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ORIGINAL RESEARCH

International Elective Opportunities in United States Anesthesia Residency Programs

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INTRODUCTION

Global health is an integral component of medical training in the United States, with formal educational curricula and international experiences currently available in almost all medical schools.¹ There is also increasing awareness of the benefits of this training in residency programs, including exposure to a diverse clinical case mix, improved understanding of healthcare disparities, and improved cultural competency.²⁻⁵ Although international electives have been a part of global health training in some primary care specialties for decades,^{6,7} opportunities for residents in surgical subspecialties have developed only recently. This may be due in part to an escalating awareness of the need for surgical subspecialty care worldwide since the formation of the Lancet Commission on Global Surgery in the past 10 years.⁸⁻¹⁰

Recent publications have described the development of international electives in US surgical residency programs—from general surgery³ to orthopedic surgery⁴ to plastic surgery^{11,12} and ophthalmology¹³—but data describing these electives in anesthesiology programs are noticeably absent. The objective of this study was to identify and describe the types of international electives offered to residents at accredited anesthesiology training programs in the US.

MATERIALS AND METHODS

An electronic survey was developed using other published examples.^{3,4,13,14} After approval by the Society of Academic

Anesthesiology Associations (SAAA), it was sent to the directors of 122 accredited allopathic Anesthesiology residency programs in the US that participate in the SAAA (Appendix A). Follow-up e-mails were sent 2, 4, and 8 weeks after the initial request to all nonrespondents. The survey and study were approved as nonhuman subjects research by the University of North Carolina at Chapel Hill Institutional Review Board (Protocol 16-2647).

The survey defined an *international experience* as “a time in which a current US Anesthesiology resident traveled outside of the US to pursue a healthcare-related experience.” This definition was inclusive of educational, research, and clinical service opportunities. Any designated program representative could complete the survey, and responses were identified by program name to avoid duplicates. After data collection, program names were removed and the responses identified only by US Census region. Surveys were excluded if less than one-quarter of questions were answered or if the program did not indicate whether or not an international elective was offered.

The following details describing international experiences were collected: location, duration, type of experience (educational, clinical, research, humanitarian service), postgraduate year (PGY) of participation, resident participation rates, funding sources, educational partners, whether the opportunity comprised American Board of Anesthesiology (ABA)-approved training time, how trainees were evaluated, and

the amount of time the opportunity had been available. Survey responses were not exclusive, and respondents were instructed to select all applicable responses. The final component was Likert scale questions describing survey respondents’ opinions of global health opportunities in residency.

The proportion of programs offering international electives was summarized by US Census region and size of residency program and compared to programs that did not offer international electives. The type and duration of international electives, as well as resident participation, was summarized. Barriers to implementation were examined. Likert scale responses were summarized. The websites of all programs were then individually examined and searched using the terms “global health AND international.” The survey responses regarding international elective availability were compared to the stated offerings on program websites. Statistical analysis was conducted using Stata 14.2/SE (StataCorps, College Station, TX).

RESULTS

The survey was distributed to 122 programs, and 59 (48.4%) programs initially submitted responses. Three respondents were excluded: 2 for incomplete surveys and 1 at subsequent request from the program. Among the completed surveys approved for analysis (N=56, complete response rate 45.9%), 39 (69.6%) programs offered international electives for residents. A large proportion of these programs (43.6%) were in the Northeast, with 20.5% from

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the South, 20.5% from the Central region, and 12.8% from the Western region. The majority that offered international electives (71.8%) had at least 11 residents per class, and 28.2% had more than 20 residents per class. There was no difference in the number of programs offering international electives when stratified by geography or size (Figures 1 and 2). In the website review of all 122 program sites, 41 (33.6%) included descriptions of international electives for residents. Among the 56 survey respondents, 39 indicated the availability of an elective, although only 22 of these had website descriptions of the international opportunity.

