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Global Health Training and International Clinical Rotations during Residency: Current Status, Needs, and Opportunities

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Abstract

Increasing international travel and migration have contributed to globalization of diseases. Physicians today must understand the global burden and epidemiology of diseases, the disparities and inequities in global health systems, and the importance of cross-cultural sensitivity. To meet these needs, resident physicians across all specialties have expressed growing interest in global health training and international clinical rotations. More residents are acquiring international experience, despite inadequate guidance and support from most accreditation organizations and residency programs. Surveys of global health training, including international clinical rotations, highlight the benefits of global health training, as well as the need for a more coordinated approach. In particular, international rotations broaden a resident's medical knowledge, reinforce physical examination skills, and encourage practicing medicine among underserved and multicultural populations. As residents recognize these personal and professional benefits, a strong majority of them seek to gain international clinical experience. In conclusion, with feasible and appropriate administrative steps all residents can receive global health training and be afforded the accreditation and programmatic support to participate in safe international rotations. The next steps should address accreditation for international rotations and allowance for training away from continuity clinics by residency accreditation bodies, and stipend and travel support for 6 or more weeks of call-free elective time from residency programs.

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During the 2008 U.S. presidential election campaign, candidates debated immigration policies that may affect the 40 million people living in the U.S. (13% of the population) who were born in another country.¹ In addition, 1,160,000 people immigrate to the United States annually, accounting for 25% of the country's population growth. Each year, more than 60 million American residents travel abroad, with more visiting developing countries than ever before.²⁻⁴ As the mobile U.S. population grows, the importation of emerging infectious diseases, such as those caused by virulent strains of influenza virus and drug-resistant pathogens including *Mycobacterium tuberculosis*, presents greater health threats within our borders.⁵ Consequently, assuring a healthy domestic population now requires greater knowledge of diseases that typically occur in distant geographic regions.⁶ This is just one of many reasons why providing global health training to new U.S. physicians has become increasingly important.

Currently, nearly all medical schools have incorporated some form of global health teaching into their curricula, and more than 25% of U.S. medical school graduates enter residency training with some international health experience.⁷ Although these earlier experiences provide a useful introduction to global health, the optimal time for this type of medical training is during residency, after young physicians have developed a clinical context of diseases. Furthermore, resident physicians are often the first to encounter patients in hospital emergency rooms and inpatient wards, and global health training can be an invaluable asset when dealing with patients who were born or have spent significant time abroad. As part of the recognized need for this type of training, residents have increasingly selected residency programs based upon available global health training opportunities.⁸⁻¹³ Unfortunately, residency programs have been much slower than medical schools to adopt global health training and meet the global health interests of residents. Based on these realities, the objectives of this manuscript are to review resident participation in global health training opportunities, including international clinical rotations, and to identify the major barriers to such training opportunities and propose solutions that can advance global health training and international clinical rotations for residents.

Defining Global Health Training

Although few people have attempted to define global health,¹⁴ key components of a definition would include aims to understand and reduce health disparities at home and abroad, as well as working collaboratively with other communities and countries to improve community health locally and globally. Thus, global health training involves learning about health issues that transcend geographic borders and commonly present a greater burden to disadvantaged populations. Global health training also encompasses a wide variety of disciplines, may be accomplished through vastly different approaches depending upon sociocultural context, and shares a goal of improving the health of global communities. Currently, no standardized curriculum exists for global health training among medical students or residents, and related curricula vary quite widely in medical centers throughout the United States. Given the diversity of disciplines and work settings involved in health professions training, it might be undesirable, if not impossible, to develop strict guidelines for global health training. The American Academy of Pediatrics' section on International Child Health recently eschewed mandating a standardized global health curriculum in favor

of developing clinical global health competencies for each of the six Accreditation Council for Graduate Medical Education (ACGME) areas: Patient Care, Medical Knowledge, Interpersonal Skills and Communication, Practice-based Learning and Improvement, Professionalism, and Systems-based Practice.¹⁵ Other residency programs can and should examine these competency objectives to guide the creation of educational programs and international opportunities. A new guidebook, *Developing Residency Training in Global Health*, published by the Global Health Education Consortium, a non-profit consortium of health professionals, educators, students, and institutions, provides guidance for incorporating global health training in residency programs.¹⁵ This guidebook can aid programs in developing and global health training for resident physicians.

