A Historical and Undergraduate Context to Inform Interprofessional Education for Global Health

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Introduction: The Case of Fluoride

Despite remarkable improvements in health worldwide over the past century, both persisting and new global challenges are impacting health in complex ways. For the first time, people living in urban areas outnumber those living in rural regions, and there are now more individuals over the age of 60 than under the age of five. Socioeconomic disparities between and within countries are widening. Many countries are experiencing what has been dubbed the “double burden of disease,” managing risk factors and consequences of both infectious and non-communicable disease.

In addition to the aforementioned trends resulting from globalization, another lesser-known trend is underway. Of the 291 diseases and conditions measured by the Global Burden of Disease 2010 Study, untreated dental caries (cavities) was found to be the most prevalent. Over the past 20 years, untreated cavities have risen by 38.1% globally. Unfortunately, the greatest burden of these conditions lies with disadvantaged and vulnerable populations who are least able to manage them and have many other compounding challenges to their health and productivity.

Because oral health has been so universally neglected, millions of children around the world are currently suffering from oral pain, missed school days, chronic dental infections, inability to eat, and overall poor quality of life. In Rwanda, for example, the leading cause of morbidity in district hospitals and one of the top reasons for child outpatient visits in 2011 was oral diseases, including dental caries. From 2008-2010 in the United States, over two million hospital-based emergency department (ED) visits involved dental caries, the most frequently identified dentally related condition. ED visits involving a dental condition in the U.S. during this period equated to approximately $2.7 billion in charges and a highly inefficient use of limited hospital resources.

Water fluoridation is a widely recognized, highly cost-effective preventive method for dental caries, particularly in children. This well-researched intervention is recognized among the top 10 greatest public health achievements of the 20th century. The effects of water fluoridation are known to reduce social inequities and disparities in children because those with the highest rates of decay and least access to care benefit the most.

Yet, despite its success, water fluoridation has not gained universal support. The following illustration offers an explanation and argues for interprofessional education in global health as a solution.

Recently, a journal article with recognized limitations was released naming fluoride as one of six newly-identified developmental neurotoxicants. The authors’ conclusions were based on a single previous meta-analysis by the same author. The validity of many of the studies reviewed in the cited meta-analysis were questioned by the Agency for Toxic Substances and Disease Registry (ATSDR) due to design limitations, small sample size, and numerous unaddressed and potentially confounding variables.
ically, the release of this article followed the American Dental Association’s (ADA) empirically-supported announcement only two weeks prior that it had changed its longstanding guidelines for the use of fluoride in young children. Due to rising rates of caries, the ADA is now recommending an increase in fluoride exposure before the age of two, as compared to the former recommendation for the same age group. Yet, only hours after the article’s publication on February 14, 2014, the story of fluoride as a new threat to nor-

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mental child development was covered online by CNN, USA Today, Forbes, and Time, among other popular media outlets. These four news sources alone generated over 54,000 views and shares through social media by the end of the weekend. Some news outlets accurately reported the article’s limitations, while others did not. Anti-fluoride sentiments have since echoed across social networking and video sharing sites. One well-known anti-fluoride advocacy group, the Fluoride Action Network (FAN), organized over Twitter to lobby the Environmental Protection Agency (EPA) Office of Water in Washington, D.C. in September 2014. Communities across the United States are petitioning to abolish water fluoridation, and some are advocating for elimination of fluoride use altogether, no matter the kind or source. How is it possible that so much confusion and controversy exists surrounding one of public health’s greatest achievements and most effective prevention measures at a time when dental caries are on the rise worldwide?

The case of fluoride demonstrates a complex web of conflicting perceptions, misunderstandings, and a case-based lack of scientific, public and global health literacy. It represents a modern-day intersection of academia, research, popular press, policy and law, public health, communication science, journalism, and the general public. At this intersection is the rapid widespread “digital pandemic” of incomplete and misinterpreted scientific information about fluoride, propagated by social media platforms lacking the traditional gatekeepers of information quality. In response to this example and other 21st century challenges, a growing consensus recognizes the need for collaborative practice toward improved health that begins with interprofessional education: team-based and integrated training for health professionals and specialists. In fact, a coordinated response beyond only the health sector is likely necessary for global health improvement. Thus, interdisciplinary education including, but not limited to, health disciplines is extremely important, but preparing students to collaboratively lead the way in addressing modern challenges in practice is proving difficult. An historical perspective on global health education helps to illuminate existing barriers in order to better target learners, develop effective curricula, and create a truly interdisciplinary learning environment that can translate from interprofessional education into practice.

