

Surgical Education**International surgical clerkship rotation: perceptions and academic performance****Ira L. Leeds, A.B.^{c,*}, Lee A. Hugar, B.S.^c, Barbara J. Pettitt, M.D.^{a,c},
Jahnavi Srinivasan, M.D.^{a,c}, Viraj A. Master, M.D., Ph.D.^{b,c}**^aDepartment of Surgery, ^bDepartment of Urology, ^cEmory University School of Medicine, 1648 Pierce Dr NE, Atlanta, GA 30307, USA**KEYWORDS:**Surgical education;
Global health;
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education**Abstract****BACKGROUND:** Concerns about international training experiences in medical school curricula include the effect on student learning. We studied the educational effect of an international elective integrated into a traditional third-year (M3) surgical clerkship.**METHODS:** A 1-week surgical elective in Haiti was available to M3 students during the conventional 8-week surgical clerkship each year for the 4 academic years 2008 to 2011. The authors collected student and surgeon perceptions of the elective using a mixed-methods web-based survey. Statistical analysis compared the academic performance of participating M3s relative to nonparticipating peers.**RESULTS:** Twenty-eight (100%) students (41 trip weeks) and 3 (75%) surgeons responded. Twenty-five (89%) students believed the elective provided appropriate clinical training. Surgeon responses were consistent with students' reported perceptions.

Strengths included unique clinical experiences and close interactions with faculty. Criticisms included recurring overwhelming clinical responsibilities and lack of local provider involvement.

Academic performance of participants versus nonparticipants in the same clerkship term were statistically insignificant.

CONCLUSIONS: This study demonstrates the feasibility of integrating global health experiences into traditional medical student clinical curricula. The effects on less tangible attributes such as leadership skills, fostering teamwork, and cultural competency require future investigation.

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Exposure to and interest in global health have become commonplace in US medical education over the past 20 years.^{1,2} These opportunities have varied widely in both structure and function. Ad hoc travel programs existing at the periphery of traditional medical student education³ have evolved along with formalized global education

elective clerkships.² Extended field experiences such as the National Institutes of Health Global Health Program for Fellows and Scholars (formerly the Fogarty International Clinical Research Scholars program) are increasingly popular.⁴

Unfortunately, the highly structured nature of traditional medical education programs provides limited opportunities for unconventional clinical experiences. Few medical students are able to stray from institutional time constraints and traditional curricular structure. Global health opportunities have traditionally been available only as extracurricular opportunities early in medical school, often during

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* Corresponding author. Tel.: +1-404-727-5655; fax: +1-404-727-0045.

E-mail address: ileeds@emory.edu

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students' limited vacation time, or loosely regulated fourth-year electives.⁵⁻⁷

Global health experiences for medical students have focused largely on internal medicine, pediatrics, and obstetrics, but generally do not include the surgical specialties. This bias against global health training in surgery mirrors many of the often discussed gaps in global health funding priorities.⁸ For example, more than 75% of the former National Institutes of Health Fogarty International Clinical Research Scholars sites were primarily focused on infectious disease research.⁹ With some notable exceptions, surgical specialties^{10,11} and noncommunicable disease subspecialties¹² are poorly represented in substantive global health experiences.

Many organizations sponsor short-term humanitarian trips to provide specialized surgical care in under-resourced international health settings. These trips have generated much controversy in the academic literature, often condemned as being ineffective or even deleterious to the communities they aim to help.¹³⁻¹⁵ Trip supporters have proposed conditions for distinguishing those short-term trips that successfully address the needs of the community and trip participants from those that fail to do so.^{16,17}

A student-faculty collaborative group at our home institution has spent the past 5 years attempting to address both the unmet burden of surgical disease in low-income countries and the dearth of global health opportunities in surgery for medical students. Each July, members of Emory Medishare, a student-faculty university affiliate of the international nongovernmental organization Project Medishare for Haiti, performed operations at Hôpital St. Thérèse in Hinche, Haiti. Students who elected to participate in this week-long experience did so as part of their 8-week required surgery clerkship or approximately 15% of their total surgical education time. The learning objectives for the students included gaining international health experience, interacting closely with senior faculty, experiencing the doctor-patient relationship in a different culture, and observing a broad range of surgical pathologic conditions. Previous published work describes the logistics and student-led planning process for these trips in detail and how these trips met the educational requirements of the traditional surgical clerkship¹⁸ while providing safe and effective care.¹⁹

