

# The Impact of an International Elective on Anesthesiology Residents as Assessed by a Longitudinal Study

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## ABSTRACT

**INTRODUCTION:** Participation of anesthesiology residents in international electives may lead to the acquisition of skills as described in the Accreditation Council for Graduate Medical Education (ACGME) competencies. There is great interest in participating in such electives, but it is not clear there are educational or professional benefits. The purpose of this study was to evaluate the educational benefits of participating in overseas electives among anesthesiology residents.

**METHODS:** A longitudinal study design was used between 2010 and 2015 to survey all anesthesiology residents selected to participate in the nationally competitive Society for Education in Anesthesia-Health Volunteers Overseas (SEA-HVO) Traveling Fellowship Program in which third-year residents receive scholarships and ABA credit for 1-month teaching electives in a low-resource country. Pre-elective and post-elective surveys were sent via de-identified e-mails during the third year of residency. We investigated residents' expectations, plans, and comfort level with teaching techniques prior to the elective and after and asked about perceived benefits.

**RESULTS:** The response rate was 68.8% of the 45 residents who received the survey. Participants were motivated by professional and humanitarian goals. Residents reported improved comfort with teaching techniques, especially lecturing and giving feedback. Participants acquired better skills in assessing the learning needs of students. There was a slight but nonsignificant increased comfort dealing with cultural and language barriers. The major self-perceived unique benefit of international electives was improvement in intercultural communication. The systems' changes reported by residents as the most important to improve were those that affected patient safety.

**CONCLUSION:** Global health electives have a small positive effect on teaching, cultural proficiency, and systems assessment skills. Residents improve in their ability to identify educational needs and to give feedback. Patient safety during anesthetic care is appreciated as the most important systems' need.

**KEYWORDS:** Global health, International elective, ACGME competencies, anesthesiology education, anesthesiology electives

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## Introduction

There is a growing interest among physician residents across all specialties in participating in international electives.<sup>1–3</sup> The annual surveys of graduating medical students conducted by the Association of American Medical Colleges (AAMC) demonstrated that during the 5 years prior to 2017, 27.1% to 31.2% of students, representing more than 14 000 medical students, participated in global health experiences during medical school.<sup>4,5</sup> Among anesthesiology residents, 91% of 460 residents in one survey confirmed their interest in global health work and 78% agreed that their program ranking during the residency match was influenced by the availability of a global health outreach track.<sup>6</sup> The actual participation of anesthesiology residents during their training in international electives is difficult to quantify but there is evidence that anesthesiologists and surgeons are the specialists who participate the most in short-term volunteer assignments abroad.<sup>7,8</sup> Interest in global

health among residents is widespread and has received attention in the literature, but the resulting academic and professional benefit to anesthesiology residents after an overseas teaching elective has to our knowledge not been the focus of previous studies.<sup>9–11</sup>

Accreditation Council for Graduate Medical Education (ACGME) recommends that residents in their training programs learn to “work effectively in various health care delivery settings” and how to “incorporate considerations of cost awareness and risk-benefit analysis in patient and population-based care.”<sup>12,13</sup> Residents doing global health teaching electives are given opportunities to improve in ACGME competencies such as practice-based learning, professionalism, interpersonal and communication skills, and systems-based practice. These competencies may receive inadequate attention compared with patient care and medical knowledge in a busy clinical residency. The austere conditions, unfamiliar equipment, and drugs and



medical co-morbidities overseas may be challenges experienced by anesthesiology residents.<sup>14</sup> The challenge of adapting to a low-resource environment may spur ingenuity, foster resilience, and enhance the participants' critical thinking skills or ability to "think outside the box."<sup>15-19</sup> The possibility of cultural misunderstandings can present a challenge if the resident is not prepared to deal with communication barriers and may even result in harm.<sup>7,19-21</sup> The resident may also have to diplomatically address the unrealistic expectations of local staff.<sup>20,21</sup> A benefit of practicing professionalism and intercultural communication with self-restraint and respect for local customs is usually a strong welcome from the host country.<sup>18,21</sup> In fact, sparse evidence of international volunteering suggests improvement in cultural proficiency.<sup>7,18,20</sup> Finally, the balance between clinical responsibilities and issues such as self-care and safety is particularly challenging among residents engaging in international volunteerism.<sup>14,22</sup>

