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# Results of a National Survey of Surgical Resident Interest in International Experience, Electives, and Volunteerism

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- BACKGROUND:** Data are emerging about the essential nature of sustainable global surgical care and interest among North American surgeons. Currently, there is no formal mechanism for US surgical residents to participate in international training opportunities. A small, single-institution survey found that general surgery residents at New York University are highly motivated to pursue international training. But little research has addressed the attitudes of North American residents about international training. The goal of this study was to acquire a broader understanding of surgical resident interest in international training.
- STUDY DESIGN:** A structured questionnaire was administered anonymously and voluntarily to all American College of Surgeons resident members.
- RESULTS:** Seven hundred twenty-four residents completed surveys. Ninety-four percent of respondents planned careers in general surgery. Ninety-two percent of respondents were interested in an international elective, and 82% would prioritize the experience over all or some other electives. Fifty-four percent and 73% of respondents would be willing to use vacation and participate even if cases were not counted for graduation requirements, respectively. Educational indebtedness was high among respondents (50% of respondents carried  $\geq$  \$100,000 debt). Despite debt, 85% of respondents plan to volunteer while in practice. The most frequent barriers identified by respondents were financial (61%) and logistic (66%).
- CONCLUSIONS:** American College of Surgeons resident members are highly motivated to acquire international training experience, with many planning to volunteer in the future. A consensus among stakeholders in North American surgical education is needed to further explore international training within surgical residency. (J Am Coll Surg 2009;208:304–312. © 2009 by the American College of Surgeons)
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Discussion of international surgical training and work with the underserved has become more frequent in recent years. In 2004, the American College of Surgeons established Operation Giving Back to provide a central resource for surgical volunteer opportunities and disaster response worldwide.<sup>1</sup> Some surgical programs have established col-

laborations with countries abroad, and have either presented their work at meetings or published descriptions.<sup>2</sup> Despite growing interest and more frequent discussion of international training, no standard mechanism exists for residents to train in international settings. These experiences currently often require personal funding and use of vacation time, and procedures performed abroad cannot be counted toward American Board of Surgery (ABS) graduation requirements.

As a first step toward establishing formal international surgery electives within the US surgical residency training system, a survey was designed to collect information about resident interest. This survey was administered to New York University (NYU) surgery residents in 2006.<sup>3</sup> Although the response rate was high, the data were limited by a small sample size and the single-institution nature of the study. Currently, little research describes the attitudes and opinions of surgical residents from across North American

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**Abbreviations and Acronyms**

DALY	=	disability-adjusted life years
NYU	=	New York University
RAS-ACS	=	Resident Associate Society of the American College of Surgeons
WHO	=	World Health Organization

about international training. The goal of this study was, using a survey tool administered to resident members of the American College of Surgeons, to develop a more complete understanding of resident interest in international training. Based on the NYU data, the hypothesis was that surgery residents are interested in international training; the authors wanted to test this hypothesis in a larger, more diverse, and possibly more representative sample group.

**METHODS****Survey population**

The survey was developed by the Education Committee of the Resident Associate Society of the American College of Surgeons (RAS-ACS). One of the members of the Education Committee (Powell) was involved in the survey of NYU general surgery residents. The RAS-ACS was chosen as the survey population for this study given the large number of resident members. Although the RAS-ACS does not include all North American surgery residents, it provides a centralized database that makes survey administration more practical and secure than it would be attempting to survey residents through their individual programs. Additionally, the RAS-ACS has access to online survey development and administration tools.

**Survey development and administration**

A structured questionnaire was developed initially based on the survey instrument that was administered to all NYU general surgery residents.<sup>3</sup> Significant modifications were made to the questionnaire after review by members of the Education Committee. Demographic information was collected in the first part of the survey, including information about earlier and current volunteer experience in any field. In the second part, the survey elicited information about resident interest in and commitment to an international survey elective. Questions probing future practice plans, including plans to volunteer and the impact of debt on practice choices, were also asked. The response format for most questions was changed from a binary yes/no format to a 5-level Likert scale; this represented the most significant change from the NYU survey. Free text space was also added for respondents to make comments.

After the expanded survey was reviewed by the Education Committee, it was administered to 10 residents from

diverse residency programs for  $\beta$ -testing. As a result of these initial responses and comments, further modifications were made. After these final modifications, the paper survey was submitted to the Division of Communication of the ACS; the survey was converted to an electronic format and again tested by members of the Education Committee.

