student's fieldwork experience academically and providing adequate counseling, preparation, and debriefing support are intrinsic

components of any scholarship program that sends students abroad to tackle fieldwork, research, and service in an international setting. We have carefully designed rubrics to train and prepare students before departure and to help students deconstruct and understand their experience on their return. We understand that independent student projects can pose significant risk to the student and host country sponsors if not designed or mentored appropriately. Therefore, counseling and advising students about ethical and medical risks and corresponding actions to minimize these risks play a critical part in our scholar program. To this end, we continue to work with faculty and administrators throughout the university to identify and make available appropriate training in cultural competency, ethics, and research design. We are continuing to work to institutionalize curricular opportunities which correspond to these types of student research and service abroad.

Projects in action

Successful proposals have combined research, academics, and service as a means to understand and address a broad array of global health concerns, including HIV/AIDS, women's reproductive health, diabetes, and the effects of political unrest on health.

Since we began giving CGH scholar awards in 2001, 281 graduate and undergraduate students from across the university have been provided scholarships to work on global health projects to address critical health issues in Latin America, the Caribbean, sub-Saharan Africa, Asia, and Europe. Diverse disciplines, including biomedical engineering, psychology, environmental sciences, math, physics, foreign affairs, architecture, and economics, have been represented in student fieldwork. The projects typically last six to eight weeks, and sometimes much longer.

One of our first university-wide CGH scholars was Breyette Lorntz. Her expertise in education enabled her to join our collaborative team working in Brazil to help discover that the best single predictor of a favela (shantytown) child's educational functioning (as described by grade promotion and the age at starting school) is how much the child suffered from diarrhea in the critical and

formative first two years of life. This work reinforces our ongoing collaborative study of the devastating, long-term impact of early childhood diarrhea.¹ Other examples of early student projects include *Water Rights in the Limpopo Watershed: Improving Understanding and Equality* conducted in 2003 by second-year law student Sandra Nichols in South Africa, *The Application of the Protection Motivation Theory in a Non-Western Setting: Preventing AIDS by Changing Behavior* in Nigeria in 2003 by third-year undergraduate chemistry student Duza Baba, and *Using Databases to Help Improve Water Treatment Infrastructures along the US–Mexico Border* by third-year undergraduate computer science major Aaron Johnson in 2003.

Students return profoundly affected by their experiences abroad, often ready to incorporate their life-changing experience into long-term career goals. For example, Aaron Johnson returned from Mexico and founded the UVa chapter of Engineering Students without Borders, a student-run organization which continues to send multidisciplinary teams of students abroad each year to work on global health projects. After graduating from UVa's law school, Sandra Nichols became a lawyer with the Montgomery, Alabama office of WildLaw, a private, nonprofit environmental firm. In this work, Nichols strives to enforce environmental laws involving national forests, water quality, and community protection. Duza Baba is currently pursuing an MHS in international health at the Johns Hopkins Bloomberg School of Public Health.

These early CGH scholars brought back to UVa an enthusiasm for work in global health that quickly mobilized other students and faculty alike. Within a short time, the program grew dramatically from sending a few fourth-year medical student scholars abroad to sending more than 50 students each year from a wide range of disciplines throughout the university (Figure 1).

Since 2001, UVa CGH scholars have traveled to 50 countries to conduct international fieldwork at the intersection of academics, research, and service. In creating their projects, students have worked with faculty from the UVa schools of nursing, law, education, engineering, medicine, architecture,