Despite the perceived widespread interest, popularity, and potential benefits of global health work, few studies have reported on the effects of these initiatives on anesthesiology residents, especially those who do teaching electives.<sup>3,7,8,19,23</sup> Measuring the educational outcomes of an international elective is important if residents continue to request them and academic programs want evidence of efficiency and lack of harm. Harm has been reported in the areas of ethical responsibilities of the visiting trainee and psychological stress on the trainee in some unstructured volunteer assignments.<sup>24</sup>

This research study is based on a survey of senior anesthesiology residents accepted in a nationally competitive international elective known as the Society for Education in Anesthesia-Health Volunteers Overseas (SEA-HVO) Traveling Fellowship. This elective is organized by HVO<sup>25</sup> and the SEA. Residents apply midyear during the second year of residency and are required to submit their CV, a letter of motivation, and a letter of recommendation by their program director. The applications are reviewed by 5 academic anesthesiologists in a 3-tiered winnowing process. The number of applicants between 2010 and 2015 varied from 20 and 44 residents. Accepted applicants varied between 7 and 9 yearly based on the scholarship money available from private donations. Scholarships cover travel, visa, and lodging expenses as well as stipends for country-specific Centers for Disease Control and Prevention (CDC)-recommended vaccinations and medications.

Residents are selected based on previous leadership, teaching, and intercultural experiences. They are required to be in good standing in their program and to have the academic support of their chairperson. Their program must support their attendance at the annual SEA meeting where they receive their award and can attend workshops on teaching. The scholarship recipients receive an orientation on how to prepare themselves for their overseas rotation and are given references to help them be effective, culturally sensitive teachers (see

Supplemental Material). They are given advice about maintaining personal safety during their rotation, including advice about vaccinations, requirements for medical and evacuation insurance, and recommendations to visit a travel clinic and the Centers for Disease Control (CDC) where they can obtain country-specific health risk information. Residents are given contact information to HVO and SEA advisors who will mentor them before, during, and after their rotation as needed. Residents are guided by a local clinician at pre-approved sites overseas in countries deemed safe and stable by the US Department of State and HVO. Residents are given the opportunity to choose their site among those that HVO has a long-term relationship with that includes a Memo of Understanding (MOU) with the hospital and Ministry of Health of the country. The residents are also mentored by academic anesthesiologists running the program through the Committee of Global Outreach in SEA and by a US credentialed anesthesia site director assigned to the site who has multiple years of in-country familiarity with the site.

The SEA-HVO residents spend the month teaching medical students, residents, and anesthesia assistants using the curriculum assigned by the local department of anesthesia. The schedule varies by site and student need, but usually involves lectures in the morning before surgical start times and in midafternoon. The rest of the day is spent observing in the operating room or postoperative care areas and mentoring students through discussion or demonstration. The late afternoon (after 4 PM) is free to prepare for the following day's lectures. The SEA-HVO Traveling Fellowship has been in existence for 19 years, and more than 100 residents have participated without serious incident. We used an opportunity created by the SEA-HVO Fellowship to assess the impact of participating in a global health elective on anesthesiology residents' self-assessed benefits in ACGME core competency skills.

## Materials and Methods

### Study design

The Institutional Review Board at the University of Pennsylvania (Philadelphia, PA) approved this study. This was a longitudinal survey study that recruited US-based anesthesiology residents participating in an SEA and HVO-sponsored international teaching program. Inclusion criteria consisted of senior anesthesiology residents currently in accredited training programs who were selected in a nationally competitive scholarship program. Survey items employed in the study were formulated by 2 of the authors (LD and KL) based on a review of the literature, analysis of prior work completed in this field of research, and reports from previous residents. We used the contextual analysis of previous trip reports to create basic ideas for questionnaire items.<sup>7</sup> Common ideas were identified and translated into question format and sent via e-mail to anesthesiology residents who had been accepted to receive an SEA-HVO Traveling Fellowship. Pre-trip survey questions were tested on

6 SEA-HVO Traveling Fellows in 2010 to assess understanding and readability. Verbal feedback from these residents resulted in 2 questions being altered to avoid ambiguity. These residents were then asked to fill out the revised pre-survey and the results were included in the study. The post-trip survey questions were mostly the same as the pre-trip survey and were changed only to reflect that the trip had already taken place.