Other programs have placed students in overseas electives previously,^{20,21} but the program reported here is the only example in the literature of an international training option incorporated into the surgical clerkship rotation. Although previous works have described the importance of international health programs aimed at medical students in the nonsurgical subspecialties,²²⁻²⁵ as well as overseas surgical experiences provided for residents,^{10,26,27} a thorough review of the literature revealed no reports of another international surgical rotation specifically designed for medical students. We hypothesized that this unique type of experience during the third-year clerkship would result in an equivalent educational outcome. Additionally, we surveyed

the participants to determine the effect of the experience on them personally and on their career choices.

Methods

Study population

The study population consisted of all historical participants of Emory University Department of Surgery's international Haiti elective from its inception in 2008 through 2011. For academic performance comparison, we compared participants with nonparticipant cohorts from corresponding rotation sections.

Data collection

The names and contact information of all participants in the Haiti elective were provided by Emory University's Department of Surgery. Each participant was contacted by email and invited to complete an online confidential questionnaire. Invitations, participant responses, data security, and basic data aggregation were all managed by a secure, internet-based commercial survey tool (SurveyMonkey, Palo Alto, CA).

The survey instrument was a 27-item questionnaire (Appendix 1), with a number of the questions requiring multiple responses. The items were practical questions derived from hypotheses and areas of interest raised by the investigators and modeled from previous surveys for medical students participating in international experiences.^{23,28} Information collected included demographic data, current professional status, future career plans, and subjective evaluation of the elective experience. A number of items asked the respondent to note the perceived effect of the Haiti elective on professional development. Whenever possible, respondents were asked to respond with a 5-point Likert scale, with 1 indicating the most negative effect ("strongly negative" or "strongly disagree"), 3 indicating no effect, and 5 indicating the most positive effect ("strongly positive" or "strongly agree"). A similar Likert rating was used for all questions asking respondents to value the likelihood of effect, from 1 indicating "no effect" to 5 being the "single most important factor." Nearly every survey item also included an optional free-response section for respondents to include additional comments. We piloted the survey with 6 medical students who had participated in previous nonsurgical trips to Haiti to ensure the clarity, safety, and functionality of the survey instrument. A minimally modified form of this survey (Appendix 2) was also sent to participating surgical faculty to assess their view of the educational value of the trips.

An automatically generated follow-up survey (Appendix 3) was sent to any respondent who had previously replied that he or she had noted multiple incidents of risks to patient safety, lapses in standards of care, or imminent danger of harm to oneself. This survey provided targeted

free-response items asking the respondent to elaborate on the incidents reported in the initial survey.

Deidentified academic data were provided by the Emory University Department of Surgery. The data set included National Board of Medical Examiners (NBME) Surgery Subject Examination scores, 2 oral examination scores, and overall clerkship grades for participants and their peers in the same academic rotation. Data were also obtained about residency specialty choices for the participating students who had already graduated from medical school, as were aggregate residency specialty data for their entire graduating classes.

Statistical analysis

Descriptive analysis was first performed to illustrate the characteristics of the participating student cohort. When possible, we compared these characteristics with those of respective nonparticipating classmates. We tested comparison of means and frequency distributions for statistical significance ($P \leq .05$) using the Student's *t* test and chi-square analysis, respectively. For free-response and nominal-response items, answers were thematically grouped and reported with basic descriptive analysis. Academic performance compared scaled NBME scores reported by the examination authority, the average of each student's 2 oral examinations, and a final grade based on a 4.0 scale.

The study design was evaluated by the Emory University Institutional Review Board and was determined to be exempt from further review because of its focus on educational pedagogy and programmatic improvement.