The survey responses indicated that international electives were primarily clinical at 17 programs (43.6%), primarily teaching electives at 9 programs (23.1%), and combined clinical/teaching at 17 (43.6%) programs. Humanitarian electives were offered by 19 (48.7%) programs, and research electives by 7 (17.9%) programs. The majority (58.9%) of programs offered electives in sub-Saharan Africa, while 46.2% were in Central America, 38.5% in South America, 41.0% in East Asia, 12.8% in India, and 7.7% in Europe. Most programs (66.7%) offered 3–4-week electives, and 61.5% also offered short-term electives (1–2 weeks).

Electives had been available for more than 10 years at 14 (35.9%) programs, 5–10 years at 9 (23.1%) programs, and less than 5 years at 11 (28.2%) programs. At least 4 residents participated annually in 43.6% of programs reported; 23.1% reported that 2–4 residents participated annually, and 17.9% of programs reported that 1–2 residents participated annually. Almost all (97.2%) programs required residents to be in the final or penultimate year of residency. Among the 39 programs with international electives, 11 programs (28.2%) also hosted foreign clinicians.

Residents were evaluated by an attending from their home department at 17 (43.6%) programs and by an on-site attending at 14 (35.9%) programs. They were required to make a formal presentation upon return at 17 (43.6%) programs and to present a case log by 3 (7.7%) programs. Six programs (15.4%) did not require any formal

Figure 1. Number of responding programs with international elective opportunities, by United States census region

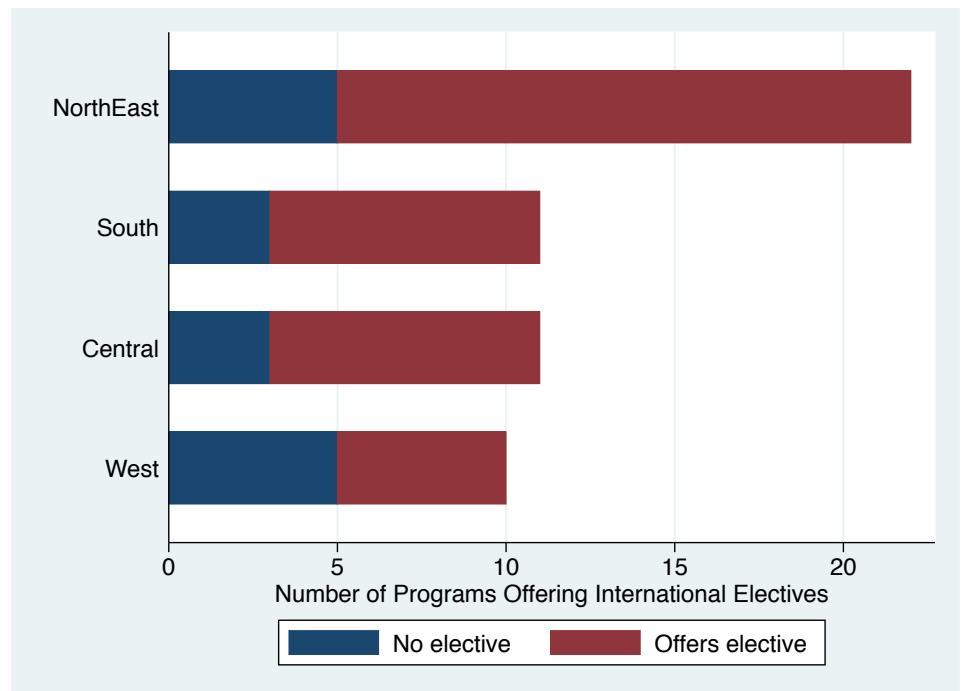
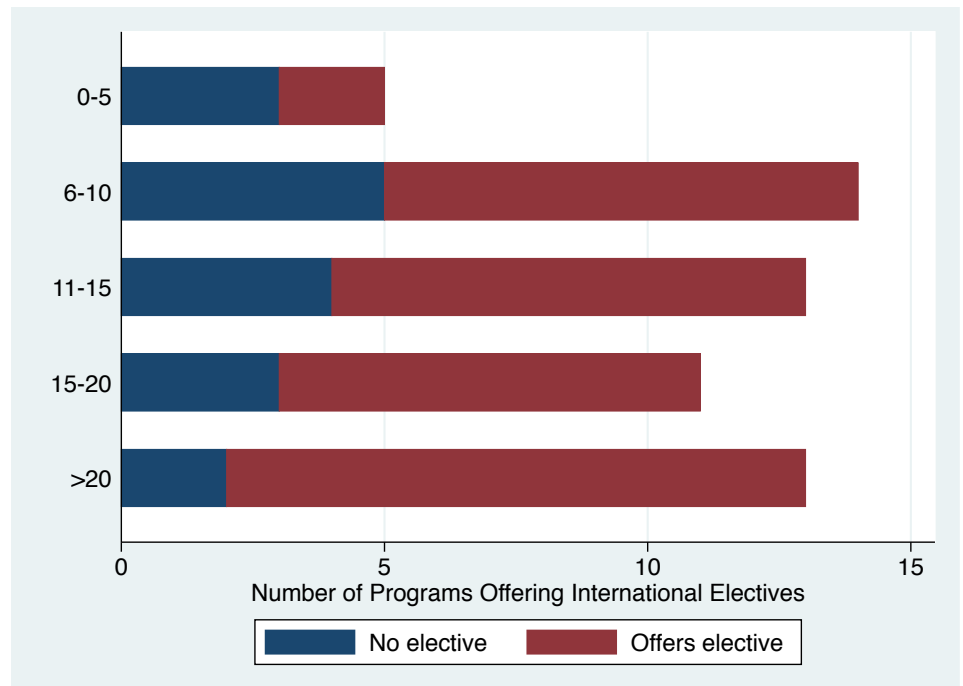