The post-trip survey was therefore changed based on the feedback on the pre-trip survey results. Subjects were approached regarding the study after the award ceremony and their location assignments had been approved. Residents were verbally informed after the SEA Award Ceremony that answering surveys was voluntary, would not change their participation in the program, and that responses would be recorded anonymously. Participants had 2 weeks to complete the pre-activity survey. After completion of their 1-month elective, a post-activity follow-up survey was administered via email. Each participant received 2 reminders 30 days apart and only participants filling both surveys were included in analysis.

We studied subjects recruited from the SEA-HVO Fellowship Program between July 2010 and May 2015. A total of 45 individuals were recruited out of which 31 completed both surveys (68.8% follow-up ratio). There was no difference in age, sex, job expectations, and language skills between responders and nonresponders.

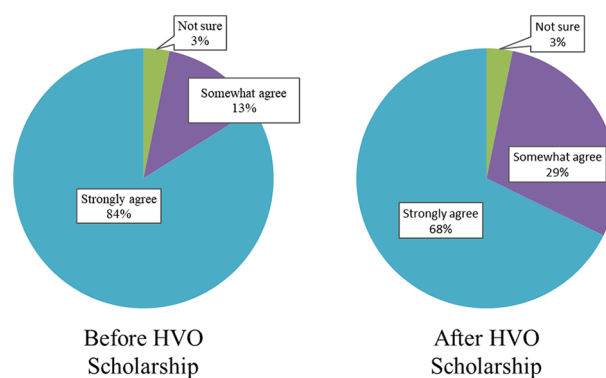
We estimated the number of participants based on the contextual analysis of prior studies.<sup>7</sup> Parametric data are presented as the mean and standard deviation ( $X \pm SD$ ) while nonparametric data are presented as median and interquartile ranges ( $M_e \pm IQ$ ). Chi square ( $\chi^2$ ) testing was employed to measure the degree of association between categorical variables. Lavene and Shapiro-Wilk tests were performed to evaluate the characteristics of the data and choose an appropriate test for statistical contrast. The 2-group comparison  $t$ -test and Wilcoxon matched pair test were conducted for data with parametric and nonparametric characteristics, respectively. The data were flagged as significant if the 2-tailed hypothesis was significant at  $P \leq .05$  unless otherwise specified in the manuscript. Statistica v8.0 (Statistica, Tulsa, OK) was used for all analysis.

## Results

### Demographic characteristics of the studied sample

A total of 45 subjects were initially enrolled in the study; 43.95% were males, 39.02% of the participants were 25-30 years old, 58.53% were 30-35 years age category, and 2.43% were above 35 years.

As anesthesiology residents included in our study were all in their last year of residency, we surveyed their future career expectations. In the pre-trip survey, 43.9% planned to join an academic practice, 29.27% hoped to join private practices, 19.51% were thinking of public health, and 31.71% were undecided. After completing the SEA-HVO assignments, the percent of residents planning on academics was virtually unchanged