Results

One hundred percent of the 28 trip participants responded to the survey. Seventeen (61%) were women and the median age was 26 years (range 23 to 29 years). Fifty percent had participated in previous international health training experiences. These participants represented 41 trip weeks of experience, with a majority (57%) having participated in 1 trip, the median time interval since the last trip being 2 years (range 0 to 3 years), and 10 (36%) respondents having begun residency at the time of the survey.

Three of the 4 (75%) participating surgical faculty members responded to the survey. The median number of previous trips attended was 2, and the median time interval since the last participation was 2 years.

Effect on medical education

One hundred percent of student respondents rated their overall experience with the international surgical elective as "positive" or "very positive." Twenty-five (89%) of respondents "agreed" or "strongly agreed" that the elective provided an overall appropriate training experience when compared with the typical clerkship rotation available at the students' home institutions. The vast majority of students agreed (Likert means >3.0) that all pedagogical objectives of the clerkship (clinical knowledge building, skill development, diverse clinical experiences, and fostering mentoring relationships) were comparable to or better than the traditional offerings at their home institutions (Table 1).

The surgical faculty's responses were consistent with those of the students (Table 1). One hundred percent "strongly agreed" that the elective provided an overall appropriate training experience, and 100% rated the overall student experience as "very positive."

Academic performance

Academic performance on the surgical clerkship between Haiti elective participants ($n = 18$) and all other students in the same clerkship cohort ($n = 55$) was compared using results from the NBME subject examinations, oral examinations, and overall grade for the clerkship. The NBME subject examination score for participants was 4% higher ($P = .534$) than that of nonparticipants, whereas nonparticipants outperformed participants by 4% ($P = .258$) and 3% ($P = .389$) on oral examination and overall grade, respectively. None of these differences were statistically significant.

Practicality and safety

Students were asked a series of questions on the practicality of the international elective as a means of training

Table 1 Student evaluation of learning objectives for Haiti surgical elective

Learning objective	Mean student score* ($n = 28$)	Mean surgeon score* ($n = 3$)
Elective provided an appropriate clinical learning experience	4.78	5.0
Elective provided appropriate surgical skills training (eg, suturing, intravenous line placement, wound care)	4.70	4.0
Elective provided instruction in surgical knowledge (eg, antibiotic choice, postoperative management, fluid resuscitation)	4.37	4.3
Elective provided a diversity of surgical cases	4.19	4.3
Elective provided a good teaching relationship between students and faculty	4.88	5.0

*Likert scale: 1 = strongly disagree, 5 = strongly agree.

medical students. Twenty-one (78%) students agreed that appropriate supervision was maintained and that the personal financial burden associated with the experience was reasonable. Fourteen (52%) agreed that local provider involvement was appropriate. Surgical faculty agreed with these findings 100% and 66% of the time, respectively.

The survey also asked respondents to report on their observations of problems thought to be particularly important given the unique hierarchy and clinical setting of the international elective (Table 2). Two (7%) respondents reported observing risks to patient safety and 6 (21%) respondents reported observing nonadherence to standards of care occurring more than once. None of these reports were from the participating surgical faculty. The most common recurring event was overwhelming patient care responsibilities (8 respondents [29%]).

The 13 students reporting the concerns noted in the previous paragraph received the follow-up survey described in the Methods section, and 8 responded. Of these 8 students, 5 reported no risks that fell outside the realm of regularly encountered events in clinical training in the United States. Two of the 3 remaining students (2 first-time participants and 1 repeat participant) reported that risks to patient safety and lapses in standards of care occurred when they believed a clinical faculty member had made an incorrect clinical decision given the limited resource setting. These students also noted a number of logistical errors such as a shortage of a particular glove size or insufficient sharps containers for there to be one next to each patient bed. The final student noted observing a number of patient care risks resulting from an overwhelmed clinical team, which led to scheduled pain medications not being given at the appropriate time or a wound not being redressed per scheduled orders.