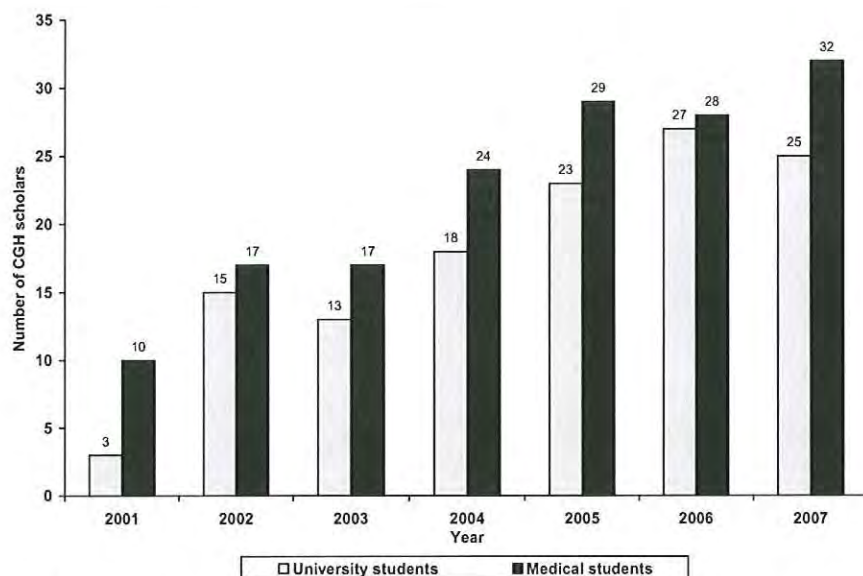


Figure 1 Growth in the number of Center for Global Health University Scholar Awards, 2001–2007, at the University of Virginia, Charlottesville, Virginia.

commerce, and the college of arts and sciences. This scholar program has blossomed to become a flagship of undergraduate and graduate research at UVa with the help of funding from a combination of external grants and gifts and internal support, including key support from the Pfizer Initiative in International Health.

Future of the scholar award program

Current strategic goals for the CGH scholar award program include improving mechanisms for maintaining contact with CGH scholar alumni, identifying stable/endowed funding, and creating curricular pathways for student scholars to integrate their global health projects into a variety of majors and minors within various schools at UVa. Developing evaluative tools to measure student learning is also a top priority.

Reversing the Brain Drain through CGH Fellowships: The Heart of Our International Partnerships

The UVa CGH fellow training program is at the heart of successful partnerships with institutions in Brazil, the Philippines, China, Ghana, Uganda, Bangladesh, Mexico, South Africa, and Haiti. These partnerships are built on close personal and professional relationships among senior faculty members who are committed to investigating common research

objectives. Our longest-running collaboration is with the Federal University of Ceará in Fortaleza, Brazil, where Aldo A.M. Lima, MD, PhD, himself a fellow at UVa from 1984 to 1988, directs the Clinical Research Unit and Institute of Biomedicine and has been Major Foreign Collaborator on ongoing NIH-funded research with UVa since that time.

Senior faculty within the collaborating international institutions select rising junior faculty to take part in the fellow training program. These individuals travel to UVa for formal and informal research training which is overseen by UVa faculty members. The length of fellowships for these visiting international faculty has varied from three months to three years, depending on the scope and purpose of the research and training that is most appropriate for the fellow and his or her home institution. The number of fellows who train at UVa is limited mainly by the funding available. Training grants secured by senior UVa faculty from the NIH, FIC and foundations provide the majority of funding for fellows' travel and research expenses. In recent years, important and synergistic funding from the Pfizer Initiative in International Health has supported joint Pfizer–CGH fellows. Our CGH fellow training program builds on long-standing research excellence in infectious disease and microbiological research and is branching out to other areas of global

health. The simple design of this training model has proven to be a powerful force behind the ability of the CGH to foster long-standing international collaborations which directly address endemic infectious diseases and other health threats facing the home communities and regions of our visiting fellows.

The research agenda of our training model is grounded in real-world problems that extend and hone the scientific research agenda of all faculty involved. We have noticed that beyond the intellectual and professional benefits to the individuals involved, such collaborative research strengthens existing relationships between UVa and institutions in developing countries and builds the capacity of all the institutions involved. The CGH fellow program creates further opportunities for UVa faculty and students (as well as collaborators from other institutions) to work with outstanding colleagues in functioning, collaborative laboratories and field sites abroad and to advance the growing institutional infrastructure (Table 1).