**Figure 1.** Commitment to future health volunteerism among participants. HVO indicates Health Volunteers Overseas.

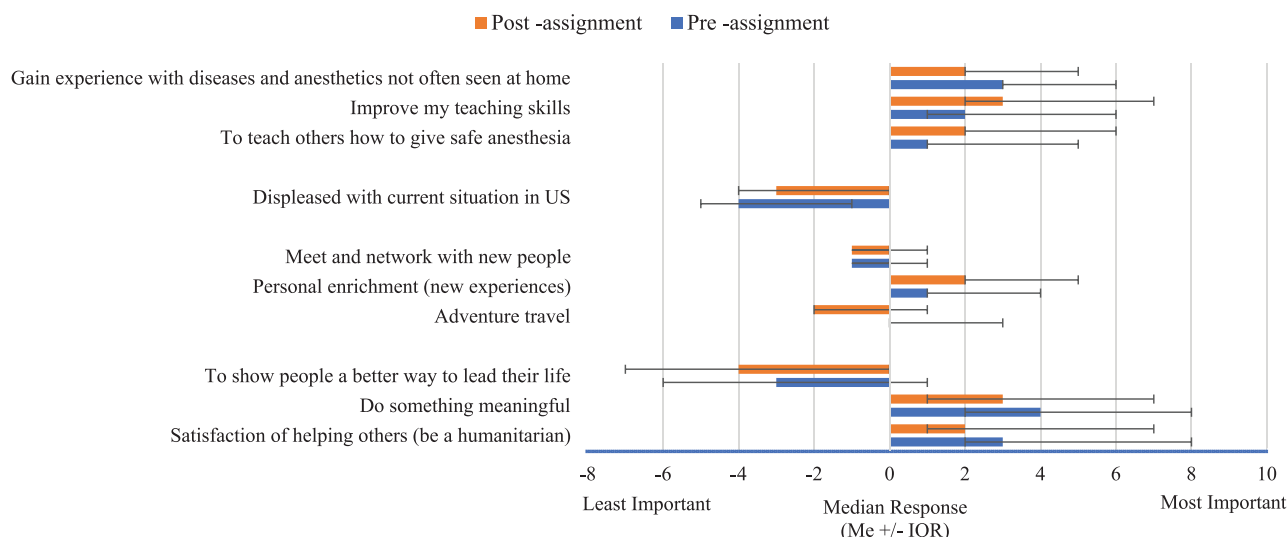
at 44.83%. Many who were undecided at the beginning of their last year had decided to join private practices (31.03%), 17.24% remained undecided, and only 6.9% planned public health careers post elective.

*Medical volunteering plans and expectations.* Most participants strongly agreed that “they plan to participate in volunteer assignments abroad in their future career” before their overseas trip (Figure 1; 84% of all participants). After their overseas elective, 68% still strongly agreed with this statement after 6 changed their mind (Figure 1;  $\chi^2 = 2.455$ ;  $P = .29$ ).

The most significant driving force motivating participants to apply for a global health elective was humanitarian in nature. Volunteers wanted to “to do something meaningful” and “gain satisfaction from helping others” while “to show others a better life,” “displeased with current situation in the United States,” and “meet and network with other people” were less important (Figure 2). “Personal enrichment,” “adventure (travel),” and “networking” were also low on the frequency as motivators (Figure 2). After completing the elective, residents indicated “to show others a better way of life” became even less of a motivating factor by a small yet significant degree (Figure 2;  $P = .032$ ).

We asked the residents how they were planning to contribute during their rotation abroad and contrasted that with the post-trip perception about their actual contribution. Participants reported improving “patient safety” and “medical knowledge” as the highest frequency contributions they expected before and found after their assignments abroad. The importance of providing “medical knowledge” as a contribution significantly increased after participation in the rotation ( $P = .044$ ). The expectation of “friendship” was significantly less prominent in the post-trip survey as compared to the pre-trip expectation ( $P = .017$ ) but it was of low frequency prior.

*Challenges to participation in international electives.* Volunteers did not perceive language barriers as a significant problem before their rotation even though some chose to teach at sites where the language spoken was not shared by the resident who was teaching and the students at the site. Post-assignment



**Figure 2.** Pre-assignment and post-assignment comparison of motivators for volunteering. IQR indicates interquartile range.

this perception increased slightly—yet was statistically non-significant ( $\chi^2 = 9.45$ ;  $P = .052$ ). Residents reported that the elective increased their ability to communicate effectively. Some post-trip comments mentioned the language barrier and need for language acquisition. Noteworthy, in our study group, 34% spoke one foreign language, 49% spoke 2 foreign languages, and 17% self-reported knowledge of three or more languages.

Learning about the effect of cultural differences on medical care was one of the most important and unique benefits of the international elective as reported by 44% of participants. Most residents felt well prepared to handle cultural differences before and after the trip. A slight increase in residents' perception of their comfort in handling cultural differences post-trip was nonsignificant (68% vs 81%, respectively;  $\chi^2 = 5.61$ ;  $P = .13$ ). In contrast, most residents had an increased appreciation of the importance of cultural differences on medical care after the assignment. Interestingly, cultural adjustment to life in the United States after returning home was found “challenging” in approximately 56% of the participants (data not shown).