Qualitative responses

All respondents were asked to provide up to 3 strengths and weaknesses of the international elective, which were then thematically categorized (Table 3). For students, the most common strengths included a unique surgical care experience (34 respondents [39%]) and enhanced faculty interaction and teaching (23 respondents [26%]). Commonly reported drawbacks included doubts about the effectiveness of patient care objectives (16 respondents [25%]), a lack of top-down organizational leadership (13 respondents [21%]), and excessive personal financial cost

(12 respondents [19%]). There were nearly 50% more strengths (87) than weaknesses (63) reported. The surgeons' responses were largely consistent and as broad as those reported by students.

Specialty and institution choice

The likelihood of applying for a surgical residency program (ie, general surgery or surgical subspecialty) was statistically increased before (Likert mean = 3.43) and after (Likert mean = 4.0) participation in the international surgical elective ($P = .002$). The median response for the elective's effect on one's specialty choice was that it was "one of many" (Likert median = 3.0). This marginal effect, however, was found to be "positive" or "very positive" for 22 (79%) respondents.

Of respondents who had begun residency, 6 (60%) were in a general surgery or a surgical subspecialty residency program compared with 38% of the institution's total graduating class for those years ($P = .16$). Respondents rated the Haiti elective as having a "minimal effect" (Likert median = 2.0) on residency institution choice. Interestingly, however, 8 (80%) of these residents are at programs that offer international programs. All 8 of the current residents whose programs offer international opportunities have participated or intend to participate in these programs.

Career trajectory

Seventeen (61%) respondents reported an intent to pursue a career in academic medicine, and 7 (25%) indicated plans to actively incorporate global health activities into their careers. Respondents noted that the international elective's effect on their career choice was "one of many" (Likert median = 3.0). Twenty-seven (96%) respondents reported being "likely" or "very likely" to pursue global health opportunities in the future.

Comments

The educational experience of participants in the Emory University School of Medicine international surgery elective is unique in its integration into the surgical clerkship curriculum. Our results indicate that this educational experience results in equivalent outcomes as measured by standard end-of-clerkship examinations.

Table 2 Student-reported observations of patient and personal risks during Haiti surgical elective (n = 28)

Observed event	No. reported observations		
	None reported	Observed once	Multiple reported
Unacceptable risk to patient safety	16	10	2
Nonadherence to standards of care	18	4	6
Overwhelming clinical responsibilities	11	9	8
Imminent danger of harm to oneself	24	4	0

Table 3 Student-reported strengths and weaknesses of the Haiti surgical elective (n = 28)

Themes	Sample comments	No. Comments
Strengths		
Surgical care experience not otherwise available through (traditional) home rotations	"Increased responsibility for patient care" "Unique urologic procedures"	34
Enhanced faculty interaction/teaching	"Intimate contact with attendings"	23
Unique global health experience	"International experience not otherwise offered" "Minimal diagnostic tools"	10
Interdisciplinary team building and leadership	"Teamwork involved in executing trip"	8
Delivery of humanitarian aid	"Effective trip" "Population in need"	7
Miscellaneous		5
Total		87
Weaknesses		
Productivity and effectiveness of trip	"Too short to make a huge impact" "Difficulty in following up with patients" "Lack of supplies and resources"	16
Disjointed leadership	"Distribution of responsibilities...was misunderstood" "Would be helpful to have more faculty involvement" "Limited supervision"	13
Cost and financial support	"Need to fundraise" "Lack of departmental support"	12
Demands on time	"[Pretrip] time commitment" "Having to miss portion of [traditional] rotation" "Limited time to prepare for surgical shelf [examination]"	10
Lack of organized relationship with local staff; language barriers	"Lack of communication with local staff" "Need for more interpreters"	8
Limited exposure to country outside of medical mission	"We didn't get to see any of Hinche or Port-au-Prince"	3
Poor preparation for less senior medical students	"Lack of educational preparation before trip"	2
Demands on ability level	"Overwhelming clinical responsibilities"	2
Total		66

Nearly all student respondents felt that the training standards of the Haiti elective were aligned with those of the clerkship and that the experience fulfilled the clerkship's pedagogical objectives. Students believed that the elective provided clinical problems, leadership opportunities, and mentoring relationships that were not available during rotations at their home clinical institutions. We also attribute the students' substantial satisfaction to an opportunity to work in smaller clinical teams with more teaching moments available per student. The majority of students felt the dangers and risks of working in this under-resourced setting were well controlled. Finally, assessment of students' academic outcomes suggests no difference in performance between participants and nonparticipants.

