CLOSING THE GAP BY FILLING THE GAPS: LEVERAGING INTERNATIONAL PARTNERSHIPS TO TRAIN THE WORLD'S CARDIAC SURGICAL WORKFORCE

To the Editor:

We applaud Nissen and colleagues[1] for their important international overview of cardiac surgical training pathways in 17 countries across the globe. Their review highlights an important point: a large diversity of training programs adapted to local pathology and technological developments in a field far removed from standardized international accreditation or certification. Notably, the authors raise that "there is little reason to believe a shortage [of cardiothoracic surgeons] would not also be present internationally." Rightfully so, as large disparities exist between and within countries worldwide in the availability and distribution of cardiothoracic surgical specialists, substantially impeding comprehensive health services for patients in need.[2] For example, low-income countries only possess 0.04 cardiac surgeons per million population, in strong contrast with the 7.15 in high-income countries.

Interestingly, although a dip in medical students' interest in the field of cardiac surgery is visible in high-income and upper-middle-income countries around the world, no formal mechanism is in place to close the global workforce gap by leveraging this decline in interest.[3] In Brazil, only 62 of the 228 available cardiovascular surgery training spots were filled in 2018.[4] In other words, 166 spots could theoretically be filled by aspiring cardiac surgeons from other countries, either consequently filling gaps in the sparsely staffed Northwestern part of Brazil or returning to their home countries. Substantial differences in residency pathways in Central and South America exist as a result of different stages of socioeconomic development and political environments. These lead to the need for many medical graduates to seek postgraduate cardiac surgical training elsewhere on the continent. For example, no training program is in place in Ecuador, whereas Venezuela's surgical programs have decreased in size due to a less-favorable contemporary environment. Similarly, (future) cardiac surgeons in sub-Saharan African and Southeast Asian low- and lower-middle-income countries (LLMICs) commonly train in South Africa, Egypt, Russia, China, and India—of which the latter 3 have numerous unfilled training spots. However, barriers include visas, administrative processes, language, funding, and the right connections.

Although some individuals are able to successfully obtain training abroad, many do not. Inter-societal efforts, governmental agreements, and academic partnerships are critical to maximize annual training capacity around the world and build capacity in and for LLMICs. While some inter-continental conferences and inter-societal partnerships exist to enable surgeons to do clinical training abroad through conference workshops or short-term placements, these do not contribute meaningfully to initial career entry. The Nordic countries model, whereby budding Icelandic surgeons are trained in other Nordic countries, the United Kingdom, or the United States, may be modeled between LLMICs and, for example, the aforementioned upper-middle-income countries.[5] Similarly, countries ought to consider collaborative models to train specialist workforces in neighboring LLMICs as universal health coverage plans and national surgical, obstetric, and anesthesia plans are developed to strengthen health systems as a whole. As we gather a better understanding of countries' unique approaches to train future generations, collaborative opportunities need to be sought to train the world's cardiac surgical workforce by filling the slots unfilled in nearby countries.

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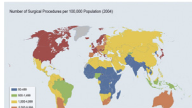

REPLY: INTERNATIONAL PARTNERSHIPS TO HELP TRAIN THE WORLD'S CARDIOTHORACIC SURGERY WORKFORCE:

Reply to the Editor:

The Letter to the Editor submitted by Vervoort and Velazco-Davilla[1] is a response to an article by Nissen and colleagues[2] describing an international overview of cardiac surgical training in developed countries. The authors point out many of the well-known gaps and limitations in cardiac surgical training in low- and lower-middle-income countries (LLMICs).[1] They argue that there are gaps in country-specific training in LLMICs. They suggest that sponsors of training programs in neighboring countries or in regional programs should tailor curricula to local and regional needs, many of which are unique and are not necessarily in the mainstream of cardiothoracic surgical education and training. It is hard to argue with the authors' premise. Yet, there are some additional relevant facts worth mentioning that temper the authors' message.

The authors focus on needs for specialized surgical trainees who can respond to country-specific surgical needs. They do not mention the unmet needs for ancillary medical services that are specific for cardiothoracic surgery. These ancillary needs are paramount and include nursing, perfusion, and intensivists among others needed to support surgeons within a cardiac program. In many LLMICs, these ancillary services may be even less available than surgeons.[3,4] While there are some limited training programs available for cardiothoracic trainees in these underserved areas, there may be even less availability of training for ancillary services to support advanced surgical techniques and cardiac-specific care patterns.

The authors also point out the unique cardiothoracic needs of LLMICs and the relative absence of LLMIC-specific cardiac surgical curriculum in training programs. Again, it is hard to argue with this assertion. The authors provide some vague suggestions about filling the needs in LLMICs and even offer a model used in the Nordic countries. It would help to have some concrete, region-specific proven models to point to as possible ways forward. The sad fact is that there are few successful locoregional models that exist and even fewer models supported by LLMIC countries. The authors are stating an important and obvious message that needs to be heard. What might make a bigger impact is to produce some concrete recommendations using a region or several LLMIC countries as examples. Others have made similar observations to those of the authors. Often what is lacking in these observational efforts are proven solutions. Because of constraints on the manuscript length of Letters to the Editor, it was not possible for the authors to outline comprehensive plans for enhancing global cardiothoracic surgical care. The Commentary by Vervoort and Velazco-Davilla[1] highlights some well-recognized global problems related to specialty surgical care. It would be refreshing to cite some concrete examples of a way forward. Unfortunately, the way forward is not clear and needs much increased interest on the part of local, regional, and worldwide cardiothoracic surgical workforces.

It is worth pointing out that the original article by Nissen and colleagues[2] describing differences in cardiothoracic training in developed countries triggered a much-needed discussion of the worldwide disparities in cardiothoracic surgical care and education. It is a sad but critical fact that nearly one half of the world's population does not have access to adequate advanced cardiac surgical care, much less specialty training programs. The number of deaths as a result of this limitation is incalculable, but enormous. As a specialty, we have avoided this fact to a greater or lesser extent, and Editorial Commentaries and associated *Journal* articles that draw attention to this consistent disparity in care are an important initial part of the process to gain international attention. This added attention could begin the process of fixing a problem that has existed over a very long period of time that is neither acceptable in the eyes of cardiac surgeons nor tolerable in the eyes of countries suffering from the lack of advanced cardiac care. I hope that the dialog created by this series of Commentaries will stimulate much needed efforts at change.

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