Many residency programs have already developed global health curricula for residents. These may include a global health journal club, a seminar series involving global health topics, a local outreach activity to a minority population or ethnic group, an elective didactic course for residents, a review of the global burden of disease, or preparations for risk management and behaviors for a specific international rotation. Global health training can be accomplished at each resident's home institution and within local communities, but many residents want additional hands-on experience in an international clinical rotation at a foreign institution. These rotations, while extremely valuable, are not an essential component of introductory global health training. However, they are increasingly being offered to residents as part of a global health pathway, track, or certificate in global health.

Global Health Training during Residency

Growing interest

Resident physicians in the United States have been participating in formal international clinical rotations for decades. Reports from Yale, Duke, and University of Arizona described early programs during the 1980s and 90s.^{8,9,16} Since then, residency programs among various medical specialties sought to incorporate global health training into their programs.^{17,18} By 1998, 45% (195/429) of family medicine programs offered international clinical rotations to residents.¹⁸ In 2001, 71% (72/102) of emergency medicine program directors reported that their program offered international clinical rotations.¹¹ In 1995, 25% (41/161) of U.S. and Canadian pediatric programs offered formal or informal international clinical rotations, while an additional 42% (67/161) wanted either to learn more about or develop such rotations.¹⁹ By 2006, 52% (55/106 respondents) of U.S. pediatric programs offered formal international clinical rotations, and 7% (7/100 respondents) had established either a formal global health track or certificate program.²⁰

Many residents, especially those with previous international experience, have selected their training programs based in part on global health training opportunities (Table 1).⁸⁻¹³ Two recent surveys reported that 58% of New York University surgical residents and 67% of University of Colorado pediatric interns identified global health opportunities as a significant factor in their selection of a residency program.^{12,13} On average, their preferences for selecting a global health-oriented program was twice as great as was found by studies conducted among internal medicine residents a decade earlier.^{8,9} One large cross-institution survey in 2000–01 reported that 47% (173/369) of emergency medicine residents

had ranked programs with global health training opportunities higher than programs without opportunities, and the percentage was even higher (68%) among those residents with previous international experience.¹¹ As more medical students continue to acquire international experiences, global health training opportunities are likely to become an even more common factor for selecting residency programs.

Despite the expansion of global health training opportunities, residents from a wide variety of specialties have been voicing their interests for more international clinical rotations (Table 1).^{9,11-13,21,22} In one large cross-institutional survey, 86% of Emergency Medicine residents wanted to participate in an international rotation during residency training.¹¹ In two recent surveys, more than 95% of Surgery and Pediatric residents wanted international clinical experience during residency.^{12,13} Three-quarters of surgical residents surveyed would have prioritized an international clinical elective over all other available electives.¹³

