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## WEB PAPER

# Global health education for medical students: New learning opportunities and strategies

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## Abstract

**Background:** A new course was offered to introduce basic global health concepts to all first year Johns Hopkins medical students, that took advantage of new distance learning capacity to connect medical students in Baltimore with students and faculty in Uganda, Ethiopia, Pakistan and India.

**Aims:** Lessons learned from the launch of this new course will optimize the conduct of future global health courses at JHUSOM and may be of value to other institutions.

**Methods:** Feedback from the Hopkins students was obtained through an on-line structured course evaluation questionnaire. Unstructured student and faculty feedback from partners institutions was solicited via email.

**Results:** Students reported high levels of satisfaction with the course content and format, as well as achievement of course competencies and objectives.

**Conclusions:** Distance learning can support unique, high-quality medical educational experiences that leverage technology and global connectivity, but also the power of group learning and “South-to-North” capacity building.

## Introduction

With more than 40 million foreign-born people living in the US and over one million immigrants each year (Barr 2010), it is important for all US medical students to receive training in global health. US physicians need an understanding of the multiple cultural, environmental and genetic factors that influence the risk for and effective management of diseases among their patients. In addition, the rapid, worldwide distribution of infectious diseases such as SARS, H1N1 influenza and multi-drug resistant TB, highlight the need for US physicians to have a global understanding of health issues. US medical students have also “voted with their feet” for more global health education, with more than 25% opting for at least one international health experience, prior to graduation (Drain et al. 2007). The opportunity for an “international health” experience has been associated with higher USMLE exam scores (Gupta et al. 1999), a greater appreciation of the relationship between culture and health (Chiller et al. 1995), greater confidence with history and physical examination skills (Thompson et al. 2003), as well as increased interest in careers in primary care and underserved US communities (Quinn 2008).

In response to the increasing recognition of the importance of global health, medical schools have introduced a wide range of educational approaches to include global health in their curricula. These strategies include the incorporation of global health content in required pre-clinical course work, optional global health courses, international rotations and global health educational “tracks” for medical students. For many years, Johns Hopkins, like many US medical schools,

## Practice points

- Increases in international trade, travel and immigration make global health education an important part of medical education.
- The use of communications technologies, such as computer-based videoconferencing, allows medical schools from different countries to engage in collaborative learning.
- Global health education enhances medical students’ knowledge of population-based medicine.

provided optional opportunities for students to take global health courses in the Johns Hopkins Bloomberg School of Public Health, as well as for international rotations. However, in February 2010, with the launch of the new “Genes to Society” curriculum, the Johns Hopkins University School of Medicine (JHUSOM) established its first mandatory global health course. This new, four day, intensive global health course leveraged Information Technology (IT) infrastructure and long-standing partnerships with medical schools around the world, to provide 120 first year medical students with a unique global health education experience. This new course provided an opportunity to explore new approaches and strategies to provide global health education for US medical students, including the engagement of medical students and faculty from other countries in interactive group learning. The lessons learned from the launch of this new course have been valuable for optimization of future global health courses at JHUSOM and may be of value to other institutions.

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## Global health curriculum development

The 2009–2010 academic year marked the beginning of a new curriculum, “Genes to Society,” (GTS) at JHUSOM. One central component was the combination of basic science courses with multidisciplinary content (Wiener et al. 2010). Core biomedical courses are organized by organ system such as hematology/oncology, neuroscience and endocrinology and are combined with intercessions based on cross-cutting themes, including pain management, healthcare disparities, disaster medicine and global health. GTS acknowledges the variability of genetic, environmental and societal influences in determining health outcomes. The global health intercession was taught immediately following an eight-week microbiology and immunology course. Students were able to draw upon their background knowledge in infectious diseases, anatomy, immunology,

biochemistry and pharmacology to discuss the clinical cases. The purpose of the intercession was to introduce general concepts in global health such as the major determinants of health and to examine the impact that global health issues can have on clinical practice in the US. This course was designed as an introduction to global health for all of the first year students, regardless of their interests or future professional goals. The global health course competencies and learning objectives are shown in Table 1 and were based primarily on recommendations of the Global Health Education Consortium (GHEC) (Heck and Pust 1993) and, in part, based on the American Association of Medical Colleges (AAMC) Medical School Objectives Project as shown in Table 2. Core competencies recommended by the American Society for Tropical Medicine and Hygiene (Haupt et al. 2007), including knowledge of the global burden of diseases, and issues related to immigrant and travelers health, were also considered.