Figure 2. Number of responding programs with international elective opportunities, by program size (number of residents per class)



evaluation.

Among programs that offered international electives, 51.3% had established partner sites, 19 (48.7%) worked with the Society for Education in Anesthesia-Health Volunteers Overseas Travelling Fellowship (SEA-HVO), and 18 (46.2%) with the

American Society of Anesthesiology (ASA) Resident International Anesthesia Scholarship Program. Other collaborations included a variety of nongovernmental organizations (NGOs; eg, Operation Smile, Austin Smiles, Faith in Practice, Hospital de

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la Familia). Funding was primarily through department or university internal funding (69.2%), while 11 programs (28.2%) expected residents to contribute to funding, 9 programs (23.1%) had outside grants, and 6 (15.4%) relied on NGO funding (Figure 3).

Barriers to International Elective Opportunities

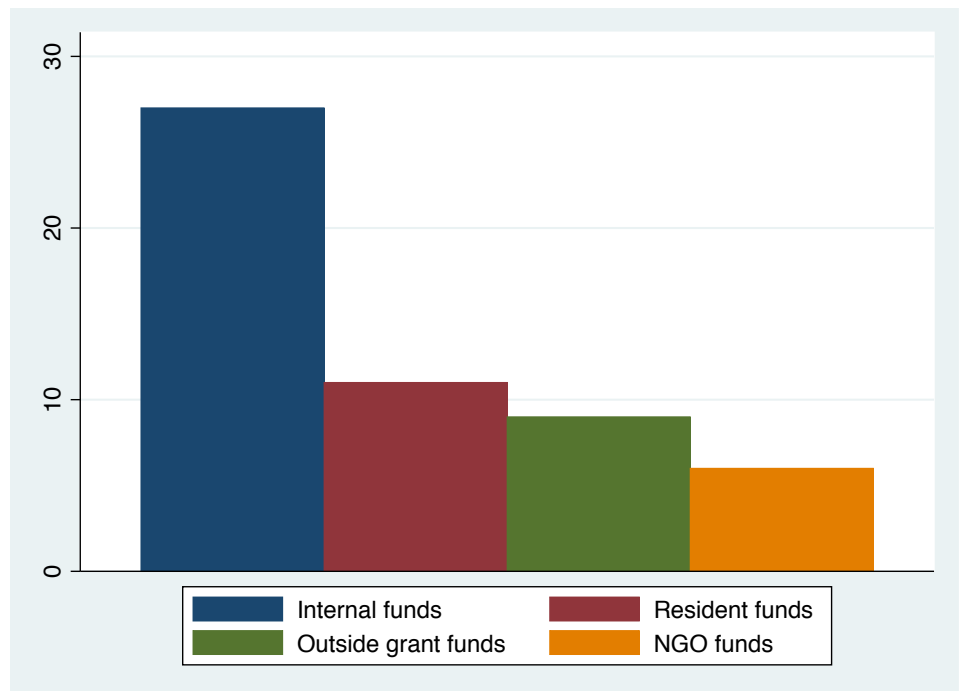
Among programs that did not offer international electives (n=17), inadequate funding was cited as the main barrier by 10 (58.9%) programs. Lack of time within the parameters of residency was cited by 8 (47.1%) programs. Other barriers selected included lack of attending supervision at an international site (52.9%) and lack of an established international partner (52.9%). Twenty-five (44.6%) of the overall respondents—including those from programs with and without international electives—wrote in additional barriers, summarized in Table 1.

Perceptions of International Electives

There were no differences between the responses of programs with international electives compared to those without such electives on any Likert scale questions. Out of 49 respondents to these questions, 32 (65.3%) somewhat or strongly agreed that global health was an important component of residency training in anesthesiology. Thirty-six (73.5%) somewhat or strongly agreed that applicants are increasingly looking for programs with international electives. Twenty respondents (40.8%) somewhat or strongly agreed that international electives offered residency trainees diversity in case mix that enhanced their training or that they might not otherwise encounter during training. Five respondents (10.2%) somewhat agreed that international electives may stifle the healthcare development at partner sites, while 19 (48.7%) of respondents neither agreed nor disagreed with this statement. Thirty-six respondents (73.5%) somewhat or strongly agreed that collaboration to improve the availability of international electives nationwide would benefit residents in anesthesiology.

