Chapter 13
Innovations in Global Health Professional Education: Implications for Urbanization

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Narrative History of Health Professional Education

Developed through literature review and through conversations with each field's prominent leaders and historians, this section presents a narrative history of medical, nursing, and public health education. We describe the major global innovations chronologically and then organize them based on their impact and implications for urbanization. Many of these "organization" and "teaching" innovations are described from the US perspective, because they originated there. The more recent innovations originate from other countries, including many developing countries. These will also be described, along with their impact for the future of urbanization worldwide.

Medical Education

That Abraham Flexner was the single most important factor in shaping the course of medical education in the twentieth century is incontrovertible. The state of medical education and medical practice in the late 1800s was appalling, devoid of science, standards, and regulation. As the President of Harvard University, Charles Eliot remarked in 1870: "The ignorance and general incompetence of the average graduate of American Medical Schools, at the time when he receives the degree which turns him loose upon the community, is something horrible to contemplate. The whole system of medical education in this country needs thorough reformation" [1].

Medical schools had existed in the United States since the late 1700s, with the University of Pennsylvania, Harvard University, and Johns Hopkins University

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among the first universities in the world to start affiliated medical schools. Medical education had become a lucrative business, as more and more students sought to gain entrance. Unfortunately, there were few standards for what constituted a "medical school," and by the late 1800s, for-profit enterprises masquerading as educational institutions had proliferated by the dozens. This is an account of what Flexner witnessed when he traveled by horse, train, and buggy, to audit these establishments [2]:

> These enterprises—for the most part, they can be called schools or institutions only by courtesy—were frequently set up regardless of opportunity or need, in small towns as readily as in large, and at times, almost in the heart of the wilderness. No field, however limited, was ever effectually preempted. Wherever and whenever the roster of untitled practitioners rose above half a dozen, a medical school was likely at any moment to be precipitated. Nothing was really essential but professors…
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> The teaching was, except for a little anatomy, wholly didactic. The schools were essentially private ventures, money-making in spirit and object. Income was simply divided among the lecturers, who reaped a rich harvest besides, through the consultations which the loyalty of their former students threw into their hands… No applicant for instruction who could pay his fees or sign his note was turned down… Accordingly, the business throve.

Flexner also had some critical things to say about the few legitimate medical schools that he visited. About Harvard Medical School, he noted:

> The stethoscope had been in use for over thirty years before its first mention in the catalogue of the Harvard Medical School in 1868-69; the microscope is first mentioned the following year.

At the end of the report, Flexner made three major recommendations, all three of which form the basis of how US medical education functions today. First, he recommended that there be no more for-profit schools and that all existing schools be linked to universities and teaching hospitals. Second, the admitted students must meet certain qualifications, including a rigorous undergraduate science education. Third, Flexner believed that scientific research should form the basis of all medical school teaching and that medicine should be taught by those who are actively involved in original scientific investigation [2].

Flexner's report was damning. Because the report addressed the lay public, there was public outrage about sham schools and quacks profiteering at the expense of the health and well-being of the nation. Not surprisingly, the impact was swift and significant: from 1910 to 1935, 89 of the 155 institutions that Flexner surveyed closed their doors. As the number of medical schools decreased, admission became more competitive, and only students with qualified undergraduate degrees were granted entrance. The intertwining of medical training with universities and academic medical centers became complete. Medical students would receive training at university-affiliated teaching hospitals rather than at local clinics or home-based apprenticeship settings. Medical schools and their affiliated hospitals were to become engines of cutting-edge research, and medical training would be at the forefront of science.

In the first half of the twentieth century, this system of integrating teaching, clinical care, and scientific investigation worked well—so well that this was the model of medical education that spread around the world [3]. Clinical research was still predicated on direct interaction with patients, and those most gifted in clinical

research tended to be the most talented clinicians and teachers. However, as scientific advances became more increasingly specialized and more technology-based, the cutting edge of science transitioned more and more from the wards to the laboratory. Those who were first-rate clinician-teachers found it difficult to also be first-rate researchers and vice versa. There was also increasing pressure for clinicians to increase their "clinical productivity" so as to generate increased revenue for their academic centers. Clinical teaching became divorced from the apprenticeship model, and medical students began to lose the benefit of learning from a master teacher. Students gradually lost hold of their ties to their community and strayed from their initial purpose of advocating for their patients and their communities.