Too often, international training provides the means for overseas physicians and scientists to move permanently to high-income countries, leaving their home institutions to find someone to take their place, a phenomenon that has been dubbed the *brain drain*. However, our strongly articulated philosophy and documented track record are precisely the opposite. We strive to attract the brightest and most innovative international researchers who have positions in their home communities to which they are firmly committed to return. We accept these individuals as fellows, with the intention of helping to reverse the brain drain, because the opportunities for further relevant research and clinical trials and the potential impact of these will be greatest in the fellows' home countries. Since 1978, the CGH fellow program has trained more than 80 fellows from 10 countries. One hundred percent of these outstanding colleagues returned home after training to continue their research. CGH faculty maintain contact with former fellows and track their research progress and publications. Many have become leaders in their home institutions. Key to this success is

Table 1

University of Virginia (UVA) Center for Global Health Sustained International Collaborations

Country	City (university)*	Health Issue	Duration of collaboration In years	No. of international fellows trained at UVA	No. of UVA students sent abroad	No. of collaborative scientific publications
Brazil	Fortaleza (UFC) Natal (UFRN) Salvador (UFBA) Florianopolis (UFSC)	Enteric infections, malabsorption, HIV/AIDS, diarrhea, cryptosporidiosis, cognitive functioning, leishmaniasis	27	40	46	174
Ghana	Accra (UGMS) Kumasi (KNUST)	Meningitis, glutamine supplementation, malaria, diarrhea, amebiasis	20	7	20	6
Uganda	Kampala (MU)	HIV/AIDS, sepsis, fluid rehydration therapy	20	2	5	20
China	Hefei (AMU)	<i>Helicobacter pylori</i> infection, diarrhea, gastric cancer, malnutrition, enteric infections, cryptosporidiosis	20	4	2	17
Philippines	Manila (UP)	Enteric infections, tuberculosis, diarrhea, sexually transmitted infections	7	3	6	17
Bangladesh	Dhaka (ICDDR-B)	Women's health, amebiasis, diarrhea, enteric infections	14	3	4	20
South Africa	Thohoyandou (Univen)	Sexual assault, HIV/AIDS, sexually transmitted infections, malnutrition, diarrhea, enteric infections	5	3	6	20
Tanzania	Moshi (KCMC and TU)	HIV/AIDS, diarrhea, enteric infections, new diagnostics	4	3	3	3
Haiti	Port-au-Prince (GHESKIO)	Enteric diagnostics, clinical outcomes of antiretroviral therapy	3	3	0	5
Totals				68	92	282

* University names are abbreviated as follows: Universidade Federal do Ceará (UFC); Universidade Federal do Rio Grande do Norte (UFRN); Universidade Federal da Bahia (UFBA); Universidade Federal do Santa Catarina (UFSC); University of Ghana Medical School (UGMS); Kwame Nkrumah University of Science and Technology (KNUST); Makerere University (MU); Anhui Medical University (AMU); University of the Philippines (UP); International Center for Diarrhoeal Diseases Research-Bangladesh (ICDDR-B); University of Venda for Science and Technology (Univen); Kilimanjaro Christian Medical Center (KCMC); Tuzuni University (TU); and Haitian Group for Study of Kaposi's Sarcoma and Opportunistic Infections (GHESKIO).

an understanding that sustained international collaborations benefit everyone involved.