Figure 3. Funding sources for international electives amongst respondents

*Responses are not mutually exclusive



DISCUSSION

This study describes the availability of and respondents' perceptions of international electives for anesthesia residents in the US. The availability of international electives based on website review and survey ranges from 33.6% to 69.6%. Notably, not all programs with international electives described the offering on their websites. Some of these opportunities have been available for many years at established partner sites. Perceptions of global health in anesthesia training among survey respondents were largely positive, and funding was the primary obstacle for programs that do not yet offer these electives. Recent surveys show that only 10–24% of general surgery residency programs offer international electives.^{3,15} Our results demonstrate that the proportion of Anesthesia residency programs offering international electives is higher than general surgery but still smaller than other subspecialty fields. National surveys of orthopedic surgery, ophthalmology, and plastic surgery residency programs demonstrated that 61%, 55%, and 41% of programs offered global health electives, respectively.^{4,11,13}

The substantial burden of surgical illness in low-income countries has been recognized by the World Health Organization¹⁶ and

leading global economists,¹⁷ and most clinicians recognize the importance of capacity-building and partnership in global health. This is increasingly a factor in residency selection.^{18–21} A recent survey demonstrated that 91% of anesthesia residents expressed interest in global health, but only 44% had participated in an international experience as a component of this interest. It is unclear if this discrepancy is secondary to attrition, lack of opportunity, or lack of interest in international work as it applies to global health.²² International training may increase awareness of health disparities among early-career physicians,²³ improve training efforts worldwide,²⁴ and strengthen international partnerships. Furthermore, at least 13% of the US population was born in another country,²⁵ and 25% of US physicians are either born or educated abroad.²⁶ International training could strengthen workplace relationships, improve cultural competency, and enhance anesthesiology trainees' understanding of patient populations here in the US.