Though initially and primarily a US phenomenon, the Flexner Report's effects were worldwide. The creation of the China Medical Board by the Rockefeller Foundation and the establishment of Peking University Medical College in the People's Republic of China represented the first application of the Flexnerian model in a developing country and marked the beginning of globalization of the Flexner Report [4]. There are several other examples of successful long-term collaborations between developed and developing countries. In 1948, the University of London helped establish the Medical School of Nigeria's University of Ibadan; graduates from Ibadan were able to receive the MBBS degree recognized by the General Medical Council of Great Britain, and Ibadan became the model for all of Nigeria's other medical schools [5, 6].

Much has evolved in US and international medical education since Flexner. The concept of Graduate Medical Education (GME) is arguably one of the other major developments in twentieth century medical education, requiring doctors to go through post-medical school apprenticeship training through residency programs. Initially pioneered by major US academic centers in the 1950s, GME has spread throughout the world. Although not technically part of "medical school" training, GME is now an integral part of medical training worldwide, mandating post-medical school clinical training and routes to specialization [7].

The 1970s saw explicit challenges to the Flexner model. Before Flexner, there was very little reliance on science; after Flexner, medicine became integrally intertwined with it, to the detriment of losing the "art" of medical practice. In the 1970s, medical schools began experimenting with models of medical education that would bring the art—and the patient—back into clinical teaching. An example is Canada's McMaster University developing the concept of problem-based learning, in which students learned in teams about cases instead of the traditional classroom lecture approach [8]. Since then, PBL has been adopted by prominent institutions, such as Harvard Medical School. As evidence accumulates for the superior professional competencies of those trained in PBL, more medical and health professional schools are beginning to rely on it for their core curriculum. This is a good example of global diffusion of a concept of medical education [9]. A related innovation is the use of standardized patients, not only to evaluate students on scientific know-how, but also to test their competency in communication and professionalism.

Another development away from the traditional Flexnerian approach has been the focus on community-oriented primary care (COPC). At the turn of the last century,

it had been necessary to tie medical training to academic centers, as these were the only places with the rigor required to couple medicine with science. In the 1980s, an opposing phenomenon arose: educators realized the need not only to have innovative methods of medical education but to shift the location of education from the ivory tower to the community and to shift the focus away from increasingly sub-specialized science to primary care.

Developing countries have led the way in ensuring that training opportunities occur in rural and underserved areas. For example, Walter Sisulu Medical School in South Africa was an early adopter of the instructional design of COPC to improve primary healthcare delivery and teaching. Students are taught to incorporate COPC principles, such as prevention and promotion, into their daily routines. From the first year, students visit community resources like traditional healers and community health centers. They undertake a study of a community by visiting family homes, and most gain fluency in native dialects such as Khosa. There are now more than 500 graduates in primary care practice in the Eastern Cape, and a study of career destination of graduates shows that the majority are serving in rural and peri-urban areas [10].

Even the United States, traditionally a bastion of specialist academic training, has experimented with the branch campus movement and the establishment of osteopathic schools that are not associated with an academic center. A.T. Still School of Osteopathic Medicine in Arizona, for example, has a particularly innovative model of medical education. After the first year of medical school, students are assigned to one of 11 community health centers spread out across the country for their preclinical and then clinical education. Students are fully integrated into their community and are trained as apprentices by master educators at each site [11]. This and other efforts herald the return to a pre-Flexner education—though with a much improved approach. In Flexner's time, community-based training was not possible, as the training available outside academic centers was questionable; Walter Sisulu and A.T. Still are testament to adaptation and optimization of progress in the modern setting.

Not only has community-based teaching introduced students to the problems most relevant to what they will see in practice, it is helping to produce more physicians with less financial investment. This has been a particularly useful development as, since the 1990s, there has been increasing recognition that our society is facing a global health workforce shortage. Many reports have been written about the critical shortage of the most precious health resource: our healthcare workers. Several countries are using methods, including teaching outside academic centers as a way to address the impending shortage.

