Three Domains of Competency in Global Health Education for All Medical Students

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In the setting of world population growth and migration, global health issues are increasingly reaching domestic soil and our medical practitioners. Questions posed are what exactly constitutes global health and how much should United States and Canadian medical students or practitioners know about it. To address this topic the authors convened an American Society for Tropical Medicine and Hygiene ad hoc committee on Medical Education,* sought input from the Global Health Education Consortium, and surveyed members of the American Committee on Clinical Tropical Medicine and Travelers' Health for educational priorities within the tropical medicine field. These information sources have been distilled into three domains of global health competency that the authors propose each medical school curriculum should try to achieve for all students: Global Burden of Disease, Traveler's Medicine, and Immigrant Health. We present here the rationale for these three topics as a starting point for discussion.

WHAT IS GLOBAL HEALTH?

Terms such as “Global Health,” “International Health,” or “Tropical Medicine” are evasive and do not fit into geographical, climatic, or infectious disease pigeonholes. “Global health” is increasingly utilized to stress the global commonality of health issues that transcend national borders, class, race, ethnicity, income or culture. While disease patterns vary geographically, the conditions that foster disease onset such as poverty, limited access to healthcare, the status of women, environmental degradation, political instability, war, and genetic susceptibility, are often the same worldwide. The rise of chronic conditions of the industrialized world in rapidly developing countries, such as cardiovascular disease, lung disease due to smoking, and diabetes mellitus, highlights our sameness again. The Director General of WHO summarized it best, “In the past, desperate conditions on another continent might cynically be written out of one’s memory. The process of globalization has made such an option impossible. The separation between domestic and international health problems is no longer useful.” [1]

WHAT DO U.S. AND CANADIAN MEDICAL STUDENTS NEED TO KNOW TO BE COMPETENT IN GLOBAL HEALTH?

One’s answer will depend on one’s philosophy of how theoretical versus practice-oriented medical education should be. Ultimately the answer rests on the medical school faculty, as it is they who are charged by the Liaison Committee on Medical Education or the Committee on Accreditation of Canadian Medical Schools to determine the coverage and depth of topics in their medical school’s curriculum. As such, we should not prescribe a curriculum herein, but will describe the rationale for three core domains of

global health competency that we authors feel provide meaningful coverage for all students: Global Burden of Disease, Traveler's Medicine, and Immigrant Health.

COMPETENCY DOMAIN 1: BURDEN OF GLOBAL DISEASES

We propose that every medical student should carry a basic understanding of the major diseases that affect humans worldwide. Just as basic science education in disciplines such as biochemistry and physiology is required by the LCME to inform students of pathogenesis of disease, we argue that knowledge of the major diseases that affect and kill people worldwide serves to inform the host, environmental, and systems-based factors that govern health worldwide. The annual World Health Report[2] is one key resource of global health epidemiology that presents estimates of global mortality and disability adjusted life years (DALY), a disease-specific measure that incorporates time lost due to both premature mortality and disability (Figure 1). By learning, for example, that an entirely preventable disease such as measles accounts for almost 2% of the developing world's DALY burden, students can appreciate how health system and myriad other factors conspire to the impede the delivery of cost-effective vaccination services. For those who favor practice-oriented education, knowledge of the global patterns of disease remains critically important by informing the care of travelers and immigrants.

COMPETENCY DOMAIN 2: TRAVELER'S MEDICINE

Over 808 million persons crossed international borders in 2005 and this figure is projected to increase at a +4.1% rate.[3] More than 27 million travelers departed from the U.S. in 2004, 56% of whom were destined for the developing world represented in Figure

1. Based on prior estimates whereby travelers seek medical care at an 8% rate,[4] U.S. physicians may see as many 1.3 million returning travelers from the developing world each year and this figure will rise.

