

# Education Research: A framework for global health curricula for neurology trainees

Anindita Deb, MD, Melissa Fischer, MD, MEd, and Anna DePold Hohler, MD

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## Correspondence

Dr. Deb  
Anindita.deb@  
umassmemorial.org

## Abstract

As the global burden of neurologic disease increases, educating future neurologists about the principles of global health through global health curricula is of utmost importance. However, few neurology residency training programs have developed and implemented comprehensive global health curricula. This report outlines the design, implementation, and evaluation of the University of Massachusetts Medical School neurology residency global health curriculum. Using accepted curriculum development methods and incorporating an innovative use of technology, we created a global health curriculum focused on neurology to engage trainees. The implementation of curricula and organization of elective opportunities also incorporates learning objectives and an evaluation process. The University of Massachusetts Medical School neurology global health curriculum can be used as a framework for other residency programs developing global health programs. Global health education increases young neurologists' awareness of the growing burden of neurologic disease and, subsequently, may motivate them to address the need for neurologic expertise around the world.

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From the Departments of Neurology (A.D.) and Medicine (M.F.), University of Massachusetts School of Medicine, Worcester; and Department of Neurology (A.D.H.), Saint Elizabeth's Medical Center, Brighton, MA.

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## Glossary

**ACGME** = Accreditation Council for Graduate Medical Education; **AHC** = academic health center; **ASPPH** = Association of Schools and Programs of Public Health; **CAM** = Charutar Arogya Mandal; **PGY** = postgraduate year; **UMMS** = University of Massachusetts Medical School.

In an increasingly interconnected world, health issues are no longer confined to specific geographical regions. To prepare physicians for the challenges posed by globalization, there has been a growing interest in incorporating global health topics into medical student and resident education.<sup>1</sup> Approximately one-third of US and Canadian neurology training programs offer global health electives. Multiple studies have shown that participation in international electives increases interest in pursuing practice in underserved areas and with diverse patient populations both in the United States and abroad.<sup>2</sup>

The University of Massachusetts Medical School (UMMS) Department of Neurology recognized the importance of a global health curriculum for residents. Development of the curriculum involved a comprehensive needs assessment, identifying goals and objectives, partnering with a global site, implementation with the incorporation of technology, and curriculum evaluation. The lessons learned in this process are shared to guide others in developing a global health program.

A comprehensive global health curriculum meets competencies expected of neurology trainees, and incorporates global health principles while allowing for exchange of ideas with a global site. Although a lack of funding can hinder travel, technological innovations allow for new approaches to collaboration from afar. Global collaborations increase trainees' exposure to region-specific neurologic diseases, opportunities for population-based research, and understanding of diagnostic and treatment options in resource-limited settings.

## Needs assessment

### Assessing for institutional need

The neurology department leadership at the UMMS recognized the value of a pilot global health program to enhance resident training and support skills development. The department provided protected time for curriculum development and implementation. A needs assessment included discussions with key stakeholders, neurology residency program director, and the chief residents to gauge interest and determine goals. During the pilot phase, various scheduling options were considered. Given the demanding schedules of the residents, global health modules were integrated into the existing lecture schedule.

### Identifying resources

An increasing number of resources exist to support new global health program development. *Developing Global Health*

*Programming: A Guidebook for Medical and Professional Schools* by Jessica Evert et al.<sup>3</sup> is a comprehensive review of objectives of global health education, development strategies, and medical education competencies. Also, *Curriculum Development for Medical Education: A Six-Step Approach* provides a practical way to develop curricula.<sup>4</sup> *Global Health 101* is a popular reference used by many global health programs including UMMS.<sup>5</sup> In addition, the Consortium of Universities for Global Health provides slides on a variety of global health topics.

There is limited literature on formal global neurology education and track development. One experience outlines the development of a track incorporating global and community health emphasizing the need for mentored longitudinal experiences, scholarly projects, and participation in global health academics. Residents in this particular track have a mentored experience abroad for at least 3 weeks, participate in community clinics, develop a project, and attend at least 2 nonneurology global health lectures per year.<sup>6</sup> Another example, the Global Health Track at Yale University, offers global health coursework, scholarly work, and international electives in Uganda and the Czech Republic. Some residency programs offer a concurrent certification in public health. The global health program in pediatrics at the University of Minnesota offers certification through the American Society of Tropical Medicine and Hygiene in addition to collaboration with the Makerere University in Uganda.<sup>10</sup> Long-standing programs, such as Yale University's Internal Medicine International Health Program, often receive funding support through the department.<sup>7</sup> The UMMS program has similar requirements to the programs described above but unique in its neurology-focused global health curricula integrated into the residency didactics, and use of videoconferencing to enhance bidirectional exchange and foster collaboration year-round.