The ABA and Accreditation Council for Graduate Medical Education (ACGME) will allow residents to receive credit for participation in international rotations if the rotation fulfills educational purposes and if approval is obtained from the

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Residency Review Committee for Anesthesiology. Significant organization and cooperation with partner sites is required to achieve these goals. Elective applications must describe the educational rationale, the partner site, support services on site, ACGME competency-based objectives, evaluation forms, faculty oversight, malpractice insurance, the physical environment and safety, and a plan for compliance with ACGME hours requirements. ABA policy also states that residents may participate in international electives for credit only in the final year of residency.²⁷

International electives require investment from clinicians, educators, and administrators at all partner sites. If clear goals are not established, these electives have the potential to deteriorate into fruitless voluntourism, ineffective patient care, or damaged international relationships.²⁸ Voluntourism, a practice where physicians travel abroad to deliver medical care, is not necessarily negative; however, this term has developed from the potential for such trips to de-emphasize medical care in favor of sightseeing. This may not only cast visiting physicians in a negative light but can also compromise local relationships. Frameworks for the creation of successful collaborations have been published in other fields,²⁹⁻³¹ and this is an area for future anesthesiology research. Many questions remain unanswered, including the training that should be completed before participating, the balance between service and education or research, the ethics of medical care in low-resource settings, and whether or how foreign providers should be hosted at US institutions. The next step is the formalization of global health curricula and partnership contracts for international anesthesia training. It is also imperative to analyze international electives and publish reports of successes and failures. Scholarly transparency will contribute to improved relationships, increased capacity in low-resource sites, and expand the influence of anesthesiology in global health.³²

This study had several limitations. Survey-based studies are always dependent on the response rate, and physician surveys are characterized by lower rates than

nonphysician surveys;^{33,34} response rates less than 20% are not uncommon.³⁵ Our 48.4% response rate is within the range of similar studies, but the potential effects of selection bias still limit the generalizability of these data. Additionally, the surveys could be completed by any designated residency representative. This may have led to survey completion by the person most active in global health at each residency program, which would bias the results. However, we aimed to attenuate this bias with the addition of the website review, which (1) provided an alternative estimate of the proportion of programs with international electives and (2) demonstrated that not all programs with international electives advertise this on their website. Another limitation was that this study did not evaluate residents' perceptions of international electives. Although program representatives largely agreed with the perception that residency applicants are seeking international opportunities, we could not clarify the types of opportunities in demand. Because this study was exploratory in nature, we did not pursue detailed differentiation of established overseas electives versus utilization of travel fellowships (eg, ASA or SEA-HVO) beyond noting that 51.3% of programs with electives did so at partner sites independent of ASA or SEA-HVO. Finally, an assessment of specific activities at international sites was beyond the scope of this study. There are many putative concerns in sending US trainees overseas, including the potential economic effects at the host site, lack of reciprocity, language barriers, safety, and potential lack of supervision.³⁶ A future comprehensive survey of international partners in anesthesiology programs may clarify these questions.

CONCLUSIONS

Global surgery and perioperative care is increasingly a focus of global health; accordingly, there is demand for international training within anesthesia residency programs. A large proportion of anesthesiology programs in the US offer international elective opportunities, and perceptions of global health are generally positive. Formalized educational curricula and publications of scholarly collaborations are needed to escalate and improve the role of anesthesiology in global health.