An important question that follows from these results is: what can the greater medical education community draw from the success of this international elective? This study demonstrates the potential of international programs that are fully integrated into traditional curricula. This and other studies,^{18,19} demonstrate that such experiences can provide standard-aligned patient-centered learning opportunities that medical students cannot easily find elsewhere.

Limitations to our study include the small number of students involved, the short length of each trip, and the

retrospective data collection, which makes performance evaluation and unbiased recall more difficult. Future elective participants should be surveyed before and after the experience. As of 2012, the length of the trip was extended from 1 to 3 weeks to provide for more training time and direct follow-up care. Additionally, all the work was done at a single institution led by a small group of dedicated clinical faculty, so the experience reported here may not be generalizable to other institutions or departments.

This study also raises a number of concerns. First, some of the students found themselves overwhelmed with the clinical workload compared with what they encountered at their home institutions. This issue is fundamentally the most difficult to address. It is exactly this demanding environment that leads to some of the most commonly noted strengths of the trip (eg, learning by doing and more responsibility for patient care). Similar concerns have been noted in residency training in which early trainees often find that being directly responsible for patient care reinforces learning but can be emotionally distressing.²⁹ For future trips, we plan to increase the effort spent establishing appropriate expectations and selectively screening students who are prepared for the program's rigor. We are also establishing a trip orientation week to educate participants

about the issues inherent in working in a difficult environment in a foreign culture.

Second, a quarter of the students noted lapses in patient care standards and risk of personal harm. This was a surprising finding given that previously published work about this elective did not identify any complications or other adverse events.¹⁹ The only reported student injury outside routine health care workplace injuries was a minor candle burn that occurred during night rounds. The responses to the follow-up survey sent to these students suggest that their inexperience in this type of environment may have led to conclusions based more on perception than general consensus or fact because most of the reported lapses in patient care were disagreements with the course of care decided on by the clinical faculty supervisor. Distinguishing objective substandard care from distorted perception can only be assessed through ongoing study of the trips' outcomes data.¹⁹ Risk of personal harm issues included lack of appropriate glove sizes or sharps containers in easy reach. Trip organizers have begun to address these issues through 3 distinct design efforts. First, we believe that better participant education before the trip will help students learn to cope with the working environment in which they will find themselves. Second, the time course of the trip has been altered by the extended trip length mentioned earlier. With a 3-week trip, clinical activities are more gradually scaled up and down to allow for better student adjustment to the demands and expectations of such a training experience. Finally, faculty-led debriefing sessions now occur regularly on each trip to provide a forum for discussing suboptimal outcomes openly with the team, thereby transforming these events into teaching opportunities about how to best provide care in under-resourced settings.

The trips described here meet the standardized learning objectives of a typical surgical clerkship, although with limitations. Rather than viewing international learning opportunities as add-on electives to be taken during the students' final year of medical education, we believe that they can be carefully integrated into required clerkships with earlier exposure of students to the issues of global health. Their effect on less tangible attributes such as leadership skills, fostering teamwork, and cultural competency are areas of future investigation. These unique international clinical experiences require passionate leadership, precision teamwork, and an emphasis on cultural awareness.

We support such an appropriately designed trip that is closely integrated into a medical student curriculum. We believe that this model averts some of the common negative critiques of short-term surgical trips and provides a unique educational experience that cannot be provided through the traditional surgical clerkship.

Supplementary material

Supplementary data related to this article can be found at <http://dx.doi.org/10.1016/j.amjsurg.2012.10.034>.

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