**Table 1.** Hopkins global health course for medical students competencies and learning objectives.

Day	Themes	Learning objectives
All	Overall Course competencies	<p><u>Goal 1:</u> To identify, describe and discuss the need for an integrated, interdisciplinary approach to global health problems</p> <p><u>Goal 2:</u> To recognize, describe and discuss the challenges and opportunities for global health issues to impact clinical practice.</p> <p><u>Goal 3:</u> To identify, describe and discuss why a global perspective is needed to solve public health problems</p> <p><u>Goal 4:</u> To critically examine global health issues, as they are encountered in future practice and training, especially with regards to immigrant and travelers' health</p> <p><u>Goal 5:</u> To identify, describe and discuss six major global determinants of health:</p> <ul style="list-style-type: none"> <li>– Global burden of disease</li> <li>– Healthcare delivery systems</li> <li>– The environment and health</li> <li>– Health and human rights</li> <li>– Social determinants of health</li> <li>– Health policy, programs and health</li> </ul>
1	Maternal health & Measuring the burden of disease	<ul style="list-style-type: none"> <li>• To compare rates, risk factors, clinical presentation and management of high risk pregnancy in the US and Ethiopia</li> <li>• To learn the definitions, data sources and limitations of the following disease burden metrics: <ul style="list-style-type: none"> <li>– Total fertility rate</li> <li>– Maternal mortality rate</li> <li>– Neonatal mortality rate</li> <li>– Infant mortality rate</li> <li>– Under 5 mortality rate</li> <li>– Life expectancy at birth</li> <li>– Disability adjusted life years (DALY)</li> </ul> </li> <li>• To learn the Millennium Development Goals</li> <li>• To learn and compare the rates and causes of maternal and infant death in the US and Ethiopia</li> </ul>
2	Child health & Multi-sector prevention of disease	<ul style="list-style-type: none"> <li>• To compare rates, risk factors, clinical presentation and management of childhood pneumonia in the US and Uganda</li> <li>• To compare clinical, research and public health strategies to prevent childhood death from pneumonia in the US and Uganda</li> </ul>
3	Emerging diseases & geography, environment and health	<ul style="list-style-type: none"> <li>• To compare rates, risk factors, clinical presentation and management of multi-drug resistant TB in the US and Pakistan</li> <li>• To compare and discuss the most important emerging diseases in the US and Pakistan</li> <li>• To create a differential diagnosis of diseases of travelers, based on geographic and environmental exposures</li> <li>• To understand the impact of geography and environment on vector-borne, water-borne and zoonotic diseases</li> </ul>
4	Chronic diseases & international research ethics	<ul style="list-style-type: none"> <li>• To compare rates, risk factors, clinical presentation and management of heart disease among South Asians in the US and India</li> <li>• To compare and discuss research priorities to prevent and treat heart disease among South Asians in the US and in India</li> <li>• To compare the review a case study and critical debate of the ethical principal of justice</li> <li>• To critically debate the question: Do researchers have a duty to provide the highest available or local standard of clinical care for all research study participants, regardless of location?</li> </ul>

This course was a required course for the first year medical students at Hopkins. Participation in the live case discussions was offered to medical students in the partner institutions, as an optional activity.

Global health course content and format

As shown in Table 3, the 4-day global health intersession utilized four main instructional components, including clinical case conferences utilizing a live videoconference with faculty and students from medical schools in Uganda, Ethiopia, Pakistan and India (Figure 1). These were supplemented with faculty lectures, small group discussions and optional activities. The live case discussions included presentations of two clinical cases of the same condition, in two different settings, facilitating a faculty-guided student discussion and comparison of the risk factors, clinical presentation and management of the cases. Faculty leaders at Hopkins and the partner institutions were selected based on their areas of expertise (pediatricians led child health discussion, OB/GYN physicians led the maternal health discussion, etc.). The theme for Day 1 was maternal health and included discussion of cases of high-risk pregnancy in Baltimore and Addis Ababa. The theme for Day 2 was child health and included discussion of cases of community acquired pneumonia in Baltimore and Kampala. Day 3 focused on emerging diseases and included discussion of cases of MDR-TB in Baltimore and Karachi. The theme for the final day was chronic diseases and included two South Asian patients with coronary disease, one in the US and one in Pune, who were both present to discuss their clinical presentation and management with the students in the US and India.