Self-care, or the ability to maintain personal health and safety by volunteers, is crucial for a successful overseas elective and as part of professionalism. When residents were asked in the pre-trip survey whether they felt they could take care of their health and safety, more than 95% agreed or strongly agreed that they could. Only one resident was unsure they could take care of their health according to pre-trip survey. However, the post-rotation evaluation revealed that 31% of participants were either unsure or slightly disagreed with the same statement ( $\chi^2 = 9.94$ ;  $P = .02$ ). Although the participants reported significantly less certainty in the post-trip survey about their ability to maintain their health during their rotation overseas, a follow-up with HVO revealed that none of the residents experienced serious medical emergencies necessitating evacuation from the site.

*Comfort with teaching skills before and after international electives.* It was striking that residents felt very confident in their abilities and skills to teach in various settings pre-trip ( $\chi^2 = 45.9$ ;  $P < .01$ ). The techniques they had the least confidence in were one-to-one tutorials, leading journal club groups, and jeopardy Q&A (Figure 3). Comfort with these 3 techniques was not significantly increased post-trip. However, residents reported improved comfort in the other 5 teaching techniques. Comfort with giving lectures and effective feedback were the most improved (Figure 4). The volunteers used and were most comfortable with lecturing, small group discussions, problem case-based discussion, and teaching by demonstration (Figure 4). Airway management, basic pharmacology, regional anesthesia, and anesthesia monitoring were the most prominent topics prepared by the volunteers in advance of their assignments. On the post hoc analysis, safety, professionalism, and advanced cardiac life support were emerging trends (data not shown). After completion of their elective, residents ranked highest an increase in appreciation of the effect of cultural differences in medicine, professionalism, and interpersonal and communication skills (median ranked importance of 8, 6.5, and 6, respectively). Gains in medical knowledge and clinical skills were ranked lowest, both with a median ranked importance of 4.

## Discussion

This is the only study we are aware of attempting to quantify the educational impact of an international teaching elective on anesthesiology residents in a longitudinal fashion. Our study found that residents were strongly motivated to participate in global health electives for compassionate and humanitarian reasons and they demonstrated an ethical attitude. This is not surprising as humanitarian motives for participation in global health trips are frequently cited by others.<sup>2-4,7,24,26</sup> Residents did not believe their goal was to “show a better way of life,” which is fortunate as this attitude could be viewed as alienating to local staff.<sup>18,19</sup> Residents

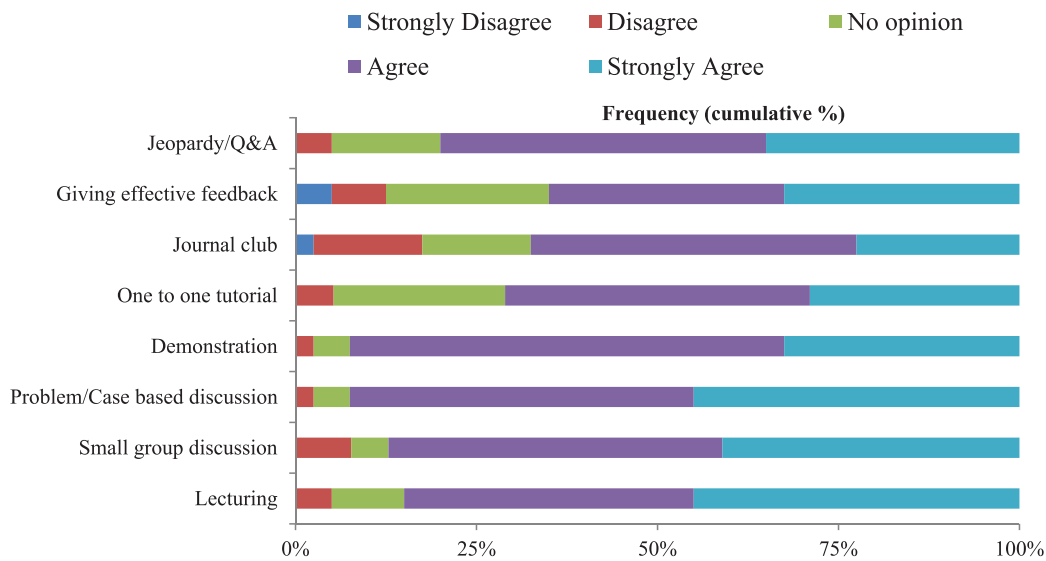


Figure 3. Pre-assignment assessment of familiarity with teaching techniques among residents.