What then should every medical student learn about traveler's medicine? First, it is unrealistic to propose every student can learn the large and changing body of traveler's medicine, which has emerged into an independent field with its own textbooks, specialists and examination. We therefore sought input from the American Committee on Clinical Tropical Medicine and Travelers' Health, the parent organization for this specialty. During 2005 voluntary on-line questionnaires were sent to the approximately 500 ACCTMTH members. Replies were received from 132, 74% of whom identified themselves as past or present teachers in North American medical schools. Two major questions were posed: how many hours should be dedicated to medical school curricula in tropical medicine and traveler's health, and how should this time be distributed, whereby we asked respondents to prioritize a list of topics taken from the outline of testable material from the ACCTMTH Certification examination (www.astmh.org/certification). ACCTMTH respondents felt that ideally a median of 30 hours (mean 45.8 hours, 95% confidence interval 36.0-55.5) should be dedicated to tropical medicine topics in the course of undergraduate medical education. Malaria was highlighted as the most deserving subject (2.8 ± 0.1 hours out of 30, $P < 0.05$), followed by tropical disease clinical syndromes (2.4 ± 0.1 hours), global health epidemiology (2.4 ± 0.1 hours), global HIV and tuberculosis (2.2 ± 0.1 hours), and intestinal protozoa (2.0 ± 0.1 hours). An anecdote that illustrates the importance of a basic cognizance of malaria was that of Lt. Cmdr. John Newman, a general surgeon, who at the microscope in 2003

made the life-saving diagnosis of *Plasmodium falciparum* malaria when U.S. Marines presented atypically in Liberia.[5]

COMPETENCY DOMAIN 3: IMMIGRANT HEALTH

The third basic global health domain involves the healthcare of the increasing immigrant population of the U.S. and Canada. The foreign-born population of the U.S. rose from 7.9% in 1990 to 12.1% in 2000.[6] Of 946,142 immigrants to the U.S. in 2004, 77.7% were from WHO-defined developing countries[7] (Figure 2). These figures exclude refugees, asylees, and an estimated 11.1 million illegal immigrants.[8] Toronto leads North American cities with fully 43% of its residents born in foreign countries.[9] The challenge of immigration is not an issue only for urban medical schools. Certain counties of Kansas, Idaho, and Washington State share equally high rates of foreign-born. Minnesota has the highest per capita concentration of Laotians in the U.S. The foreign-born populations of North Carolina, Georgia, and Nevada have more than tripled during the 1990s.[6] In order to provide healthcare for this changing population, independent of the political debate on how to fund it for those that reside illegally, future physicians must be familiar with the spectrum of disease they may bring. A key public health example is tuberculosis, where 53.5% of U.S. cases are foreign-born and tuberculin skin testing of recent immigrants is a key guideline for control.[10, 11] Culturally competent care is another basic requirement for the proper healthcare of immigrants (and minorities in general) which has received appropriate AAMC attention.[12]

STUDENT INTEREST IN GLOBAL HEALTH

Regardless of faculty opinion on a global health curriculum, medical students are highly interested in the topic of global health and we must listen to their views as the consumers and purchasers of medical education. The American Medical Students Association has a Global Health Action Committee and Canadian students operate a Student University Network for Social and International Health. The "other comments" section of the ACCTMH survey we administered repeatedly mentioned that advanced electives for students in global health-related topics were popular and filled to capacity. One measure of this interest is medical student participation in international electives, which has averaged a robust 23.1% among U.S. graduates since 2000 (not including those who participated in cultural awareness workshops, multicultural community-based projects, or learned a foreign language for patient care; Figure 3). The educational needs and benefits of this highly-interested increasing minority of students participating in international electives are significant, and have appropriately received some attention from the AAMC as well as the published literature.[13-15] Indeed, largely fed by student interest, some schools have created explicit international health tracks and curricula (Baylor University and Columbia University are but two examples[16]). Importantly, however, schools need to separate the educational needs of the highly-interested group of students that participate in global health electives from the core competency in global health needed by all. These latter educational requirements are particularly in need of attention. Medical schools in the UK, Sweden, and Netherlands appear to be confronting this already.[17]

THE FUTURE OF GLOBAL HEALTH EDUCATION

We are keenly aware that U.S. and Canadian medical school curriculum committees are under tremendous pressure to balance changing educational content and new styles of learning. We know that a 30-hour global health curriculum, either as a stand-alone course or with the equivalent hours incorporated into existing courses, may not be possible for all schools. Yet by ensuring that the existing curriculum covers at least these three domains, all students can achieve basic competency. It is likely that some schools are achieving competency already and are exceeding this core with additional offerings. However our charge is for all medical schools in the United States and Canada to reevaluate their curricula in order to equip all their graduates to meet changing global healthcare needs.