Lasting benefits

The benefits of international clinical rotations for a physician's development have long been recognized.^{23,24} International clinical rotations broaden a physician's medical knowledge through exposure to patients with diseases not endemic to their home region, and to the more severe stages of illness seldom encountered at home. For example, Pediatric residents who rotated in Peru and Guatemala reported that 18% of the patients they observed had diseases they had never encountered, and 6% of the patients had familiar diseases in advanced stages they hadn't previously seen.¹² International clinical rotations also foster an improvement of physical examination and procedural skills, due in part to less availability of extensive laboratory testing, accessible consultants, and expensive diagnostic imaging.^{8,9,23,25} Among 96 internal medicine residents, those with international clinical experience were more likely than residents without international experience to agree that U.S. physicians underutilized physical exam skills (80% vs. 69%, respectively, $P = 0.03$).⁸ In open ended comments, one-third of the participants noted the positive influence of international experiences on their comfort with clinical and diagnostic skills, and in particular on their improvement of and greater reliance on the physical examination.⁸ These benefits were not limited to those in primary care specialties, as general and orthopedic surgery residents also reported similar experiences.^{21,22} The highest perceived benefit of an international rotation among resident surgeons who completed an international elective rotation was acquisition of technical and clinical skills, which was a near universal expectation (94%).¹³ In addition, resident physicians also report developing a deeper appreciation for public health issues, professionalism, and cultural sensitivity during their international clinical rotations.^{9,26} When surveyed two years after international clinical rotations, participants reported a continued positive influence on clinical and language skills, awareness of cultural and socioeconomic factors, and greater recognition of the importance of communication skills.²⁶ Finally, international clinical rotations expose residents to medical systems that may have a different approach to and expectations of the physician-patient interaction, which may influence the resident's cultural understanding of medical care.

Residents returning from an international clinical rotation generally endorse more inclusion of these rotations in residency programs (Table 1).^{8,9,12,21,22} Among physicians who completed medicine residency training at Yale University, 87% of the International Health Program participants agreed that “residency training should include voluntary electives in developing countries.”⁸ For Duke University's internal medicine residents who participated in an international rotation, the experience exceeded expectations for 81% and was described as having the most significant positive impact on their medical training.⁹ All participants felt the program should be continued, and even 98% of residents who did not participate in an international rotation at Duke wanted the program to continue because of the benefits of global health seminars and informal discussions with participants.⁹ Finally, surgeons at the University of California - San Francisco, who had returned from a clinical rotation in Uganda, recently concluded that “a developing country surgical experience... should be an essential component of surgical training programs”.²¹

In addition to enhancing residents' overall educational experience, the knowledge and skills acquired from international clinical rotations also help meet the current needs of the U.S. health care system. Medical students and residents who participate in international clinical rotations are more likely to pursue primary care medicine, obtain a public health degree, and practice medicine among underserved and multicultural populations.^{7,8} Among medicine graduates of Yale University, participants in an international clinical rotation were more likely than non-participants to have a practice that includes immigrant patients (43% vs. 24%, $P = 0.006$) and patients on public assistance (80% vs. 54%, $P < 0.001$).⁸ The Yale medicine graduates who completed an international rotation were also more likely than those without such rotations to change career plans from subspecialty to general medicine (56% vs. 31%, $P = 0.02$).⁸ Given the growing shortage in the United States of new physicians choosing careers in primary care specialties, and the increasing numbers of uninsured and immigrant patients, these physicians can help fill widening gaps in the medical system.

Residents who have participated in an international rotation may also be more likely to work internationally in the future. Participants in international clinical rotations from Yale University and Duke University were significantly more likely than non-participants to consider or plan future work overseas ($P = 0.002$ and $P < 0.05$, respectively).^{8,9} In 2005, the National Academy of Sciences' Institute of Medicine issued recommendations for creating a global health workforce,²⁷ which, in order to be met, require physicians with previous international experience and a desire to work in underdeveloped settings.

Opportunities for Overcoming Barriers to Global Health Training

Barriers for programs

Many residents do not acquire global health training simply because it is not formally offered at their institution. Some residency programs offer minimal global health training with an occasional noon conference or grand rounds presentations on global health topics. Few programs officially recognize global health training with tracks, certificate programs, designated pathways, or additional degrees. Despite the high level of interest among residents and the availability of international rotations at the majority of pediatric training

program in North America, a recently published survey revealed that only 10% of Pediatric residents among 106 programs had participated in an international clinical rotation during residency.²⁰ The barriers to pursuing such rotations stem from personal considerations, as well as from a combination of accreditation and administrative issues (Table 2). First, most medical accreditation organizations do not officially recognize time spent doing clinical training in other countries. The American Board of Surgery and the American Board of Orthopedic Surgeons, for example, do not count procedures performed overseas towards meeting accreditation requirements. Despite this apparent disincentive, 85% of resident surgeon respondents to a 2007 survey reported that they would have pursued an international rotation even if their overseas surgical cases were not counted towards accreditation.¹³ Currently, only the American Academy of Pediatricians has developed guidelines for overseas clinical rotations.