The survey was then administered anonymously and voluntarily to all RAS-ACS members of the College in August 2007; members of the RAS-ACS who were in post-residency training were excluded. All resident members received an email with a link to the survey embedded in the text of the email; the survey was also publicized in the RAS-ACS eNewsletter. Access to the survey was available through a password-protected Web site. Survey responses were collected anonymously. A respondent could take the survey only once; cookies were used to track and enforce this. The survey was available for 4 weeks; a reminder was sent near the end of the survey window. Survey responses were collected by the Division of Communication of the ACS, which then compiled the data and forwarded them to the Education Committee. Given the voluntary and anonymous nature of the survey, Institutional Review Board approval was not sought.

**RESULTS****Demographic characteristics**

Surveys were sent to the email addresses listed on file for the 6,941 resident members of the ACS. One hundred sixteen emails were rejected for invalid email addresses, yielding a total survey pool of 6,825 residents. Of these 6,825 residents, 724 respondents completed surveys, for a response rate of 11%. A response to each question was not mandatory; the mean number of responses to each question with only one answer was 722 (range 716 to 724, SEM  $\pm$  0.32).

Selected demographic characteristics of survey respondents are listed in Table 1. The majority of respondents were planning careers in general surgery (respondents were able to check more than one box for career plans; many respondents were planning careers with more than one general surgery subspecialty). A small number of respondents ( $n = 40$ , 6%) were planning on specializing in otolaryngology, orthopaedics, obstetrics and gynecology, urologic surgery, head and neck surgery, and ophthalmology. Thirteen percent ( $n = 92$ ) of respondents were originally from outside the US and Canada, 5% ( $n = 35$ ) were from Canada, and 82% ( $n = 597$ ) of respondents were from the US. Information about geographic location of residency program was not captured.

**Table 1.** Selected Resident Characteristics (n = 724)

Characteristic	n	%*†
Postgraduate year		
1	88	12
2	106	15
3	141	19
4	134	19
5	94	13
6	75	10
7	43	6
8	21	3
9	22	3
Age, y		
<25	3	0.4
25–29	272	38
30–34	335	46
35–39	85	12
≥40	28	4
Gender		
Male	468	65
Female	253	35
Original geographic area		
US	597	82
Canada	35	5
Outside of US and Canada	92	13
Marital status		
Single	260	36
Married/committed relationship	463	64
Children		
Yes	218	30
No	503	70
Family abroad		
Yes	296	41
No	424	59
Speak another language		
Yes	465	65
No	255	35
Planning fellowship training		
Yes	636	88
No	86	12
Planned surgery practice specialty‡		
General surgery	266	
Plastic and reconstructive	98	
Laparoscopy	91	
Oncology	78	
Cardiothoracic	68	
Trauma	68	
Pediatric	66	
Vascular	66	
Colorectal	64	
Critical care	51	
Breast	28	

**Table 1.** Continued

Characteristic	n	%*†
Endocrine	26	
Transplant	26	
Urology	15	
Orthopaedics	14	
Head and neck	8	
Ophthalmology	2	
Obstetrics and gynecology	1	

\*Numbers may not sum to 100 because of rounding.

†Some questions were not answered by every respondent; percentages are calculated based on total respondents for each question.

‡Respondents were allowed to submit more than one planned specialty; the total number of respondents planning nongeneral-surgery careers was 40.

There were 562 respondents originally from the US and planning careers in general surgery. During the year 2006 to 2007, the American Council for Graduate Medical Education reported 20,737 US surgical residents (total US surgical residents were calculated from a table listing all residents reported by the Accreditation Council for Graduate Medical Education; fellows are also included in this number). Of these, 7,307 residents (35%) were enrolled in general surgery residency programs (colon and rectal surgery, plastic surgery, and thoracic surgery residents were excluded from the total general surgery residents, assuming these residents were in fellowship training).<sup>4</sup> Without knowing the locations of residency, it was not possible to calculate the exact number of US general surgery residents, presumed to be the largest subgroup of the overall respondent pool. By using 562 as an approximation of the number of US general surgery respondents, we estimated that the survey respondent pool consisted of approximately 7% to 8% of all US general surgery residents. The number of respondents planning careers outside of general surgery was low (n = 40) and was divided between the various other surgical specialties, representing very small percentages of these fields.