Our first CGH fellow from Brazil, Dr. Anastacio de Queiroz Sousa, says it best: "We must do research where the responses are needed!" After his fellowship, Dr. Sousa returned to Brazil to continue his work as a professor at the medical school at the Federal University of Ceará and as a physician at a state hospital specializing in infectious diseases. His work with faculty at UVA has resulted in several research projects and many publications.^{2,3} Dr. Sousa subsequently became secretary of health for the state of Ceará, where he spearheaded efforts to reduce infant

mortality by 68% during his two four-year terms. He continues his leadership in global health—he gave the Marco Longo lecture at a past meeting of the American Society of Tropical Medicine and Hygiene (ASTMH), is writing a book on leishmaniasis in northeast Brazil with UVA Professor Dr. Richard Pearson, and had a presentation at the 56th annual meeting of the ASTMH on his experience reducing infant mortality.

Recent examples of fellows who were funded or cofunded by CGH during 2006 are listed in Table 2 and represent a broad cross-section of research interests and expertise—from HIV to community nursing to enteric diagnostics—and programs varying in length from one

month to three years. Each of these fellows demonstrated an outstanding ability to conduct research relevant to urgent health threats in his or her home country.

Other recent fellows include Reinaldo Oriá and Amidou Samie. Oriá's home institution is Universidade Federal do Ceará (UFC) in Brazil. After working with Hong Zhang, MD (a CGH fellow from Anhui Medical University in Hefei, China), to learn the technique of genotyping buccal cells, Oriá used this method to demonstrate that the presence of the Alzheimer-disease-associated gene, apolipoprotein E4, is protective against the negative impact of early childhood diarrhea and enteric infection on

Table 2

International Fellows Trained at the University of Virginia Center for Global Health (CGH), Charlottesville, Virginia, in 2006

CGH fellow	Field	Country (institution)	Research interest
Amidou Samie	Microbiology	South Africa (University of Venda)	Molecular characterization of parasitic and bacterial infections causing diarrhea
Etna Eyma	Microbiology	Haiti (Haitian Group for Study of Kaposi's Sarcoma and Opportunistic Infections [GHESKIO])	Enteric diagnostics, polymerase chain reaction, lactoferrin, flow cytometry
Katia Henrys	Psychology	Haiti (GHESKIO)	HIV medication adherence among adolescents
Edgar Musie	Microbiology	South Africa (University of Venda)	<i>Streptococcus pneumoniae</i>
Vhonani Ntshandama	Nursing	South Africa (University of Venda)	Evaluation of community engagement programs
Melissa Soares Medeiros	Medicine	Brazil (Federal University of Ceará)	HIV molecular virology and drug development
Francisco de Sousa Junior	Information technology	Brazil to United States (Federal University of Ceará)	Global positioning system data analysis, research-data-sharing systems
José Quirino da Silva Filho	Biostatistics and information technology	Brazil (Federal University of Ceará)	Global positioning system data analysis, genetic epidemiology
Bruna Pinto Coutinho	Veterinary science	Brazil (Federal University of Ceará)	Effects of cryptosporidial infection on postnatal malnutrition
Jamilyl Gomes Maciel	Medicine	Brazil (Federal University of Ceará)	Effects of alanyl-glutamine supplementation on malnutrition and on cognitive and intestinal development
Joao Ramos de Matos Brito	Medicine	Brazil (Federal University of Ceará)	Apolipoprotein E and the effects of malnutrition on cognitive and intestinal development
Jesus Emmanuel Allas Dalope Sevilleja	Medicine and laboratory technology	Philippines (University of the Philippines—Manila)	Immunodiagnosis of <i>Cryptosporidium</i> , <i>Giardia</i> , and <i>Entamoeba</i>

cognitive development.⁴⁻⁷ He has authored nine collaborative publications (first author on three) and cowritten a successful R01 application on this topic which has extended the collaborative research between UVa and UFC.