Loan repayment-for-service programs have also been a helpful addition to reduce the financial burden on students choosing medicine and to improve diversity in the workforce (an idea that was foreign during Flexner's time). The National Health Service Corps is a loan repayment program that has been in existence for over 30 years. In exchange for paying for medical students' tuition, it obligates trainees to practice primary care in an underserved urban or rural community for an equivalent number of years after residency. It is one of several programs that has been successful not only in addressing the shortage of primary care physicians in underserved

communities but also in encouraging those who are truly committed to service to a career in the health professions.

Another innovation that has tremendous potential is the pipeline program, one of the most successful of which is the Sophie Davis School in New York City. Established in 1973 to address the growing deficit of underrepresented minority physicians in the United States, the Sophie Davis School is unique in its early recruitment, vigorous pipeline, and impressive retention of minority health professional students. It recruits almost exclusively from inner-city high schools in New York City and provides a combined undergraduate and medical education free of charge. More than 90 % of the students who attend Sophie Davis come from the lowest income tax bracket. Of the over 1,400 graduates, 25 % are African-American, 8 % are Latino, 28 % are Asian-American, and 39 % are white—a diversity of representation not seen in any other US medical school. The pipeline and aggressive early recruitment of Sophie Davis offers a model not just for the United States and developed countries but also for developing countries who wish to prioritize diversity and representation of their healthcare workforce [12]. Such programs may be particularly important in providing opportunities to students from urban slums and in encouraging them to seek a career in the health professions and to return to serve the needs of their communities.

Another dramatic example of human resource capacity building through free medical education is the *Escuela Latinoamericana de Medicina* (ELAM), or Latin American School of Medicine. Founded in the aftermath of Hurricane Mitch in 1998, ELAM, which is operated by the Cuban government, recruited 11,000 students from marginalized communities in 29 countries to study medicine, free of charge. It has become the largest and most diverse medical school in the world. In fact, its students are all international students from outside Cuba and are drawn primarily from Latin America, the Caribbean, and Africa. In addition, ELAM draws exclusively from marginalized communities, with an extensive selection process to ensure that selected students will return to serve their communities after the 6-year education. The free tuition, accommodation, board, and small stipend enable such students to attend medical school. ELAM's structure and mission provide an important model as we consider sustainable ways to ramp up the global healthcare workforce. As it is already producing doctors who are exported throughout the developing and developed world, ELAM is contributing directly to the global diffusion of health resources and information [13, 14].

A final concept that is gaining much traction is task shifting to allow for increasing scope of practice by lower-level practitioners. This development is calling upon physicians to be trained, such that they can be placed in a more educational and supervisory role than before. In resource-poor settings facing a deficit of physicians, nurses can be called upon to perform initial assessments, history taking, physical exams, and laboratory investigations and doctors only for the most difficult cases. Community health workers can perform many screenings and public health interventions. The emerging role of task shifting in global medical education cannot be overemphasized, especially as the global brain drain represents a major concern for many developing countries heading into the twenty-first century [15].

Medical education	
Organizational innovations	Teaching innovations
Collaborations to begin training programs with global input	Graduate medical education
Twinning between developing country and developed country	Problem-based learning
Increasing access to education through "free" medical education and recruitment of underrepresented minorities	Standardized patients
Task shifting	Teaching and testing of competency not only on science but on communication and professionalism
	Community-oriented primary care

Nursing Education

The theme of nursing education over the twentieth century can perhaps be characterized as "from humanistic practice to university training." Perhaps the closest equivalent to Flexner for nursing education is Florence Nightingale, who in the mid-1800s (incidentally well before Flexner's time) began to exhort that good nursing care depended on having an educated group of nurses [16]. The first formal nursing education programs began in the 1850s in London as a 2-year hospital-based training program. Others quickly followed suit throughout the world. In the 1860s, organized nursing with hospital-based training began to become standard in Western countries, with the United States and UK leading the way followed by the Scandinavian countries and Germany. Due to the work of the Rockefeller Foundation and various missionary groups, the concept of organized nurses spread to the former colonies throughout Asia and Africa. In 1899, the International Council of Nurses was founded by nurse leaders of US, UK, and Scandinavian countries. It was modeled after the International Women's Organization, and its goal was to push for training and global standards, specifically to standardize curriculum [17].