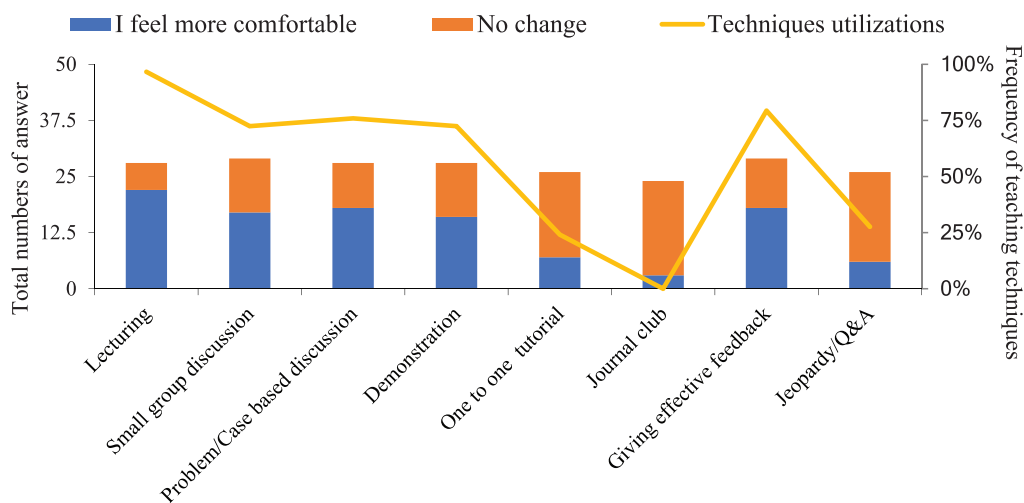


Figure 4. Post-assignment assessment of relative increase or decrease in comfort level of specific teaching techniques as well as frequency of technique utilization.

denied they were searching for adventure travel or personal enrichment. Instead, residents appreciated that learning to adapt to cultural differences was one of the most important and unique benefits of their rotation as demonstrated before in other groups of volunteers.<sup>7,18,19</sup>

Included in the ACGME Interpersonal and Communication Skills Core Competencies, residents are “expected to communicate effectively with patients, families, and the public across a broad range of socioeconomic and cultural backgrounds and with physicians and other health professionals.”<sup>5,12,13</sup> Under Practice-based Learning and Improvement, residents are expected “to participate in the education of . . . students and residents and other health professionals.”<sup>5,12,13</sup> These skills are often expected to be learned through observation and practice. The question is whether a month of teaching, with some guidance but mostly self-regulated, improves teaching and communication skills. Some studies showed durable gains in operative and professional skills during short-term supervised teaching

of residents in US-based settings.<sup>27,28</sup> In our study, residents reported a significant improvement in their ability to give feedback, and this was the most improved teaching skill acquired during their elective. Residents also reported improved comfort with lecturing after their elective. The ability to give feedback, especially in a multicultural environment, should be a useful professional skill in the future, especially in an academic setting but also in dealing with other health care professionals and patients. In the new milestones guidelines, getting and receiving feedback receives a great deal of attention.<sup>5,12,13</sup> Apart from feedback, residents limited their teaching techniques to the ones they were comfortable with before their trip. As expected, there was no improvement in the comfort level in the techniques they were fearful of practicing. Although residents reported significant improvement in giving feedback and lecturing skills and small improvements in other teaching skills, they did not value these improvements as unique benefits of the program. In the survey, residents reported no unique clinical

benefits from their elective. As education, not clinical service, was the focus, this is understandable.