This paper does not attempt to recommend a definition for global health or to suggest competencies in global health. These would be out of its scope. This paper does, however, expand the thinking around interprofessional education for global health; it investigates the history of global health and global health education and develops ideas for interprofessional education that begin at the undergraduate level. We recognize that “interprofessional” is becoming more inclusive of other professions beyond just health. Thus, in this paper, we use the term “interprofessional” in reference to students and professionals in health and other disciplines (i.e., law, engineering, etc.).

Rationale for Undergraduate Global Health Education: A Historical Perspective

International Health

Although not commonplace as a term until only recently, the concept of “global health” as an awareness that disease and medicine transcend national boundaries has existed for decades. A cholera outbreak in the 19th century prompted physicians to convene the first International Sanitary Conference, which reconvened for over 80 years and examined infectious diseases found in many countries. Over time, this conference and other collaborations, including the creation of what was then called the International Sanitary Office of the American Republics in 1902 (now the Pan American Health Association), moved this early global health concept forward beyond just infectious disease to include maternal and child health, nutrition, and others. Current expert thinking emphasizes the importance and necessity of interprofessional and interdisciplinary collaboration to meet both ongoing and emerging challenges to health. In light of this historical focus on world health problems primar-
ily by physicians, however, the proposed interprofessional collaborations necessary today are appropriate in theory but have yet to fully materialize in practice, with only cursory efforts currently underway. Global health practice largely remains too narrow and siloed to tackle 21st century challenges. Preparing learners for interprofessional practice needed for global health is essential.

International Health Education

Concurrent with the evolution of how global health has been conceptualized, global health education as a concept has roots in part with the creation of the World Medical Association in Paris in 1947. The Association adopted the highest international standards in not only medical science and treatment, but also in international medical education. Shortly thereafter, the International Federation of Medical Students’ Associations, which eventually sought to foster student cooperation toward the health of all populations, was formed. In the mid-1900s, Bandaranayake found that 61.4% of medical students were taught some aspect of international health, with a focus on developing regions of the world. The final years of the 20th century and first part of the 21st saw the formation of the International Health Medical Education Consortium, which later became the Global Health Education Consortium and then merged with the Consortium of Universities for Global Health in 2011. The change in name from “International” to “Global” reflects current terminology. It is worthwhile to observe that international health education has historically been primarily developed within graduate medical education.

Public Health Education

Global health education cannot be discussed without also considering the history of public health education in which global health and public health are considered indistinguishable. Schools of public health were first recognized by the Rockefeller Foundation as “distinct institutions to provide graduate-level education” for public health practitioners who already held a professional degree, commonly an M.D. Over time however, pilot courses, programs, and curricula sprouted from schools of public health into undergraduate education. In 2003, the Institute of Medicine published a report calling for educators to recognize public health education as essential not only for healthy communities, but also for an educated citizenry and therefore as a fundamental component of undergraduate education. At nearly the same time, the Association of American Colleges and Universities Liberal Education and America’s Promise (LEAP) initiative was underway. LEAP objectives call for an undergraduate education that fosters collaboration across disciplines, critical thinking, social responsibility, engagement in the community, and inquiry and analysis of complex problems. Educators astutely aligned the Institute of Medicine (IOM) charge with LEAP. The introduction of public health into undergraduate education was a natural response to both the IOM and LEAP. With education reform in motion, the Association of Schools and Programs of Public Health (ASPPH) produced recommendations and learning outcomes for undergraduate public health education. Public health education, thus, has been greatly influenced by the field of biomedicine and medical practitioners in the same way as international health and education.
Global Health Education for Undergraduates: An Opportunity

When analyzing the parallel tracks that international health, international health education, and public health education have taken over the decades, one begins to understand the reasons behind the biomedical-centricity of today’s global health practice. First, international health and international health education — as precursors to global health and global health education — emerged primarily from physicians and the practice of medicine. Second, public health education was initially designed for those who already had a professional degree, thus, physicians frequently designed and taught public health education. Third, global health and public health are often perceived as indistinguishable. Logically, therefore, global health has emerged with constraints tied to its history. In order to establish a culture of interprofessional learners who understand and appreciate the need to address global health beyond just biomedicine and even the health sector, educators must capitalize on the opportunities that global health education can present while still in its infancy. If designed and implemented with an awareness of its historical context, global health education can break free of existing constraints and fully optimize the opportunities it can provide future leaders entering into a multitude of sectors.