Amidou Samie's home institution is the University of Venda in Thohoyandou, South Africa. The aim of his fellowship was to understand the novel enteric pathogens causing diarrheal illness in children and HIV-infected patients in the Venda region in his home country. Using his CGH fellowship training in conventional polymerase chain reaction (PCR), real-time quantitative PCR, PCR-RFLP (restriction fragment length polymorphism), trichrome staining, and immunofluorescence (merifluor), he has published seven scientific papers (and is first author on six) on the genotypes of various pathogens found in fecal samples of children and in HIV-infected adults in South Africa.⁸ He has returned to his home institution to join former CGH fellow Dr. Pascal Besson, who was recently promoted to head of the department of microbiology at Venda, to help build their program and the continuing collaboration with UVa. As this article goes to press, a CGH scholar has just returned from working with Dr.

Samie this summer, and a new CGH fellow from Venda has been chosen to train at UVa.

In addition to concentrating on their commissioned research agenda while at UVa, visiting fellows often support UVa students in their applications to the CGH scholar program. This support frequently consists of research-related mentoring and may extend to logistical support. The participation of CGH scholars in ongoing research with colleagues and former fellows at collaborating institutions abroad enriches institutional partnerships. Fellows have also teamed with UVa faculty members to offer global health-related courses at UVa.

Engaging Multiple Disciplines to Build Curricular Pathways in Global Health

The CGH faculty and staff work to encourage a university-wide focus on global health through curricular development, including designing and offering new courses throughout the university; consulting on existing courses, majors, and degrees; and supporting other activities, such as speaker programs and workshops. CGH faculty and administrators have collaborated with

faculty throughout the university to offer multidisciplinary courses with strong international content. These faculty members have been based within schools, institutes, and centers including the Institute for Practical Ethics, the Women's Center, the School of Nursing, the Carter G. Woodson Institute for Afro-American and African Studies, the Department of Environmental Sciences, the School of Law, and the McIntire School of Commerce.

Our efforts to support and develop curricular pathways have been boosted by the receipt of a Fogarty International Center Framework Program for Global Health grant. This funding has enabled the CGH to support the development of 12 courses in key areas of global health throughout the university by awarding each course a "mini grant." One exemplary course, entitled Financing a Sustainable Future, teamed Mark White, an associate professor of commerce, and Dr. Eric Houpt, an assistant professor in the school of medicine's division of infectious diseases and international health. The two professors traveled to Tanzania in January 2007 with a multidisciplinary group of students to explore the feasibility of establishing a local enterprise for the production of

HIV testing kits. The group worked closely with Tanzanian students who also participated in the class. The students created a business plan to produce the kits in Tanzania and have formed a foundation to raise seed money to start the project.

The Fogarty framework course development mini grants have not only provided students at UVa with more global health-related coursework, they have forged new partnerships among faculty, departments, and deans who might not otherwise have occasion to collaborate. We now have professors from nearly every school at UVa coming together to talk about ways to increase the global health perspective among UVa students.

In addition to supporting courses across UVa, CGH faculty members have developed courses to spark student interest in global health and to provide an academic framework for the CGH scholars' overseas experiences. During the fall 2006 semester, CGH faculty developed and offered a course for undergraduates entitled *Global Health Fieldwork: Tools to Address Physical and Mental Health in Low Resource Settings*. This course prepared students to conduct global health fieldwork and attracted students from a wide range of majors and years, many of whom applied for CGH scholar awards to conduct projects abroad. We have also developed training sessions in research ethics for students sponsored by CGH for travel and research in other countries. CGH faculty also taught CGH's first January term course entitled *Global Health: Definitions and Perspectives*, in 2005 and 2006. This class, taught in a case-based format, asked students to explore global health issues beyond the perspectives of biomedicine.

Linking these courses together into a coherent plan of study is a longer-term goal of CGH. In 2006, we worked with the departments of anthropology and public health sciences to develop a global public health minor in the college of arts and sciences. Student response to this new program has been substantial. The minor requires students to apply for acceptance into the program at the end of their second year. Once accepted, students complete 18 credits, including a required introduction and capstone and four elective courses. In addition, they must take an upper-level language

course and complete a field placement. The students also benefit from special invitation to a variety of CGH-sponsored events where they can spend time with invited speakers discussing global health topics and career opportunities.