Self-care is emphasized as an important goal for SEA-HVO Traveling Fellows. Maintaining “Emotional, Physical and Mental Health and Pursuing Continual Personal and Professional Growth” has recently received more attention as part of Professionalism in the ACGME<sup>13</sup> Core Competencies. Residents reported that they were able to stay healthy and safe during their rotation overseas. It was interesting that despite maintaining good health, they felt more confident about self-care before their trip than after. Did they discover that there are more risks to their health overseas than they had realized? As a result of findings in this study, more attention is now given to advising SEA-HVO Traveling Fellows on how to help maintain safety. It is the authors' view that safety considerations should be a crucial component of any residency global health program.

There are limitations to this study. A survey was used as a convenient sampling technique. This limited the number of questions we felt we could ask for fear of survey fatigue. The size of the group was necessarily small due to the limited number of residents who had participated in the elective but was also based partially on a prior study.<sup>7</sup> Answers, especially on the pre-trip survey, may have contained bias. Despite assurances of anonymity and that their answers would not affect their elective, residents may have given answers they thought the organizers wanted to hear. The group of individuals in the study was selected, but there is no “special characteristic” to the anesthesiology volunteer.<sup>11</sup> The SEA-HVO elective attracts residents who are intellectually curious and interested in professional growth, which represents potential selection bias. Both before and after the elective, 44% of residents in this survey stated they were planning an academic career following residency. This is a surprisingly large percentage when compared with the 10% to 23% found by the American Society of Anesthesiologists (ASA) Practice Management Committee during their annual survey of graduating anesthesiology residents between 2012 and 2016.<sup>29</sup> There was a 1-year interval between the pre-survey and post-survey when several variables could have changed. However, the design study inherently controls several variables reducing the inter-individual differences. We used a relatively generalized survey and quantifying the professional impact is difficult to assess. However, several observations prominent in the questionnaire part of the study were also reflected in the free-style part of the survey.

## Conclusions

This study, based on pre-elective and post-elective surveys of anesthesiology residents spending an elective month teaching overseas, provides some evidence of a positive effect on professional, interpersonal, and communication skills. Significant improvements in cultural proficiency, teaching skills (giving feedback and lecturing), and systems assessment skills were

demonstrated. Anesthesia safety is appreciated as the most important systems' need.

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## Author Contributions

LD planned the experiment, conducted the survey and data analysis, and wrote the original manuscript, and prepared revisions of the manuscript. MD analyzed the data and edited and prepared revisions of the manuscript. KL originated the study, planned the experiment, conducted the survey and data analysis, and written the original manuscript.

## Data Availability

The data are available on request after IRB approval.

## Ethical Approval

Study was approved by IRB at the University of Pennsylvania.

## Informed Consent

All authors agreed on publication.

## Supplemental Material

Supplemental material for this article is available online.

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## REFERENCES

- Matar WY, Trottier DC, Balaa F, Fairful-Smith R, Moroz P. Surgical residency training and international volunteerism: a national survey of residents from 2 surgical specialties. *Can J Surg.* 2012;55:S191-S199.
- Wallis KG. Volunteerism within dentistry. *J Calif Dent Assoc.* 2015;43:712-714.
- Huang AH, Rhodes WR. Hospital-based plastic surgery volunteerism: a resident's international experience. *Ann Plast Surg.* 2012;68:396-400.
- Klugman CM. Medical humanities teaching in North American allopathic and osteopathic medical schools. *J Med Humanit.* 2018;39:473-481.
- 2016 medical school graduation questionnaire. All schools summary report. <https://www.aamc.org/data/gq/>. Updated 2016.
- McCunn M, Speck RM, Chung I, Atkins JH, Raiten JM, Fleisher LA. Global health outreach during anesthesiology residency in the United States: a survey of interest, barriers to participation, and proposed solutions. *J Clin Anesth.* 2012;24:38-43.
- Pieczynski LM, Laudanski K, Speck RM, McCunn M. Analysis of field reports from anaesthesia volunteers in low- to middle-income countries. *Med Educ.* 2013;47:1029-1036.
- Bridenbaugh PO. Role of anesthesiologists in global health: can one volunteer make a difference? *Int Anesthesiol Clin.* 2010;48:165-175.
- Evans FM, Mallepally NR, Dubowitz G, Vasilopoulos T, McClain CD, Enneking K. Factors influencing anesthesia residency selection: impact of global health opportunities. *Can J Anaesth.* 2016;63:674-681.
- Kaur G, Tabaie S, Brar J, Tangel V, Pryor KO. Global health education in United States anesthesiology residency programs: a survey of resident opportunities and program director attitudes. *BMC Med Educ.* 2017;17:215.
- Caldron PH, Impens A, Pavlova M, Groot W. Demographic profile of physician participants in short-term medical missions. *BMC Health Serv Res.* 2016;16:682.
- ACGME. Exploring the ACGME core competencies: professionalism (part 7 of 7). <https://knowledgeplus.nejm.org/blog/acgme-core-competencies-professionalism/>. Updated 2017.
- ACGME. ACGME program requirements for graduate medical education in anesthesiology. [https://chicago.medicine.uic.edu/wp-content/uploads/sites/6/2017/05/040\\_anesthesiology\\_2016.pdf](https://chicago.medicine.uic.edu/wp-content/uploads/sites/6/2017/05/040_anesthesiology_2016.pdf). Updated 2016.