Part of the advocacy work of the International Council of Nurses was to push for government licensing of nursing to further standardize practice and ensure safety. Interestingly, the first governments to license nurses were not the traditional powerhouses in the developed world but South Africa and Puerto Rico (historically this has to do with the licensing of physicians, which was occurring at the same time in these two areas) [18]. The licenses also extended to visiting nurses, a model that began in the late 1800s by Lillian Wald. Nursing has traditionally had a strong community pull, with home-based work still among the most popular positions.

In the 1920s, the Rockefeller Foundation attempted to duplicate the Flexner study by forming the Committee for the Study of Nursing Education. This so-called Goldmark Report found that existing nursing programs in the United States were inadequate. Interestingly, they discussed the role of the nurse with public health, with a proposal for work that combined clinical care of the sick with teaching of

hygiene [19]. This part of the report was controversial, but other parts of the report calling for university-based nursing programs led to the foundation of the Yale School of Nursing as the first autonomous school of nursing that emphasized nursing as an academic discipline.

The next major breakthroughs in nursing education followed this trend, with nursing education relocating from the hospital to the university. By the 1950s, dozens of universities in the United States and Europe had schools of nursing. The University of Alexandria was the first of such universities in the Middle East. Since then, education at the Bachelor's level has become standard in most Western countries. The European Union countries now mandate standardized nursing education at the Bachelor's level; many Latin American countries, Cuba, and Botswana have followed suit [20].

Due to its proliferation of community college programs, the United States stands alone in developed countries as still having half of its nursing graduates with associate rather than bachelor's degrees. At the same time, it is also in the United States that the highest proportion of nurses has advanced, master's or doctoral-level training. In the 1960s, as an outgrowth of Medicare and Medicaid, the nurse practitioner came into existence with nursing being available on the graduate level to expand scope of practice, including individual, unsupervised primary care practice in the community.

Nurse practitioners (and in developing countries, senior nurses and nurse trainers) play a central role in community-based and primary care. Discussions continue on the scope of practice of nurses. In Cuba, for example, nurses can see patients independently of doctors [21]. In Uganda, nurses are frequently trainers of community health workers such as birth attendants [22]. Such discussions of task shifting and integration of nursing care with public health will be instrumental in the next century of health professional innovation. This is particularly relevant to areas facing human resource shortages, including many urban areas.

Nursing education	
Organization innovations	Teaching innovations
Progression from hospital-based training to the university to Bachelor's level	Community college and post-baccalaureate programs for mature students
Nurses having scope of practice to see patients without doctors	Nurse practitioners
Attempts to increase scope of practice in developing world	Nursing training that is founded in population-based and primary care-based public health

Public Health Education

The roots of modern public health education lie in the nineteenth century, when the germ theory and sanitation movement provided impetus for microbiology and then population health to gain the same scientific credibility and societal recognition as medicine. In the early twentieth century, in 1913, the Harvard-MIT School for

Health Officers was founded as the first university-based school devoted to the teaching of public health. The Johns Hopkins University School of Public Health followed shortly behind. From 1916, the Rockefeller Foundation assisted with the development of several other US public health schools such as Columbia and Yale. They also helped establish some overseas ventures, including schools in Chile and Tokyo, with varying success.

While the US public health schools began developing, the London School of Hygiene and Tropical Medicine concurrently started in 1924 and flourished. Their focus was always, from the very beginning, on global health, with its mandate from the Royal Charter to send graduates to work in developing countries.

The success and failure of various public health education programs offer interesting lessons. For example, some of the most successful schools of public health have been ones that began independently of medical schools. While this allowed these independent public health schools (Harvard and Hopkins are both examples) to develop into strong entities in their own right rather than subject to funding pressures of academic medical centers, this may have led to the accidental dissociation between medicine and public health in the United States. How to integrate medicine and public health has been an ongoing debate. The Welch-Rose report of 1913 was the first to touch on the topic, and the New York Academy of Medicine and the Institute of Medicine, among others, have investigated this issue [23, 24].

Importantly, this issue of lack of interprofessional integration between medicine and public health is primarily a United States issue. In other countries, public health schools have not developed nearly to the extent US schools have, and since they are mainly departments under medical schools (i.e., department of community and preventive medicine) and many doctors work in public health, there is less separation. The flip side of this is that most other public health schools do not have the reach and impact of the separate schools of public health. Also, while the focus of other countries' public health schools has not been on leadership and research in the same way as US and UK schools, they have had perhaps as useful of a mission to develop public health professionals to work in their indigenous contexts.

