It is a sobering realization that our ability to dedicate an issue of Anesthesiology to education, and to agonize about topics such as required simulation experience and optimal faculty–resident ratios, is a luxury not shared by much of the world. In many resource-poor environments, the number of clinical specialists is so low that even if qualified students, adequate facilities, and appropriate materials are present, education still may not occur, simply because there are no teachers.

The United States has approximately 25 physicians per 10,000 population. More than 30 countries make do with less than 1/10 of this number; the vast majority of these are in Africa (fig. 1). The resulting problems with healthcare access are easily understood, but such a dearth of doctors also makes it essentially impossible to increase the number of physicians. Those in clinical practice are overworked, and the few that might be involved in teaching have to devote most of their time to administration. These countries are in a bind: there are insufficient staff physicians to educate many residents, and because not many residents are trained, there is no increase in the number of staff physicians. A critical mass of teachers is required before this problem can be solved, and therefore this vicious circle can be broken only with substantial outside teaching support.

Here are three examples from our specialty, covering a range of situations as found in east African countries with less than 1 physician per 10,000 population.

1. Malawi has no local anesthesiologists. A very small residency program is run by foreign faculty and combines education at the central hospital, where residents are supervised largely by clinical officers (CO), with a year in South Africa. The first trainee out of this program is about to graduate. Essentially all cases in the country’s 25 hospitals are done by approximately 100 independently practicing COs; volunteers from Health Volunteers Overseas assist sporadically with CO training.† For comparison: Pennsylvania has about the same area and population as Malawi (approximately 15 million people); it has 1,900 anesthesiologists‡ and 3,600 nurse anesthetists.§

2. Tanzania has less than 10 anesthesiologists. Most work in private clinics in Dar es Salaam. One is employed at the university hospital in Bugando, where he is mostly engaged in administration, and does some didactic teaching for COs. Foreigners assist with CO training in Bugando and other places in the country.║

3. Rwanda has about a dozen anesthesiologists, all employed at the two university hospitals, a military hospital, and one private clinic; work in approximately 40 other hospitals is done by COs. The Canadian Anesthesiologists’ Society and the American Society of Anesthesiologists have provided teaching and logistical support to a Rwandan residency program started in 2006.# This program has graduated several specialists, who have

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Photo: M. Durieux.
countries, residents and COs have to pay tuition, making it difficult for many to pursue specialization. But our concern here is how best to supplement the local faculty with foreign educators, to allow residency programs to build capacity. There is no single right answer, yet many vital issues to consider. Here are some pertinent questions referenced to the situation in Rwanda.

1. **Who organizes the program?** It is critical that any such program be comprehensive and unified, and driven by the local clinicians and administration—they are the only people who understand the local situation. Too many organizations send teachers for short periods of time at irregular intervals, which can never be a structural solution. Preferably, all efforts directed at a residency program should be aligned, and all visiting faculty should teach according to a defined curriculum, with local faculty in charge of the process. The Canadian Anesthesiologists’ Society/American Society of Anesthesiologists program in Rwanda is a good example: the program sends one anesthesiologist—United States or Canadian—each month, and thus provides a full FTE. A detailed curriculum tells each visiting faculty member exactly which subjects to teach.

2. **Who are we teaching: residents or COs?** Realistically, COs will be the primary anesthesia providers in most hospitals for many years to come, and it is in the patients’ best interest that COs are optimally taught. Therefore,

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**Fig. 1.** Physicians working around the world. The relative size of each territory on the map corresponds to the proportion of all physicians in the world who work there. In 2004 there were 7.7 million physicians working around the world. If physicians were distributed according to population, there would be 12.4 physicians to every 10,000 people. The most concentrated 50% of physicians live in territories with less than a fifth of the world population. The worst off fifth are served by only 2% of the world's physicians. Note the disproportionately low number of physicians in Africa (red). © Copyright Sasi Group (University of Sheffield, Sheffield, United Kingdom) and Mark Newman (University of Michigan, Ann Arbor, Michigan). Reproduced under Creative Commons license.

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participation in CO training is highly valuable. But if
the eventual goal is to have, say, at least one anesthesi-
ologist available in each hospital, residencies will have to
be started and residents educated at the same time that
we help train COs.

3. Should we go there, or should they come here? Instead
of setting up residency programs in various countries
and sending faculty over to teach, it may seem attrac-
tive to bring a few residents at a time from a resource-
poor country to the United States and let them take
part in our training programs. However, this approach
has many problems. Licensing requirements are a major
stumbling block, but maybe more important is that
such people would be trained in a way of providing
anesthesia that is radically different from what they will
do back home. In fact, they would learn to use drugs
and techniques that mostly do not exist in their country,
and not gain familiarity at all with those they will be
using there. What is feasible and useful, as shown by the
Canadian Anesthesiologists’ Society/American Society
of Anesthesiologists program, is for residents who have
completed training to spend several months in a west-
ern country to learn advanced techniques.

4. Can we do distance teaching instead? We can, and we
should, but it cannot replace bedside teaching in the
operating room. Technically, video conferencing to
most locations in the world is feasible these days. Our
institution does regular joint case conferences with the
residents in the Rwanda program and our own, and
both sides find these very educational and enjoyable.

5. How much time should visiting faculty spend? The answer
to this question depends on many factors. A longer stay
(6 months at least) may be preferable, as it allows the
faculty to truly understand the work environment of the
trainees. But it is very difficult for a practicing anesthe-
siologist to take extended time off work, if only because
of the financial implications. The Rwanda Human
Resources for Health program requires extended stays
(preferably a year), but that program comes with sub-
stantial salary support. Other programs, such as the
Canadian Anesthesiologists’ Society/American Society
of Anesthesiologists program, have demonstrated that
short-term faculty, when properly guided, can be effec-
tive. Even in that setting, though, long-term contacts
are necessary for curriculum building.

6. Should U.S. residents participate? Being able to teach
in a country with very different approaches to anes-
thesia is an extremely valuable contribution to a resi-
dent’s education. Senior residents are very effective
teachers because they often connect more easily with
the local resident group, and may carry a greater store
of practical clinical pearls to share than does the more
academic faculty member. Many overseas teaching pro-
grams allow resident participation, and the American
Board of Anesthesiology has formulated a set of rules
that allow time spent on such effort to count toward
residency requirements. U.S. teaching hospitals are not
always willing to pay residents’ salaries during away
rotations, but they should be strongly urged to support
these efforts—after all, the hospital will be more than
willing to share the publicity that comes from this kind
of work.

We should support well-designed overseas teaching
efforts. Because without our help, it will remain impossible
for the few, overworked anesthesiologists in Africa and else-
where to create the critical mass, to train enough residents,
and to break the vicious cycle of insufficient personnel that
prevents each patient from having access to an anesthesiolo-
gist when needed.

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