Undergraduate global health education holds an important and unique opportunity to meet this difficulty. Because undergraduates are in the process of preparing for their careers, but have not yet committed to a profession, they present an inimitable opportunity for investigating the interdisciplinary nature of global health education catered to a diverse audience. Despite the fact that undergraduate global health education is a recent occurrence, only formally appearing in the past decade, it is expanding rapidly. It has largely been initiated due to increasing student interest and advocacy in public health beyond national borders. The rationale behind the LEAP project acknowledges that society has moved “from the American century to the global century.” Respecting the charge to include public health in undergraduate education and recognizing that passionate students now live in a global century, many universities are developing global health learning opportunities for their undergraduate students.

The definition of global health fluctuates across the literature without total consensus, and currently, there are no formal recommendations for global health teaching, skills, or learning outcomes at the undergraduate level. Thus, many undergraduate programs are largely formed from existing course offerings and faculty interest and expertise unique to each university, resulting in vast variation in global health undergraduate education. Broad historical perspectives of global health and education can provide direction for developing preliminary theoretical learning outcomes for undergraduate global health education by way of two guiding principles. First, learning outcomes should be designed from an interdisciplinary perspective and for an interdisciplinary audience, laying the foundation for successful interprofessional educational experiences in the next stage of students’ education. Second, global health learning should not be limited to certain geographic or socioeconomic groups, but rather should address health challenges and solutions that transcend and flow across national borders, economic classifications, and professional sectors to represent the truly “global” nature of global health.

Accordingly, in order to strengthen the development of theoretical learning outcomes using these guiding principles, global health and public health education for undergraduate and graduate students were assessed. Common themes and recurring concepts from this review were noted and categorized into Domains. Within each Domain, themes were further divided into desired global health Learning Outcomes appropriate for undergraduate students with interdisciplinary goals and a common interest in the interprofessional practice of global health (Table 1). The result was a theoretical foundation of global health knowledge, skills, and values for undergraduates entering into any field in the future.

Toward Interprofessional Education for Global Health and Beyond

Interprofessional education is a burgeoning and significant method for developing health professionals, focusing on areas such as Values/Ethics for Interprofessional Practice, Roles/Responsibilities, Interprofessional Communication, and Teams and Teamwork. This educational approach, which is relevant to professionals who work in both the local and global space, recognizes that current and future expert leaders must demonstrate an unprecedented level of professionalism. Today’s globalized society is forcing the best and brightest “doers” to take a step back and reevaluate their approaches to research and knowledge dissemination, education methods, and their relationships with research subjects, intervention recipients, and the global community.

In medicine, for example, graduates take the Code of Medical Practice which adds additional principles of professionalism to their practice, beyond their clinical knowledge and skills. These principles include do no harm, patient privacy, practicing within one's
scope, patient autonomy and consent, the social contract between patient and physician, and respect for human rights. These principles of professionalism for addressing individual health become perhaps even more pertinent in global health when communities, nations, even entire societies are the “patient.” The historical context of global health reflects power dynamics born from colonialism, and this dynamic remains imbedded within today’s global culture. With the richest nations intervening in the poorest, health and economic disparities and global inequities have been underscored more than ever. Thus, while an undergraduate education framework can be useful in informing IPE for global health, principles in professionalism for global health should be the backbone of global health teaching and practice. Figure 1 illustrates a layered approach to global health education across the spectrum, where concepts of professionalism in global health encase global health learning at all levels. It should be noted that the concept of global health professionalism deserves further attention and study in the future.