Each day also included small group activities of 20 students each, as well as a faculty leader, which were designed to reinforce and build on the issues raised during the clinical case discussions. These included an exercise on Day 1 focused on measuring the burden of diseases, that required the students to estimate, compare and critique various metrics for estimating the burden of maternal and infant health, as well as compare the causes of maternal and infant mortality, in the US and Ethiopia. On Day 2 the theme for the small group session was multi-sector prevention of disease and students were divided into three focus groups (clinical, public health and research) and were asked to indentify and compare strategies within each area, for reducing childhood mortality from pneumonia in the US and Uganda. On Day 3, students were provided three clinical cases of international travelers with zoonotic, water-born and vector born emerging diseases and were required to develop a differential diagnosis and to discuss the importance of geography and environment in the epidemiology, clinical presentation and management of these conditions. On Day 4, the small group activities focused on international research ethics and the students were engaged in a structured debate of the ethics of a proposal to conduct a randomized clinical trial for the treatment of diabetes in India. Students at Hopkins and the partner institutions were provided a large amount of background material prior to each case, including general information about the health systems and health status of the countries (WHO reports, Ministry of Health Reports, etc). In addition, background papers and references were provided about the specific clinical cases that were discussed. The Hopkins students were first year medical students with limited clinical training/experience. So, basic references about clinical presentation and management of the cases discussed (maternal health, childhood pneumonia, MDRTB, cardiac disease, etc) were provided in advance, using the online “Blackboard”

Table 2. Recommended GHEC and AAMC competencies related to Global Health.

GHEC	AAMC
(1) An understanding of, and respect for, the roles of other healthcare professionals, and of the need to collaborate with others in caring for individual patients and in promoting the health of defined populations	(1) Knowledge of the important non-biological determinants of poor health and of the economic, psychological, social and cultural factors that contribute to the development and/or continuation of maladies.
(2) Knowledge of the important non-biological determinants of poor health and of the economic, psychological, social, and cultural factors that contribute to the development and/or continuation of maladies	(2) Knowledge of the epidemiology of common maladies within a defined population, and the systematic approaches useful in reducing the incidence and prevalence of those maladies.
(3) Knowledge of the epidemiology of common maladies within a defined population, and the systematic approaches useful in reducing the incidence and prevalence of those maladies	(3) The ability to indentify factors that place individuals at risk for disease or injury, to select appropriate tests for detecting patients at risk for specific diseases or in the early stage of disease, and to determine strategies for responding appropriately
(4) The ability to define and describe a population, its demography, cultural and socioeconomic constitution, circumstances of living, and health status; and to understand how to gather health information about this population. Defining the population includes the use of rates, incidence, prevalence, and demographic descriptors to characterize its health, disease (with awareness of the community from which the patient comes), and social and behavioral risk factors.	(4) The ability to retrieve (from electronic databases and other resources), manage, and utilize biomedical information for solving problems and making decisions that are relevant to the care of individuals and populations.
(5) Respect for cultural and socioeconomic diversity, willingness to work through systems, willingness to work in collaboration with other members of the healthcare team, and willingness to accept at least partial responsibility for the health of populations.	(5) Knowledge of various approaches to the organization, financing, and delivery of healthcare.
	(6) A commitment to provide care to patients who are unable to pay and to be advocates for access to healthcare for members of traditionally underserved populations

**Table 3.** Overview of the Hopkins Global Health Course for medical students.

Day	Large group activities			Small group activities		
	Theme	Partner institution	Case discussions	Theme	Activity	Other activities
1	Maternal health	Addis Ababa University School of Medicine in Ethiopia	High Risk Pregnancy in Baltimore and Addis Ababa	Measuring the Burden of Disease	Estimate, Compare and Discuss Maternal and Neonatal Mortality in Ethiopia and the US	Film “War Dance”
2	Child health	Makerere University School of Medicine in Uganda	Childhood Pneumonia in Baltimore and Kampala	The Multi-Sector Prevention of Disease	Compare Research Priorities to Prevent Childhood Deaths from Pneumonia in Uganda and the US	Faculty Discussion Hopkins in Haiti
3	Emerging diseases	Indus Hospital in Pakistan	MDR-TB in Baltimore and in Karachi	Geography, Environment and Health	Develop and Discuss Differential Diagnoses and Risk Factors for Clinical Cases of Infections in Travelers	Faculty Discussion Hopkins in Eastern DRC
4	Chronic diseases	BJ Medical College in India	Heart Disease in South Asians in Baltimore and Pune	International Research Ethics	Structured Case-based Debate of the Ethics of a Clinical Trial of Diabetes Treatment In India and the US	Faculty Discussion Hopkins in the World

platform at Hopkins and by email to the overseas students. Many of the background resources for the students were provided by the faculty experts in the partner institutions.