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DISCLAIMER

The views expressed in this article are those of the authors and do not necessarily represent those of the American Society of Tropical Medicine and Hygiene, American

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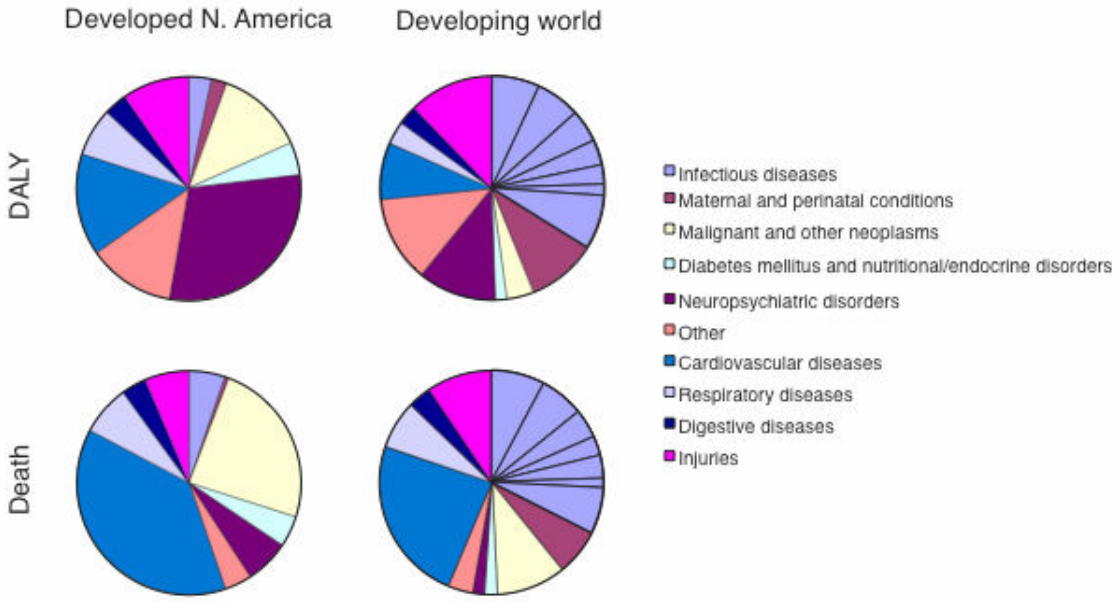
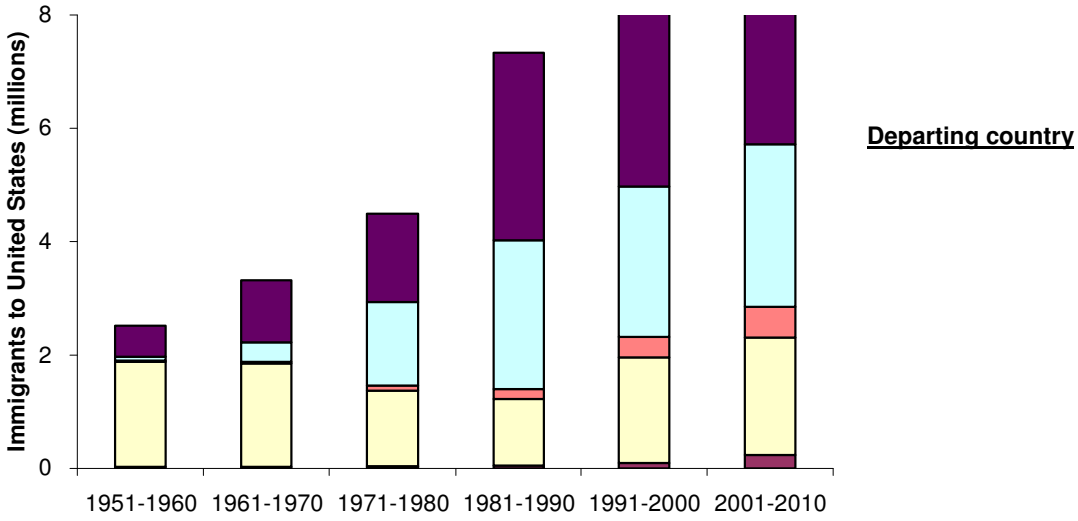
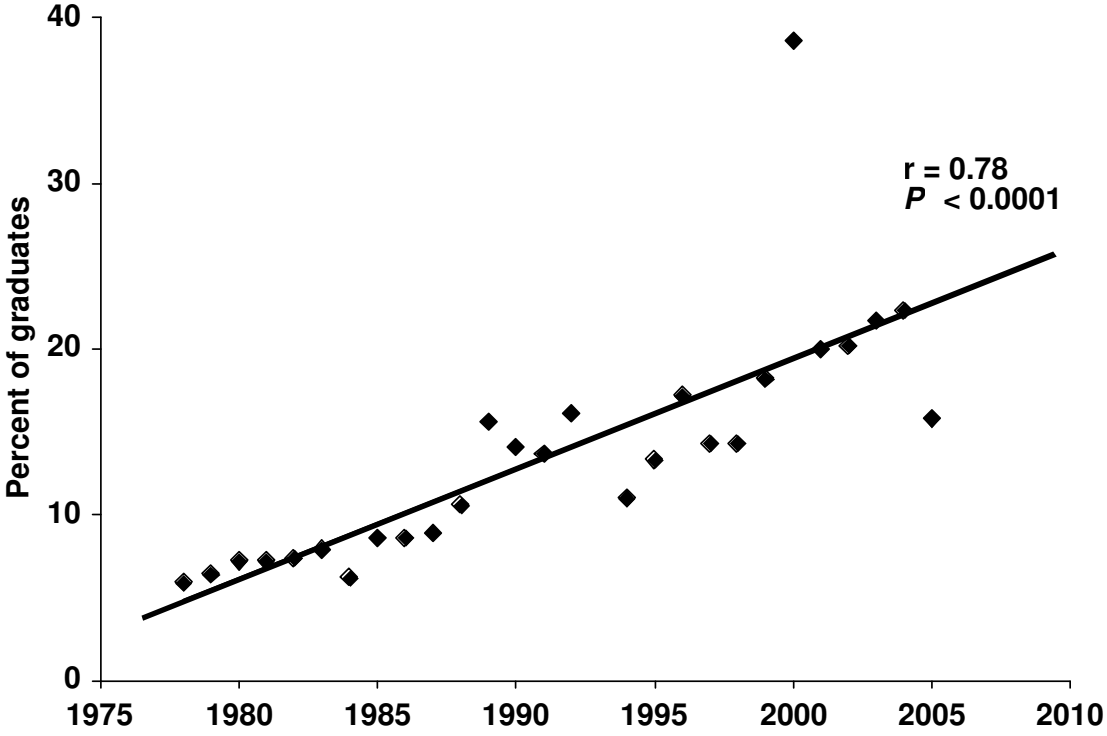
Figure 1. Global health as measured by disability adjusted life years and mortality. Data are World Health Report 2002 estimates and "developed" or "developing" country definitions are per WHO.[2] "Other" diseases include nutritional deficiencies, sense organ disorders, congenital abnormalities, genitourinary, skin, musculoskeletal, and oral diseases. Infectious diseases are fractionated clockwise as follows: lower respiratory infections, HIV/AIDS, diarrheal diseases, tuberculosis, malaria, measles, and others.

Figure 2. Immigration to the United States, 1950-2010. Absolute numbers of legal immigrants to the U.S. stratified by region of departure. 2005-2010 data are extrapolated from 2001-2004 figures.[7]

Figure 3. US medical students participating in international rotations. Percentages of US medical graduates having participated in international rotations as reported to the AAMC in their annual Medical School Graduation Questionnaire.[18]


Developed N. America
Developing world
DALY
Death
Infectious diseases
Maternal and perinatal conditions
Malignant and other neoplasms
Diabetes mellitus and nutritional/endocrine disorders
Neuropsychiatric disorders
Other
Cardiovascular diseases
Respiratory diseases
Digestive diseases
Injuries


Immigrants to United States (millions)
8
6
4
2
0
1951-1960
1961-1970
1971-1980
1981-1990
1991-2000
2001-2010
Departing country


40
30
20
10
0
Percent of graduates
r = 0.78
P < 0.0001
1975
1980
1985
1990
1995
2000
2005
2010