### Identifying mentors

Development of a novel global health curriculum requires identification of mentors with expertise in neurology, medical education, and global health. Dr. Anna DePold Hohler, MD, FAAN, and Chair of Neurology at Saint Elizabeth's Medical Center, has extensive experience in developing a Global Health Initiative in Neurology while at Boston University including developing a long-term collaboration with St. Luke Foundation in Haiti.<sup>8</sup> At UMMS, the Assistant Dean for Undergraduate Medical Education, Dr. Melissa Fischer, MD, MEd, was identified as a mentor through the Junior Faculty Development Program. She provided insight into curriculum

development, implementation, and evaluation. Finally, Global Health Track Directors of other UMMS departments were integral in gaining a broad understanding of the implementation of the program and how it can enhance collaboration.

## Goals and objectives

### Identifying competencies

There are no standardized requirements for global health education in Graduate Medical Education programs. The Accreditation Council for Graduate Medical Education (ACGME) has standard competencies that provide a structured guideline for curriculum development. Similarly, a core competency model developed by the Association of Schools and Programs of Public Health (ASPPH) covers foundations in public health and interdisciplinary topics. Global health programs that meet ACGME and ASPPH competencies, such as the UMMS global health curriculum, reinforce national standards for resident education and can serve as a prototype for others.<sup>9</sup>

### Partnering with a global site

The Neurology Global Health Director chose a global site that allowed for capacity-building and establishment of clinical, educational, and research collaborations. Transparency regarding resources, opportunities, stakeholders, and logistics was made a priority in selecting a site. As UMMS medical students were already involved in research and advocacy collaboration with the Charutar Arogya Mandal (CAM) Medical Center in Karamsad, Gujarat, this was chosen to be the first collaborative site for the UMMS Department of Neurology.<sup>10</sup> Frequent videoconference-based discussions fostered the partnership. Since the establishment of this collaboration, CAM neurology faculty members have visited UMMS, and UMMS faculty and residents have traveled to CAM, which has enhanced learning and continued to strengthen the relationship.

## Program development

### Pedagogy

In the UMMS neurology global health curriculum, each module was structured to contain a didactic portion aligned with ACGME and ASPPH competencies and a case discussion. References for case selection included online Consortium of Universities for Global Health case studies and the collaborative website between Johns Hopkins Berman Institute of Bioethics and Stanford Center for Innovation in Global Health.<sup>11</sup>

### Technology

UMMS and CAM connected through Zoom for sharing slides, audio, and video. Videoconferencing offered the unique experience of discussing principles of sustainability and resource limitations in the context of patient cases with CAM

residents on a regular basis. This type of experiential learning promoted bidirectional learning and involved a broad audience, extending beyond those who can travel.

## Program description

The UMMS neurology global health curriculum included 10 modules implemented over 16 weeks. Seven modules utilized a combination of didactics and case discussion. Two modules were video-conferenced case discussions with CAM. One module focused on theoretical problem-solving in a resource-limited setting in small groups. The video-conferenced case discussions continue on a monthly basis, and 8 modules are integrated into the didactic curriculum over a 2-year academic period.

## Program evaluation

Evaluations were administered at various points throughout the UMMS program. Pre- and postassessment consisted of questions on a Likert scale. Additional evaluations in the form of the “one-minute paper” with 3 open-ended questions were administered after modules 3, 5, and 8. Twenty UMMS neurology residents participated in the curriculum, and up to 70% completed assessments. All residents agreed in the pre- and postassessment that they are “interested in global health” and “a global health curriculum is important in residency training.” In addition, 78% were “aware of the impact of neurologic diseases on the global burden of disease” in the preassessment compared to 100% in the postassessment. Fifty percent could “identify neurologic diseases specific to international populations” prior to the curriculum, which increased to 80% after the curriculum. They commented on well-organized and interesting discussions with colleagues in India, although mentioned “technical issues” needing improvement.