The CGH Today

We measure our success by the number of students who conduct global health projects abroad, the number of courses offered to support global health scholarship, and the number of fellows who come to UVa to train and then return to their home institutions to become leaders in global health. Another measure of success is the number of collaborative publications and grants that result from CGH collaborations. Especially important are papers with the collaborating international fellow as first author, which establish those fellows' leadership roles in their respective programs. Partnerships with former fellows have resulted in more than 250 publications and four patents.

An increasing number of faculty at UVa are becoming involved with the CGH in one capacity or another—as mentors for student scholarship winners or international fellows, as applicants for global health course development awards, or as participants in monthly meetings of faculty from across the university to advise the CGH on activities and to share expertise and experience. Our scope has been multiplied and extended by the integration of the Pfizer Initiative in International Health as an important component of the CGH. This initiative, which focuses attention on research and training related to infectious diseases, has provided important funding for scholar and fellow awards. In addition, our annual Global Health Symposium attracts faculty and students from around the university and beyond.

We are proud to be associated with new sister centers for global health at collaborating institutions in Fortaleza, Brazil; Hefei, China; Manila, Philippines; Accra, Ghana; and Thohoyandou, South Africa. Our work with international colleagues in these centers continues to change our lives, ground our research, and provide opportunities for bilateral training of the next generations of leaders in global health.

Along with significant successes, we share challenges common to all ventures which forge new academic ground. A major challenge is identifying and obtaining sustained funding for the infrastructure required to coordinate these various activities within the university and for building and maintaining international collaborations. Providing leadership and coordinating communication and collaboration around global health among faculty, administrators, and students of various departments and schools within the university takes time, persistence, and dedicated personnel. Federal and foundation research and training grants support some collaborative research and training of international fellows, but there is a need for additional flexible funding to expand these efforts and to support trainees who have returned home and are getting reestablished. Reversing the brain drain requires resources to support the continuation of these collaborations, which are essential for addressing global health challenges and building capacity in areas where the health needs are greatest.

Next Steps

CGH faculty and staff are active in many international health organizations, including the Infectious Diseases Society of America, the Institute of Medicine Board on Global Health, the American Society for Tropical Medicine and Hygiene, the Global Health Education Consortium, the Global Health Council, and the Fogarty International Center. In working with these organizations we have identified both a need and an opportunity to strengthen the international community of university-based global health programs. We acknowledge that universities, especially those in North America, have the resources to play a key role in reducing global health disparities and the diseases of poverty, specifically through increasing the training, research, and service capacity of educational institutions in low- and middle-income countries. One of our next steps includes advocating for a network of university-based centers for global health. Such a network could actively address the health realities of the disadvantaged and disenfranchised in our midst and around the world. Diseases of poverty (resistant microbes, diarrhea, tuberculosis, AIDS, West Nile virus, parasites, Ebola) pose a threat to us

all. Coupled with these diseases are population overgrowth (which is always controlled when health truly improves) and huge, still unappreciated economic and productivity costs. Greatest of all, however, is the human cost to us as caring people in a civilized society. If we allow health disparities to continue increasing on a shrinking, interdependent planet, our very survival is threatened.

We will also continue the process of sharing with others our model for trans-university participation in key global health issues. We have learned that universities can indeed engage multiple disciplines to unravel the complex causes and solutions to health disparities, sustain international collaborations to help reverse the brain drain, and change students' outlooks on the world through overseas experiences.

Although we have been gratified by the success of UVa's CGH, we continue to strive to internationalize the university by placing global health at the heart of multidisciplinary and international collaborations. Concentration on global health serves to mold curricular pathways through its inherent emphasis on the intersections of diverse disciplines and by connecting theory and practice. It also serves to spearhead change within the institution itself. A university that actively supports global health becomes increasingly internationalized, grounded in scientific excellence, and committed to

addressing the most pressing issues facing humanity today.

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