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Appendix A. Survey Tool

INTERNATIONAL OPPORTUNITIES IN ANESTHESIOLOGY TRAINING PROGRAMS

The purpose of this study is to examine the opportunities available for international experiences during training at United States accredited Anesthesiology programs. For the purposes of this study, an international experience is defined as a time in which a current US Anesthesiology resident or fellow travels outside of the United States to pursue a healthcare-related experience. This survey includes 16 questions focused on residency program international opportunities, and 2 questions regarding fellowship opportunities. For those programs that offer fellowship international opportunities, a follow-up survey may be sent.

Any authorized representative at each institution can complete this survey. Although the survey includes identification of each institution, no identifying information is required of the individual who completes the survey. Participation is entirely voluntary, there are no incentives to participate, and the risks of participation are minimal. By continuing with this survey, your consent will be implied.

Program Name:

Program Size:

0-5 Residents	6-10 Residents	11-15 Residents
15-20 Residents	>20 Residents	

1. Does your anesthesiology residency training program offer elective training opportunities outside of the United States **for residents**?
 - a. If Yes, please select all that are offered:
 - i. Primary clinical training elective
 - ii. Primary teaching elective
 - iii. Combined clinical and teaching elective
 - iv. Humanitarian service opportunity
 - v. Research elective at an international site
 - vi. Other:
 - b. If No, please select the option below that most describes why your program does not offer international health electives:
 - i. Lack of interest amongst residents
 - ii. Lack of funding
 - iii. Lack of time within the parameters of training
 - iv. Lack of an international partner with whom to offer an elective
 - v. Lack of available attending supervision for international site
 - vi. Other:
2. In which region of the world are these electives currently offered? (Select all that apply)
 - a. Sub-Saharan Africa
 - b. Europe
 - c. Central America (including Caribbean)
 - d. South America
 - e. North America (i.e. Mexico, Canada)
 - f. East Asia (i.e. including China, Vietnam, Philippines)

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Appendix A. Survey Tool *continued from previous page*

- g. India
 - h. Australia/New Zealand
 - i. Middle East
3. Please describe the international elective:
- a. Our program's elective is at an established international partner site.
 - b. Our program's elective is sponsored or hosted by an outside organization (ASA, service group, educational group)
 - i. If b, please select the host organization:
 - 1. SEA-HVO Travel Fellowship
 - 2. ASA Global Health Outreach Resident International Scholarship
 - 3. Other: _____
4. How long is the duration of the resident international health elective(s) currently available through your training program?
- a. 1 week
 - b. 2 weeks
 - c. 3-4 weeks
 - d. >1 month
5. How long has any international elective been available to residents at your training program?
- a. 1-2 years
 - b. 2-5 years
 - c. 5-10 years
 - d. >10 years
6. How many residents have participated annually in the past 5 years?
- a. 1-2
 - b. 2-4
 - c. >4
7. Are residents required to use vacation time for some or all of the elective?
- a. Vacation time must be used for the entire elective.
 - b. Vacation time must be used for part of the elective.
 - c. No vacation time is applied toward the elective.
8. In what Postgraduate Year are residents allowed to participate?
- a. PGY1
 - b. CA1
 - c. CA2
 - d. CA3
 - e. All of the above

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Appendix A. Survey Tool *continued from previous page*

9. If subspecialties are a focus or host of the international health experience, which are represented? Select all that apply:
- Obstetric
 - Pediatric
 - Regional/Orthopedic
 - Critical Care
 - Pain Medicine
 - Cardiac
 - Subspecialties are not a focus, or the elective is general.
10. Funding for international health electives offered through your program is accomplished by:
- Internal funding or endowment
 - Nongovernmental organization funding
 - Outside grant allocation
 - None; residents must provide funding
 - Other (please describe):
11. Does your department have established educational outcome goals or curricula for the international elective? Y/N
12. How are residents evaluated in the international health elective? Select all that apply:
- Intradepartmental attendings evaluate the resident
 - Local (on-site international) attending evaluates the resident
 - Didactic examination
 - Oral examination
 - Presentation upon return
 - Requirement checklist (e.g. types and number of cases performed)
 - Research presentation
 - Not formally evaluated
 - Other:
13. Does a program faculty member attend and oversee the international health elective with residents? Yes / No
14. Have you ever applied for ABA credit for international elective opportunities at your training program?