### Table 1

**Theoretical Learning Outcomes in Global Health for Undergraduates**

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<thead>
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<th>Domain 1: Qualities of a Global Citizen</th>
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<tr>
<td><strong>Learning Outcomes (LO)</strong></td>
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<tr>
<td>1.1 Identify one’s own attitudes and implicit associations relating to cultural differences among and between individuals, communities, and societies</td>
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<td>1.2 Demonstrate humility in recognizing one’s larger place in the world and one’s own values, beliefs, and abilities</td>
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<td>1.3 Recognize the association between health, dignity, and human rights for all people</td>
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<tr>
<td>1.4 Exhibit global health leadership through social entrepreneurship, cultural competence, cooperation, partnership, and a participatory approach to healthy individuals, communities, and societies</td>
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<td>1.5 Demonstrate a respect and desire for lifelong learning</td>
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<td>1.6 Evaluate one’s own actions and the actions of others for ethical and humanitarian alignment</td>
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<th>Domain 2: Knowledge of Diseases, Conditions and Their Determinants</th>
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<td><strong>Learning Outcomes:</strong></td>
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<tr>
<td>2.1 List and describe priority and highly prevalent infections and non-communicable diseases affecting world health now and predicted trends for the future (note priorities and prevalence may be different)</td>
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<td>2.2 Explain general conditions - those that cannot be defined as a single condition or disease (e.g., reproductive health, mental health, oral health, adolescent health, injuries, maternal and child health, nutrition, environmental health, etc.) – impacting world health both now and predicted trends for the future</td>
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<tr>
<td>2.3 Explain global determinants of health and describe the interconnectedness of determinants for diseases and other conditions (e.g., social network, living environment, gender and sexuality, economics, politics, globalization, behaviors, risk change across the lifespan, cultural beliefs and practices, etc.)</td>
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<th>Domain 3: Skills to Improve Health in a Global Context</th>
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<td><strong>Learning Outcomes:</strong></td>
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<tr>
<td>3.1 Cite the major global health institutions and describe their philosophy and role in world health</td>
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<td>3.2 Describe metrics used to measure world health, including their utility and limitations</td>
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<td>3.3 Evaluate components of a health system (e.g., workforce, financing, facilities), identify strengths and weaknesses of health systems across the world, and discuss overlaps between health systems and other systems</td>
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<td>3.4 Assess how policies are implemented and the resultant impact on world health in a global context</td>
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<td>3.5 Identify how priority setting and resource allocation affect world health in a global context</td>
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<td>3.6 Describe the interdisciplinary aspects of the global pharmaceutical industry and how it impacts health</td>
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<td>3.7 Define how social media and technologies play a role in globalization and world health</td>
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<tr>
<td>3.8 Discuss the flow of risks, benefits, and opportunities across borders (i.e., “reverse innovation”)</td>
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First and foremost, ethical conduct and principles of professionalism must encompass all global health-related endeavors, in both learning and practice, in order to preserve human dignity and promote equity and empowerment. An awareness of these principles can then provide imperative context for moving forward into developing practical knowledge, skills, and values toward a foundation in global health learning. Students versed in principles of global health professionalism and who have also developed this foundation will then be better positioned to successfully engage in IPE for global health. Key IPE competencies building upon prior global health learning experiences can streamline into collaborative interprofessional practice for improved world health at the global level. Curriculum alignment spanning across all higher education levels will be challenging. However, lessons learned from dental caries and the case of fluoride are not unique: cooperation and calibration across the education spectrum will be essential so that today’s learners and future global citizens can become tomorrow’s leaders for interprofessional global health practice.

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References


27. See Rowson, supra note 25.


29. See Frenk, supra note 22.

30. See Evert, supra note 25.


35. See Rowson, supra note 25; Reigelman and Albertine, supra note 34.


38. See Riegelman et al., supra note 34; College Learning for the New Global Century, A Report from the National Leadership Council for Liberal Education & America’s Promise (2007).

39. See Riegelman et al., supra note 34; Riegelman, supra note 37; Gebbie, supra note 37; Riegelman and Albertine, supra note 37; Association of American Colleges and Universities LEAP, supra note 37; Albertine, supra note 37; Hill, supra note 37; Association of Schools of Public Health, supra note 37; Bernheim, supra note 37; Association of Schools and Programs of Public Health, Undergraduate Public Health Learning Outcomes, Final Model Version 1.0, (Washington, D.C., July 14, 2011, available at <http://www.aspph.org/wp-content/uploads/2014/04/UGPHLearningOutcomes_ModelVersion1.0_FINAL.pdf> (last visited September 17, 2014).

40. See Rowson, supra note 25; Rowson, supra note 31.

41. See Association of American Colleges and Universities, supra note 37.

42. See Association of American Colleges and Universities, supra note 37; Association of Schools and Programs of Public Health, supra note 41.

43. See University of Maryland, supra note 24; Association of American Colleges and Universities, supra note 37; Hill, supra note 37; Association of Schools and Programs of Public Health, supra note 37.

44. See Association of Schools of Public Health, supra note 37.

45. See Rowson, supra note 25.

46. See Bernheim, supra note 37.


48. See Association of Schools of Public Health, supra note 42.