## Student satisfaction and feedback

The Hopkins students were asked to complete an online end-of-course evaluation and 73 of 120 (61%) responded, among whom 81% reported that the overall quality of the course was “very good” or “excellent.” In general, the student responses about the quality of the live videoconference case discussions reflected a high degree of satisfaction. Additional comments confirmed satisfaction with this format, with a number of students recommending that more time be scheduled for these sessions than the 1.5 hours, to allow for more time for interaction with their colleagues in other countries. This opinion was best reflected by one student who wrote “[v]ery effective use of the technological capacity . . . The opportunity to experience an open forum with students in other nations was very exciting. Slightly more information about the location . . . before the sessions would have been interesting. A little more time for questions between students would have been very much appreciated too.”

The course also received strong favorable feedback from students from the other four partner institutions. The ability to interact with each other through live video conferencing enriched the global health learning experience for all (Bollinger 2010). However, the use of this high tech distance-learning platform also provided many wonderful opportunities to discuss the limitations of technology. The Hopkins students, who were attentively engaged by their open laptops during the class, were challenged by questions about why they needed to use their cell phones and laptops during

the class, from the Ethiopian students, who were focused and engaged in the discussion without the help these devices. For subsequent sessions, noticeably fewer laptops and cell phones were in view at Hopkins. The Ugandan medical students asked the Hopkins students whether they were taught to use stethoscopes, during the discussion of the two pediatric pneumococcal pneumonia cases, when the diagnostic work up of the child in Baltimore was described and included CT scan of the chest, as well as multiple sub-specialty consultations and a 14 day hospital course. The child from Uganda, with the same diagnosis, the same antibiotic treatment and the same successful clinical outcome, was diagnosed with an excellent physical exam and CXR. He also was discharged home from the hospital after two inpatient days on oral antibiotics. The use of distance learning technology to facilitate these discussions of global health issues provided a tremendously valuable opportunity for the Hopkins students to learn from their colleagues in Ethiopia, Uganda, Pakistan and India about the limits of technology, as well as the importance of a good physical exam.

The small group activities were also ranked as “satisfactory” or better by >70% of respondents, with Session 1 (Measuring the Burden of Disease) receiving the lowest rating (72% ranked it “satisfactory” or better) and the other three small group activities were rated as “satisfactory” or better by 86–92% of respondents. The in-class workload for this global health course was ranked as “just right” by 73% of respondents, with 10% and 4% responding that there was “not enough” or “too much” in-class time required, respectively. Eighty-eight percent of the respondents said the out-of-class workload was “just right”, with only 6% responding that the out-of-class workload was not enough and none of the students reporting that the work load was “too much.”





**Figure 1.** Clinical case discussion of childhood pneumonia in the US and Uganda Faculty and students of the Johns Hopkins University and Makerere University Schools of Medicine.

Overall, students reported high levels of achievement of course competencies and goals, with 89–93% of students reporting proficiency in each of four of the main course goals (Goals 1–4 in Table 1.) There was a wider distribution with regards to knowledge of the six major global determinants of health (Goal 5). While 96% of students reported that they were able to “identify, describe and discuss” the global burden of disease as a result of completing the intersession, only 77% reported the same level of understanding with regards to health and human rights. Levels of understanding of the other 4 determinants of health varied from 79% for healthcare delivery systems, 81% for health policy and programs, 85% for the environment and health, and 88% for the social determinants of health.

## Lessons learned

Since the course was designed for first year Hopkins medical students and only 4 days in duration, it was obviously limited in scope. However, it was intended as an introduction to global health issues for first-year medical students that would encourage some students with specific interest in global health to pursue additional opportunities and international electives. It was also intended to provide an appreciation for the relevance of global health issues for the other students who are destined for a domestic career in medicine. The use of distance education technology to facilitate group learning and engagement of US medical students with students and faculty from other countries was an innovative and valuable component of

this course. The opportunity for our US medical students to learn with and from students and faculty from Ethiopia, Uganda, Pakistan and India was invaluable and greatly enhanced the learning experience. While the technical and logistical challenges to optimize the reliability and quality of these live video links were difficult and required intensive planning and planning, as well as sufficient IT infrastructure, this type of learning platform is feasible for many US medical schools and partner institutions around the world. For future courses, it will be important to obtain more structured feedback from students and faculty at partner institutions, to compare responses of the students from different settings, as well as to optimize the educational experience for students in all of the participating institutions. Based on our experience at Hopkins, we would encourage greater use of distance learning technology to enhance global health education for medical students in the US and beyond.

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### **Declaration of interest:**

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2. Other conflicts of interest: None
3. Disclaimer: The views expressed within this paper are solely those of its authors and may not represent those of the Johns Hopkins University's administration, staff or faculty.
4. Previous presentations: A limited one paragraph description of this course was included in a chapter describing use of IT to support international clinical education, that is under-review with the Infectious Diseases Clinics of North

America. If this manuscript is accepted for publication, it will be added as a reference to this book chapter.

## Notes on contributors

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