A second barrier to pursuing international clinical rotations is the difficulty residency program directors have in granting call-free elective blocks to residents and allowing them to spend time at an overseas training site. Many program directors also lack the administrative support and the faculty oversight that would assure quality training and mentoring during these rotations. Among 144 family medicine residency programs, the most strongly correlated factor in high rates of resident participation in international rotations was the number of program faculty conducting international work during the previous two years.¹⁸ Programs without substantial faculty participation in global health training saw lower rates of resident participation in such training. However, faculty support is not the only restrictive resource affecting residents' participation in international clinical rotations. Although such rotations are relatively inexpensive, financial support is also very limited. Family medicine programs with more residents doing international rotations also had more months of salary stipend paid for international elective rotations, offered international rotations for a longer duration, and paid for living expenses while at the international site.¹⁸ More recently, in a survey of 106 pediatric residency program directors, those with more than two faculty members involved in global health activities, a greater number of residents, and more than 4 weeks of call-free elective time during the second post-graduate year had significantly greater resident participation in international rotations.²⁰

Barriers for residents

Residents have consistently reported family responsibilities and financial difficulties as their main reasons for not participating in international rotations (Table 1).^{8,9,13} Additional barriers often mentioned by residents include lack of available time, scheduling conflicts, and concerns for personal safety. Among 52 resident surgeons, the most significant perceived barriers were financial difficulties (82%), scheduling conflicts (53%), and concerns for personal safety (41%).¹³ Finally, arranging and preparing for an international clinical elective requires considerable time and effort, commodities which are in short supply among resident physicians.

The appropriate amount of time for a resident physician to spend on an international clinical rotation is a balance between the time required to adapt to and learn at an international site and the financial and other costs and programmatic constraints associated with being away

from the resident's home institution. Most international rotations last between one and three months. Few studies have assessed the optimal duration or resident's preferences, but resident surgeons at New York University responded that 2.6 ± 0.4 months was the ideal duration for international rotations.¹³ While there may be little consensus, perhaps most residents and program directors might agree that an international rotation less than six weeks is too short, and two or three months is more beneficial – especially for residents choosing a global health track or certificate program.

Suggestions for Expanding Global Health Training during Residency

Incorporating global health training into residency programs more widely will take considerable effort. There should be two major goals for these efforts. First, all residents should receive education in the spectrum of relevant global health topics, including training in cross-cultural appreciation and working with translators. Second, residents who want to gain the benefits of an international clinical rotation should be afforded at least six weeks of call-free time at an international site after their first year, preferably with financial assistance and accreditation recognition.

To achieve these goals, accrediting organizations should identify core global health competencies within their specialty to guide residency training programs in building global health educational curricula, and international rotations in meeting those stated competencies. They should develop or adopt safety and risk management guidelines and assessment tools for specific international rotations. Residency review committees could promote the growth of international clinical rotations by adopting more flexible accreditation requirements and granting a specified number of hours or procedures during such rotations toward the qualifications of board certification. Accreditation oversight organizations, such as the ACGME, could assist by establishing criteria for acceptable international rotations.

Residency programs should aim to provide basic global health training on-site to all residents, and also to provide the necessary call-free time and financial and faculty support for all interested residents to experience the benefits of an international rotation. Global health training may be facilitated by developing a certificate program, track, or pathway that requires specified educational goals and practical experience. In terms of official recognition, an overseas elective rotation should be considered equal to any other elective subspecialty rotations, providing unique and valuable training benefits. Programs should provide salary stipend support, insurance, and funding for travel assistance to supplement what residents can contribute from their own resources.