14. Sykes KJ. Short-term medical service trips: a systematic review of the evidence. *Am J Public Health*. 2014;104:e38-e48.
15. Alterman DM, Goldman MH. International volunteerism during general surgical residency: a resident's experience. *J Surg Educ*. 2008;65:378-383.
16. Pezzella AT. Volunteerism and humanitarian efforts in surgery. *Curr Probl Surg*. 2006;43:848-929.
17. Powell AC, Mueller C, Kingham P, Berman R, Pachter HL, Hopkins MA. International experience, electives, and volunteerism in surgical training: a survey of resident interest. *J Am Coll Surg*. 2007;205:162-168.
18. Caldron PH, Impens A, Pavlova M, Groot W. A systematic review of social, economic and diplomatic aspects of short-term medical missions. *BMC Health Serv Res*. 2015;15:380.
19. Roxas N. Confessions of a medical voluntourist. *Acad Med*. 2015;90:1674.
20. Fisher QA, Nichols D, Stewart FC, Finley GA, Magee WP Jr, Nelson K. Assessing pediatric anesthesia practices for volunteer medical services abroad. *Anesthesiology*. 2001;95:1315-1322.
21. Elnawawy O, Lee AC, Pohl G. Making short-term international medical volunteer placements work: a qualitative study. *Br J Gen Pract*. 2014;64:e329-e335.
22. Costa M, Oberholzer-Riss M, Hatz C, Steffen R, Puhon M, Schlagenhauf P. Pre-travel health advice guidelines for humanitarian workers: a systematic review. *Travel Med Infect Dis*. 2015;13:449-465.
23. Aziz S, Ziccardi VB, Chuang SK. Survey of residents who have participated in humanitarian medical missions. *J Oral Maxillofac Surg*. 2012;70:e147-e157.
24. Asgary R, Junck E. New trends of short-term humanitarian medical volunteerism: professional and ethical considerations. *J Med Ethics*. 2013;39:625-631.
25. Health Volunteer Overseas. Mission statement. <https://hvousa.org/>. Updated 2018.
26. Kingham TP, Price RR, Casey KM, Rogers SO, Kushner AI. Beyond volunteerism: augmenting surgical care in resource-limited settings. *Bull Am Coll Surg*. 2011;96:16-21.
27. Kolla SB, Gamboa AJ, Li R, et al. Impact of a laparoscopic renal surgery mini-fellowship program on postgraduate urologist practice patterns at 3-year followup. *J Urol*. 2010;184:2089-2093.
28. McDougall EM, Corica FA, Chou DS, et al. Short-term impact of a robot-assisted laparoscopic prostatectomy "mini-residency" experience on postgraduate urologists' practice patterns. *Int J Med Robot*. 2006;2:70-74.
29. Stein EJ, Mesrobian JR, Szokol JW, Abouleish AE. The 2016 job market for graduating anesthesiology residents. *ASA Monit*. 2016;81:56-62.