There have been many specific seeds of innovation in public health education. For example, Mexico's Institute of Public Health was founded as a training ground for the Ministry of Health and then developed into a public health school with more academic rigor. In its retention of graduates after their doctoral training, the United States added to its strong academic and research mission [25].

Various programs are beginning to increase access to public health education. South Africa's National School of Public Health initiated a distance IT program. By using a primarily online teaching curriculum and limiting compulsory classroom time to four 2-week blocks, students of 16 African countries have been able to take the course. In just 5 years of the IT/distance course, the number of graduates from this public health school has exceeded the number of graduates from all six other public health schools combined [26]. Some issues relating to its dropout rate and lack of computer literacy must still be worked out; also it is not clear whether graduates have gone on to work on resolving public health issues in sub-Saharan Africa. Nevertheless, such a model taking advantage of technological resources to transcend

national borders offers much potential, especially for those who lack the means to travel outside their home countries for public health education.

Another example of increasing public health education is through shorter-term courses. Brazil's story is colloquially referred to as how one public school turned into 40 because that, in fact, is its history. One public health school, the Sergio Arouca National School of Public Health (*Escola Nacional de Saude Publica Sergio Arouca*) in conjunction with the Oswaldo Cruz Foundation set up a short, 6-month public health course in each of Brazil's 27 states. These courses then each turned into public health schools [27]. Brazil now has one of the highest concentrations of public health training programs in the world. This model of short courses turning into core public health curricula is another good example of ramping up human resources for public health. It also illustrates how collaboration can be useful in public health education, with "private" representing both nonprofits and potentially for-profit enterprises.

Another area that has been called the greatest unfulfilled educational opportunity in public health is the lack of clinical curriculum for public health students. Bangladesh's James P. Grant School of Public Health at BRAC University is a non-governmental organization collaboration that has as part of its curriculum a required hands-on project in the community [28]. Lessons can be learned from BRAC and developing countries' programs to incorporate a practical, applied-learning experience that is the equivalent of clinical experience in medicine to public health training. Not only would this enhance public health education; it serves as a method to involve other health professions in interprofessional collaboration and can be extended to international contexts to improve global interconnectedness.

Another example of transcending national borders is direct collaboration between two schools or institutions in different parts of the world. A recent "twinning" project that focuses on interdisciplinary education is the Johns Hopkins University (USA) and Makerere University College of Health Sciences (Uganda) collaboration on the African Health Education Initiative. Funded by a $5-million grant from the Gates Foundation, the initiative is a 10-year-long process that involves the faculties of medicine, nursing, and public health at both schools to build upon the educational capacity of Makerere University, Uganda's largest university. The project is based on the principles of long-term sustainability and consistency with Uganda's national health priorities [29]. One critique of using this example is that it is a relatively new initiative, and results are still unknown; however, it is an example of a twinning collaboration that holds much promise as it takes advantage of a developed country's curriculum in the context of a developing country's health needs. This new model also standardizes public health education and makes it accessible to the many people who practice public health but have never received formal training in it.

Public health education	
Organizational innovations	Teaching innovations
Collaboration with academic institutions	Requirement of hands-on applied work
Collaboration with NGOs	Distance IT learning
Twinning initiatives	Certificate programs
Short-term courses in public health	

Ongoing Challenges and a Proposal for Reform

To commemorate the 100th anniversary of the Flexner Report, the Lancet published guidelines by a global independent Commission that aimed to establish the twenty-first century vision for the education of health professionals [30]. This Commission report emphasized the move beyond professional silos to new models of interprofessional collaboration and proposed many important innovations for moving health professional education into the twenty-first century.

A separate Lancet Commission of young health professional leaders from around the world[1] published an accompanying critique of the report that discussed its lack of emphasis to service and social accountability in health professional training [31]. The reforms of the nineteenth and twentieth centuries have been remarkable in improving the technical aspects of health care and health education, the report said, but many challenges remain—and these challenges require an entire reexamination of the mission of health professional education.

Perhaps the most important challenge is the neglect of the moral aspect of health professional education. The World Health Organization suggests that health professional training should feature social accountability, namely, "the obligation to direct their education, research and service of activities towards addressing the priority health concerns of the community, region and/or nation that they have a mandate to serve" [32]. Students entering the health professions have strong ideals that must be fostered during training and sustained within systems of practice. Such education must not only involve caring for the individual patient but must also instill the importance of community and the ethic of practicing in areas of greatest need.