Those residents participating in international clinical rotations should be expected to spend at least six weeks working at the host institution's hospital or clinic, allowing time for travel and orientation at the host institution. Visiting residents must observe the ethical mandate that they practice within the boundaries of their professional training, and not perform treatment or procedures beyond their competence.²⁸ While they should also be prepared to teach students and residents at the host institution, they must not assume that the approaches they have learned at home are better than the approaches applicable in the host institution.

A key element of many successful U.S.-based international programs has been building effective collaborative partnerships with medical institutions in developing countries. Visiting residents will need knowledgeable onsite supervisors as well as a close relationship with a faculty mentor at home. Establishing ongoing collaborative partnerships with institutions abroad will help visiting residents and physicians, and foster a more cohesive exchange of information and resources.

Last, and not least, the goals of increased international clinical rotations should not only be provision of additional training sites for U.S. physicians, but also cultivation of a long-term exchange of resources and training opportunities with partner institutions. A bilateral exchange of resident physicians, training program supervisors, and other faculty would benefit institutions in both developed and developing countries.

Conclusions

In 1969 an editorial in *JAMA* stated, “If, as a routine, young American doctors were encouraged to spend some months working in a developing country before they became tied to the responsibilities of practice, the result could only be better medicine at home and abroad.”²⁴ Since then, surveys have demonstrated the benefits of global health training and international clinical rotations, and residents are asking for more opportunities. Examining patients born in or who recently visited another country requires that physicians understand more than the diseases endemic in their home neighborhoods. Resident physicians understand the need to have these skills and are now selecting programs that provide global health training.

In summary, with the increasing migration of people, providing global health training and facilitation of international clinical rotations to U.S. resident physicians has now become a necessity. Medical accreditation organizations must take the lead in expanding global health training opportunities by recognizing the value of international rotations and promoting them through adaption of accreditation policies and requirements. Residency programs must develop structural and financial support to enable residents to acquire these valuable clinical skills. With the large number of Residency Review Committees in the United States, development of overarching global health training policies, coupled with oversight and standards specific to each specialty and subspecialty will be important. The newly trained global health-competent physicians will not only have improved clinical skills and knowledge, but will be better equipped to serve the populations of our country and, indeed, of the world.

References

1. United Nations Department of Economic and Social Affairs. Geneva, Switzerland: United Nations Publication; 2006. International Migration 2006. Available at: (www.un.org/esa/population/publications/2006Migration_Chart/2006IntMig_chart.htm) [Accessed November 24, 2008]
2. Zuckerman JN. Travel medicine. *Br Med J*. 2002; 325:260–264. [PubMed: 12153925]
3. Bacaner N, Stauffer B, Boulware DR, Walker PF, Keystone JS. Travel medicine considerations for North American immigrants visiting friends and relatives. *J Amer Med Assoc*. 2004; 291:2856–2864.