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Appendix A. Survey Tool *continued from previous page*

15. Please rate the following as:

Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree

- a. International health electives are important in the training of anesthesiology residents
- b. Exposure to international healthcare should be required of anesthesiology residents
- c. Residency applicants are increasingly seeking programs with international opportunities

16. International health experiences may lead to:

Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree

- a. Providing needed healthcare to underserved areas of the world
- b. Enhancing resident training through exposure to a case mix less commonly encountered during normal US-based training
- c. Enhancing resident training through exposure to foreign physicians' styles
- d. There is more benefit for international site partners than US trainees
- e. These electives may stifle the development of partner site healthcare

17. Does your anesthesiology program offer an international or global health **fellowship** program?

- a. If Yes, please select all options below that describe your fellowship program offerings
 - i. 1-year program with 2-6 months spent at international site
 - ii. 2-year program with >6 months spent at international site
 - iii. Concurrent degree study
 - iv. Concurrent faculty appointment at your institution
 - v. Subspecialty oriented (e.g. Regional, Pain Medicine)
 - vi. Clinical service based
 - vii. Education/Teaching based
 - viii. Research based
 - ix. Affiliated with a non-governmental organization
 - x.

18. Does your anesthesiology residency training program offer elective training opportunities outside of the United States **for fellows**?

- a. If Yes, please select all that are offered:
 - i. Primary clinical training elective
 - ii. Primary teaching elective
 - iii. Combined clinical and teaching elective
 - iv. Humanitarian service opportunity
 - v. Research elective at an international site
 - vi. Other:
- b. If Yes, please select the fellowship programs in which these opportunities are offered:
 - i. Cardiac Anesthesia
 - ii. Regional Anesthesia
 - iii. Critical Care Medicine
 - iv. Pain Medicine
 - v. Pediatric Anesthesia
 - vi. Obstetric Anesthesia
 - vii. All of the above
 - viii. Some combination of the above

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Attestation: Meghan Prin conceived of the project, contributed to project design, performed data collection and analysis, and helped write the manuscript. Janey Phelps helped with project design, data collection, and writing the manuscript. Both authors approved the final manuscript.

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anesthesiologists. Evidence-based educational outcomes favoring simulation-based airway training are highlighted.

Abstract

Background: Global health is a recognized component of medical education and is increasingly included in residency programs. International electives have the

potential to improve global health training by providing exposure to different populations and the challenges of health disparities. The objective of this study was to describe international elective opportunities in US anesthesiology residency training programs, including an assessment the types of programs offered and the obstacles to providing this type of training.

Methods: An electronic survey was sent to 122 anesthesiology programs. The survey defined an international experience as “a time in which a current US anesthesiology resident traveled outside of the US to pursue a healthcare-related experience.” Details describing international opportunities were collected. Responses were stratified by geographic region, program size, and by the availability of international electives. The websites of all surveyed programs were then reviewed to determine specific mention of international or global health programs. These results were compared to the survey responses.

Results: In the website review, 33.6% of programs’ websites described international electives for residents. Among all surveyed programs, 56 (45.9%) completed surveys were returned, with 39 (69.6%) of these programs offering international electives. Not all programs with electives described the offering on their websites. There was no relationship between program size or location and the availability of an elective. At most programs with international electives, at least 4 residents participated annually. Funding was the primary barrier to providing international electives. Perceptions of international electives were generally positive.

Conclusions: A large proportion of US anesthesia residency programs offer international electives, and perceptions of global health in anesthesiology are positive. This is consistent with developments in global health in other subspecialty fields.

Key Words: global health; anesthesiology; medical education