Unfortunately, we are far from achieving this goal. Economic factors, such as the high cost of medical education and the commoditization of health care, have disincentivized young graduates everywhere from entering much-needed primary care fields [33]. In developed countries, there is a dearth of providers in underserved rural and urban areas; in developing countries, the "brain drain" has resulted in far worse shortages [15]. Moreover, one of the unintended effects of the Flexner Report is the disproportionate focus on basic science, leading to an unbalanced curriculum that has over 90 % of students reporting that they are not sufficiently trained in public health and problems facing their community [34]. Additional studies have shown that as students go through training, their idealism erodes away, with an accompanying decline in service orientation and empathy toward their patients [35, 36].

Heading into the twenty-first century, it is critical not only to make changes regarding the technical aspects of health professional education but also to transform and redirect the focus of health professional education toward social accountability. Only then can the emerging challenges in urbanization and global health be addressed. As the commission of young professionals proposed, here are five key steps for every

[1] The chapter author served as chair of this commission.

medical school and health professional training program to help align their training with emerging societal need:

1. *Establish an explicit social mission*. Studies have shown that having social accountability as the guiding principle will have transformative effects on every step of the subsequent training, from recruitment to curriculum design to choice of eventual career [37]. Regulatory bodies should measure social accountability and use it as a metric for excellence and accreditation and incentivize inclusion of social accountability into the mission statement [38]. Health professional schools located in urban areas should have an explicit mission statement to train students prepared to address challenges in urbanization. Graduates must be ready to serve the community in which they are trained.
2. *Integrate community learning and service into the curriculum*. Experiences with Cuba, South Africa, China, and the United States, among others, demonstrate that students who spend more time in community settings have a much higher rate of returning to the community to practice [38]. For doctors to truly serve as advocates for their communities, an irreplaceable part of training needs to occur in the community and directly deal with understanding and addressing community concerns. Those students training in urban areas—the majority of students worldwide—have a ready-made platform to commence and conduct their training of urban community and service learning.
3. *Emphasize the importance of primary care*. While few question the centrality of primary health care to the health system, too few young health professionals are entering primary care fields. Preferential recruitment of those committed to primary care principles is critical, as is fostering of the commitment through teaching COPC principles and incorporating apprenticeship models with primary care practitioners. Health systems also need to incentivize practice as primary care providers. This is just important as important in rural settings where there are few practitioners, as there are in urban settings, where the number of practitioners may be high but the proportion of those willing and able to serve the urban poor remains low.
4. *Provide a service option in exchange for free health professional education*. The concept of debt repayment in exchange for service has existed in virtually every country in the form of various loan repayment options [39]. The example of Cuba's ELAM that has recruited tens of thousands from marginalized communities, and compulsory service programs, provide important models for training a health workforce to serve communities most in need [40]. Schools in urban areas need to pay particular attention to recruiting those students who show potential and provide opportunities for them to seek higher education opportunities. Such students are far more likely to return to their urban communities to serve those most in need.
5. *Engage young health professionals in social accountability throughout the continuum of their training*. Altruism is not a concept that holds true only during training; it should last through the entirety of one's career [41]. Postgraduate programs should help young professionals identify mentors who can serve as role

models for social responsibility and help guide trainees to careers in public service. Reflective practice and continuing education can help to reinforce such concepts. Those practicing in urban communities should be encouraged to reach outside their ivory tower and specialty practices to recruit new trainees and practice their art and science in the most underserved areas. This key element of social accountability needs to be modeled from the first day of health professional training and throughout the continuum of education and practice.

The nineteenth and twentieth centuries saw remarkable growth and innovations in medical, nursing, and public health education. More interdisciplinary change is needed into the twenty-first century, but a far more fundamental reform is due that is rooted in the meaning and purpose of the health professions. Particularly as the world evolves and there are new and emerging challenges to urbanization and global health, the next generation of young health professionals needs to continue to uphold the concept that service is the highest calling of our profession. Reform to the healthcare workforce is the most fundamental change that must occur to meet societal needs. Every country's system of education and practice should endeavor to train the next generation of health professionals as socially responsible agents of change.

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