4. Okie S. Immigrants and health care - At the intersection of two broken systems. *New Engl J Med*. 2007; 357:525–529. [PubMed: 17687126]
5. Institute of Medicine. *Microbial Threats to Health: Emergence, Detection, and Response*. Washington D.C: The National Academies Press; 2003.
6. Wilson CL, Pust RE. Why teach international health? A view from the more developed part of the world. *Educ for Health*. 1999; 12:85–89.
7. Drain PK, Primack A, Hunt DD, et al. Global health in medical education: A call for more training and opportunities. *Acad Med*. 2007; 82:226–230. [PubMed: 17327707]
8. Gupta AR, Wells CK, Horwitz RI, Bia FJ, Barry M. The international health program: The 15-year experience with Yale University's internal medicine residency program. *Am J Trop Med Hyg*. 1999; 61:1019–1023. [PubMed: 10674689]
9. Miller WC, Corey GR, Lallinger GJ, Durack DT. International health and internal medicine residency training: The Duke University experience. *Am J Med*. 1995; 99:291–297. [PubMed: 7653490]
10. Bazemore AW, Henein M, Goldenhar LM, Szaflarski M, Lindsell CJ, Diller P. The effect of offering international health training opportunities on family medicine residency recruiting. *Fam Med*. 2007; 39:255–260. [PubMed: 17401769]
11. Dey CC, Grabowski JG, Gebreyes K, et al. Influence of international emergency medicine opportunities on residency program selection. *Acad Emerg Med*. 2002; 9:679–683. [PubMed: 12093707]
12. Federico SG, Zachar PA, Oravec CM, et al. A successful international child health elective. *Arch Pediatr Adolesc Med*. 2006; 160:191–196. [PubMed: 16461877]
13. Powell AC, Mueller C, Kingham P, et al. International experience electives, and volunteerism in surgical training: A survey of resident interest. *J Am Coll Surg*. 2007; 205:162–168. [PubMed: 17617344]
14. Brown TM, Cueto M, Fee E. The World Health Organization and the transition from 'International' to 'Global' public health. *Am J Public Health*. 2006; 96:62–72. [PubMed: 16322464]
15. Evert, J.; Stewart, C.; Chan, K.; Rosenberg, M.; Hall, T. *Developing Residency Training in Global Health: A Guidebook*. San Francisco: Global Health Education Consortium; 2008. Available at: (<http://globalhealthedu.org/Pages/Resource.aspx>) [Accessed September 15, 2008]
16. Pust RE, Moher SP. A core curriculum for international health: Evaluating ten years' experience at the University of Arizona. *Acad Med*. 1992; 67:90–94. [PubMed: 1547002]
17. Thompson MJ, Huntington MK, Hunt DD, Pinsky LE, Brodie JJ. Educational effects of international health electives on US and Canadian medical students and residents: A literature review. *Acad Med*. 2003; 78:342–347. [PubMed: 12634222]
18. Schultz SH, Rousseau S. International health training in family practice residency programs. *Fam Med*. 1998; 30:29–33. [PubMed: 9460613]
19. Torjesen K, Mandalakas A, Kahn R, Duncan B. International child health electives for pediatric residents. *Arch Pediatr Adolesc Med*. 1999; 153:1297–1302. [PubMed: 10591310]
20. Nelson BD, Lee AC, Newby PK, Chamberlin MR, Huang CC. Global health training in pediatric residency programs. *Pediatrics*. 2008; 122:28–33. [PubMed: 18595983]
21. Ozgediz D, Roayaie K, Debas H, Schecter W, Farmer D. Surgery in developing countries: Essential training during residency. *Arch Surg*. 2005; 140:795–800. [PubMed: 16106579]
22. Haskell A, Rovinsky D, Brown HK, Coughlin RR. The University of California at San Francisco International Orthopaedic Elective. *Clin Ortho Related Research*. 2002; 396:12–18.
23. Barry M, Bia FJ. Department of Medicine and International Health. *Am J Med*. 1986; 80:1019–1021. [PubMed: 3728498]
24. Anon. Overseas medical aid. *J Amer Med Assoc*. 1969; 209:1521–1552.
25. Smilkstein G, Culjat D. An international health fellowship in primary care in the developing world. *Acad Med*. 1990; 65:781. [PubMed: 2252504]
26. Haq C, Rothenberg D, Gjerde C, et al. New world views: preparing physicians in training for global health work. *Fam Med*. 2000; 32:566–572. [PubMed: 11002868]

27. Mullan, F.; Panosian, C.; Cuff, P., editors. Institute of Medicine. Healers abroad: Americans responding to the human resource crisis in HIV/AIDS. Washington D.C.: National Academies Press; 2005.
28. Crump JA, Sugarman J. Ethical considerations for short-term experiences by trainees in global health. *J Amer Med Assoc.* 2008; 300:1456–1458.