In response to “What did you learn from the global health curriculum?” in the postassessment, one postgraduate year (PGY)-3 noted, “The broad impact of incorporating global health initiatives into providing better health care in communities with limited resources. The big gap in health care delivery among different countries.” Another PGY-3 responded, “The impact of some diseases that I thought were more ‘Western’ on the rest of the world.” When asked about ways in which the curriculum could be improved, one PGY-2 responded, “More specific cases, possibly videos of interesting cases.” Utilizing videoconference for case discussions generated positive feedback from residents who enjoyed “the discussion at every step from both sides, especially about differentials.”

## Lessons learned

As the global burden of neurologic disease is growing, educating neurology trainees about the epidemiology, management, and treatment of neurologic disease in resource-limited

settings is becoming increasingly important. There are various proposed models for developing global health curricula including use of ACGME competencies as a guideline.<sup>9,12</sup> The UMMS neurology global health curriculum is one component of a dynamic global health program. A successful global neurology program also aims for financial sustainability, encourages multi-institutional involvement in the parent country, and builds local capacity.<sup>13</sup>

The role of US and Canadian academic health centers (AHCs) as centers of excellence in medical science and technology has long been recognized. Thus, as major participants in global health, AHCs are called on to take on the responsibility of reducing health disparities and implementing efficient health systems abroad. The Global Health Education Consortium, since 1989, has promoted education and research collaborations between universities to address these challenges.<sup>14</sup> The development of a global health program can serve multiple purposes. One goal is to expose trainees to the influence of sociocultural norms on the perception of health care and guide them in developing the cultural competency skills to manage patients in resource-limited settings. Another goal may be to expand on such a program to create a defined multidimensional partnership.

Many US AHCs are committed to providing services at partner institutions abroad and fostering an international presence. A 4-stage framework for development of such partnerships includes developing educational programs and training, consulting and advisory services, management services and delivering and/or owning patient care, education and/or research abroad. Examples include Cleveland Clinic, which manages the Sheikh Khalifa Medical City in Abu Dhabi, and Duke University Medical Center, which offers joint MD degrees through the National University of Singapore Medical School. This requires significant investment by the parent institution including separate legal entities and governance structures to oversee the international activities. In terms of bidirectional educational platforms, a global program promotes specialized teaching and training of local physicians, trainees, and health care workers and research collaborations. In participating in a broad range of activities in a global setting, which may include for-profit consultations, a business approach is necessary, and institutions are using strategic planning to implement these goals with global partners.<sup>15</sup>

The UMMS neurology global health program supports a robust partnership abroad. Currently, there are multiple departmental educational and research collaborations between UMMS and CAM in the areas of quantitative health sciences, cardiology, surgery, and pediatrics. The neurology program further strengthens this existing partnership. Implementing this neurology program with other partner sites can support and expand UMMS' collaborations abroad. Moreover, helping to create a neurology residency training program at CAM,

one of the broader goals of this educational collaboration, will build local capacity.

In developing the UMMS curriculum, it was important to ensure that the goals and objectives of the curriculum aligned with those of the residency program leadership and department. Identifying mentors and resources, with the help of institutional faculty development programs, provided guidance in creating curricula. In addition, identifying internal funding opportunities was helpful in obtaining pilot data prior to pursuing external funding. Discussion with residency program leadership on how best to incorporate a global health program without compromising other neurologic education was important. Finally, sustainability of the program required vested interest from the trainees and administration. As organizations such as the American Academy of Neurology increase awareness of global neurology, they offer unique venues for discussion and exchange of material pertaining to global neurology education and scholarship.

The major limitations in developing new curricula were time and funding. Assuming a role within medical education may include protected time. In general, funding is limited for global health education. The UMMS global health program focused on small projects and travel grants available internally to initiate global collaboration.

Global health curricula incorporated into neurology residency training can guide residents on how to approach patients with cultural sensitivity and understand social and political influences on health. Most importantly, a well-developed global health curriculum with video-conferencing can enhance learning and foster bidirectional exchange with a global partner throughout the year. Global health education programs can also serve as a first step toward committing to a larger enterprise of delivering patient care and research services abroad. This type of educational program creates compassionate neurologists with an understanding of the effect of neurologic disease on the global population and better able to treat diverse populations at home and abroad.

### Author contributions

Dr. Anindita Deb: design and conceptualization of the manuscript, acquisition of data, analysis and interpretation, drafting and critical revision of the manuscript for important intellectual content. Dr. Melissa Fischer: design and conceptualization of the manuscript, acquisition of data, analysis and interpretation, drafting and critical revision of the manuscript for important intellectual content. Dr. Anna DePold Hohler: design and conceptualization of the manuscript, drafting and critical revision of the manuscript for important intellectual content.

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