Table 1

A Summary of Resident Surveys about Global Health

Survey years	Respondents	Global health program	Percentage of residents who felt that international opportunities influenced their residency selection	Percentage of residents who wanted to pursue an international clinical rotation	Comments from resident participants of international clinical rotations
1982 - 1996 (Gupta 1999) ⁸	192 of 352 (61%) internal medicine residents/graduates at Yale University	Four to eight weeks in Haiti, Tanzania, Zimbabwe, Fiji, New Mexico, or Arizona	28% (53/192)	N/A	81% (153/190) agreed that "residency training should include voluntary electives in developing countries"
1988 - 1995 (Miller 1995) ⁹	281 of 303 (93%) internal medicine residents/graduates at Duke University	12 weeks in Tanzania, Taiwan, China, or Brazil	24% (68/280)	55% (55/100) of residents planned participation	On average, international elective "had the most significant positive impact on their medical training"
1992 - 1998 (Haskell 2002) ²²	17 (sample size not specified) orthopedic surgery residents at University of California - San Francisco	One month in South Africa	N/A	N/A	Based on responses, faculty had "embraced the elective as part of an ideal orthopedic resident curriculum"
1994 - 2003 (Bazemore 2007) ¹⁰	69 of 90 (77%) family medicine graduates at University of Cincinnati	Includes work in developing country and didactics in tropical medicine and public health	Most significant factor for choosing residency among international health track participants	N/A	N/A
2000 - 2001 (Dey 2002) ¹¹	408 of 1,205 (34%) first-year emergency medicine residents at 122 programs. Conducted by Johns Hopkins University.	N/A	47% (173/369) (68% [104/152] among those with previous international experience)	86% (350/406)	77% (313/407) would "like to see more international emergency medicine exposure in [their] residency program"
2000 - 2004 (Federico 2006) ¹²	22 pediatric residents at University of Colorado Health Sciences Center	Four weeks in Guatemala or Peru	67% of 2005-06 interns (sample size not specified)	96% of 2005-06 interns (sample size not specified)	"Feedback from resident and faculty evaluations of the elective was uniformly positive."
2004 - 2005 (Ozgediz 2005) ²¹	28 of 40 (70%) surgical residents at University of California - San Francisco	Six weeks in Uganda	N/A	90% (25/28)	"A developing country surgical experience... should be an essential component of surgical training programs"
2006 (Powell 2007) ¹³	52 of 63 (83%) general surgery residents at New York University	In development	58% (30/52)	98% (51/52) (73% [38/52] prioritized global health elective over all other electives)	N/A

Table 2
Barriers and Proposed Solutions for Expansion of International Clinical Rotations (ICRs)

Stakeholder	Barriers	Proposed solutions
Accreditation organizations and review committees	<ul style="list-style-type: none"> Have not developed core competencies or training guidelines for residents doing ICRs.* Do not officially recognize time spend doing clinical training in another country. Generally have not helped to foster an exchange between domestic residency programs and foreign institutions. 	<ul style="list-style-type: none"> Discuss the utility of ICRs as part of physician training and establish core competencies and training guidelines. Allow 1 month of an ICR, and the associated procedures, to apply towards accreditation requirements. Become active in exploring “twinning” arrangements and bilateral exchange programs.
Residency administration and program directors	<ul style="list-style-type: none"> Do not provide scheduled time for residents to participate in ICRs. Do not provide administrative support to assist residents in finding appropriate ICRs. Often do not provide adequate financial support for ICRs. 	<ul style="list-style-type: none"> Allow interested residents to spend 1 call-free elective month on an ICR. Facilitate in identifying and establishing structured ICRs. Provide support, ideally with salary and travel assistance, for residents on ICRs. Seek to establish relationships with hospitals/ institutions in developing countries to foster bilateral exchange.
Residents	<ul style="list-style-type: none"> Face financial constraints. Face scheduling conflicts. Would be required to spend time away from family. Must spend significant time locating an ICR. 	<ul style="list-style-type: none"> Must have completed first year of residency and be medically licensed. Spend six weeks at the host hospital. Present work/experience to home institution upon return. Consider overlapping with prior and/or future resident for continuity.

* The American Academy of Pediatrics has developed core competencies and guidelines for international clinical rotations.