Forty-six percent of residents were in the first 3 years of training, the largest age bracket represented was 30 to 34 years (46%). Thirty-five percent of respondents were female. Most (64%) respondents were married; 30% of respondents had children. The respondent pool was diverse, as reflected by the percentage of respondents who had family abroad with whom they communicated or visited regularly (41%), spoke another language (65%), and who were originally from countries other than the United States or Canada (13%). The vast majority of respondents were planning fellowship training (88%). Seventy-three percent of respondents carried some debt; of those 527 residents carrying debt, the most common debt load was between \$150,000 and \$200,000 (Fig. 1).

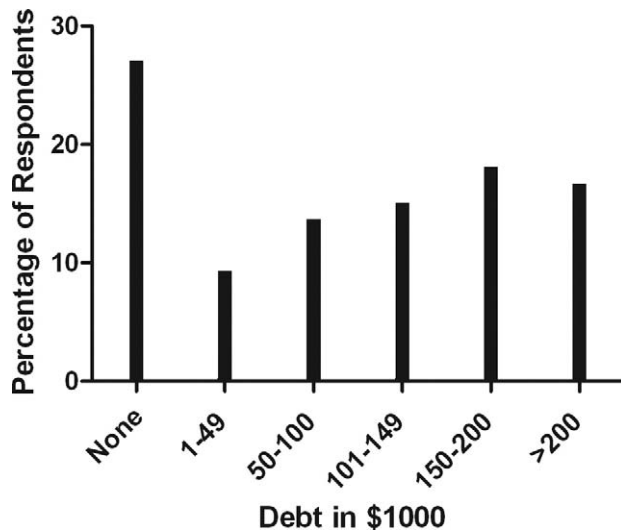


Figure 1. Educational indebtedness of respondents.

### Volunteer and international experience

The current and earlier volunteer and international experience of the respondents is presented in Table 2. Almost all respondents had previously volunteered either at home or abroad (or both). Of interest, 14% of residents were volunteering during residency at the time of the survey.

### Interest and commitment

The level of interest in an international surgery elective was very high among respondents. Most respondents would prioritize such an elective over at least some other available electives, if not all (Fig. 2). Data about willingness to finance the experience and use vacation time are also presented in Figure 2, as is the desired amount of time to be spent on international training during residency. Seventy-three percent of respondents would participate even if the cases were not counted for graduation requirements. Respondents expressed interest in all parts of the world; South America, Central America/Caribbean, and Africa were the most frequently desired locations. Of note, 48% of respondents would consider an elective in the Indian Health Service (IHS) of the United States; this was the only question directed at domestic volunteerism. Seventy-one percent of respondents would prefer the experience to include language training. Seventy-seven percent of respondents reported their interest would increase if an attending surgeon from their home institution accompanied them. Forty-two percent of respondents would consider an additional year of training that focused solely on international work or combined international work with laboratory research time. Finally, 66% of respondents reported they would have been more interested in surgical residency programs

Table 2. Volunteer and International Experience

Experience	n	%
Previous volunteer work		
Yes	685	95
Domestic	601	
International	257	
No	38	5
Current volunteer work		
Yes	98	14
No	626	86
Worked internationally		
Yes	368	51
Peace Corps	6	
Medical school elective	140	
Medical mission	122	
Other	179	
No	353	49

with established international training programs during the match process.

### Expectations and barriers

Expectations of and perceived barriers to international training are presented in Table 3. Obtaining cultural experience and technical or clinical skills were the most frequent expectations; scheduling conflicts and financial difficulties were the most frequently perceived barriers.

### Future practice predictions

Fifty-three percent of residents believed their debt would affect their practice plans. Despite this figure, 85% of respondents planned to include volunteerism in their future practice; 337 respondents planned to include pro bono domestic work (Fig. 3).

### Free text responses

Free text comments were submitted by 122 respondents. The majority of these comments were categorized into groups; representative comments are presented in Table 4.

## DISCUSSION

Surgical needs in the developing world are incompletely characterized.<sup>5-8</sup> Some understanding of the need for surgical care can be extrapolated from World Health Organization (WHO) health care measures data. Life expectancy is significantly greater in high income countries (78 years) and the Americas regions (75 years) than in low income countries (59 years) and the African region (51 years).<sup>9</sup> (Income classifications used by WHO are based on the World Bank list of economies.<sup>10</sup>) Mortality from HIV/AIDS, cancer, and injuries is greater in low income coun-

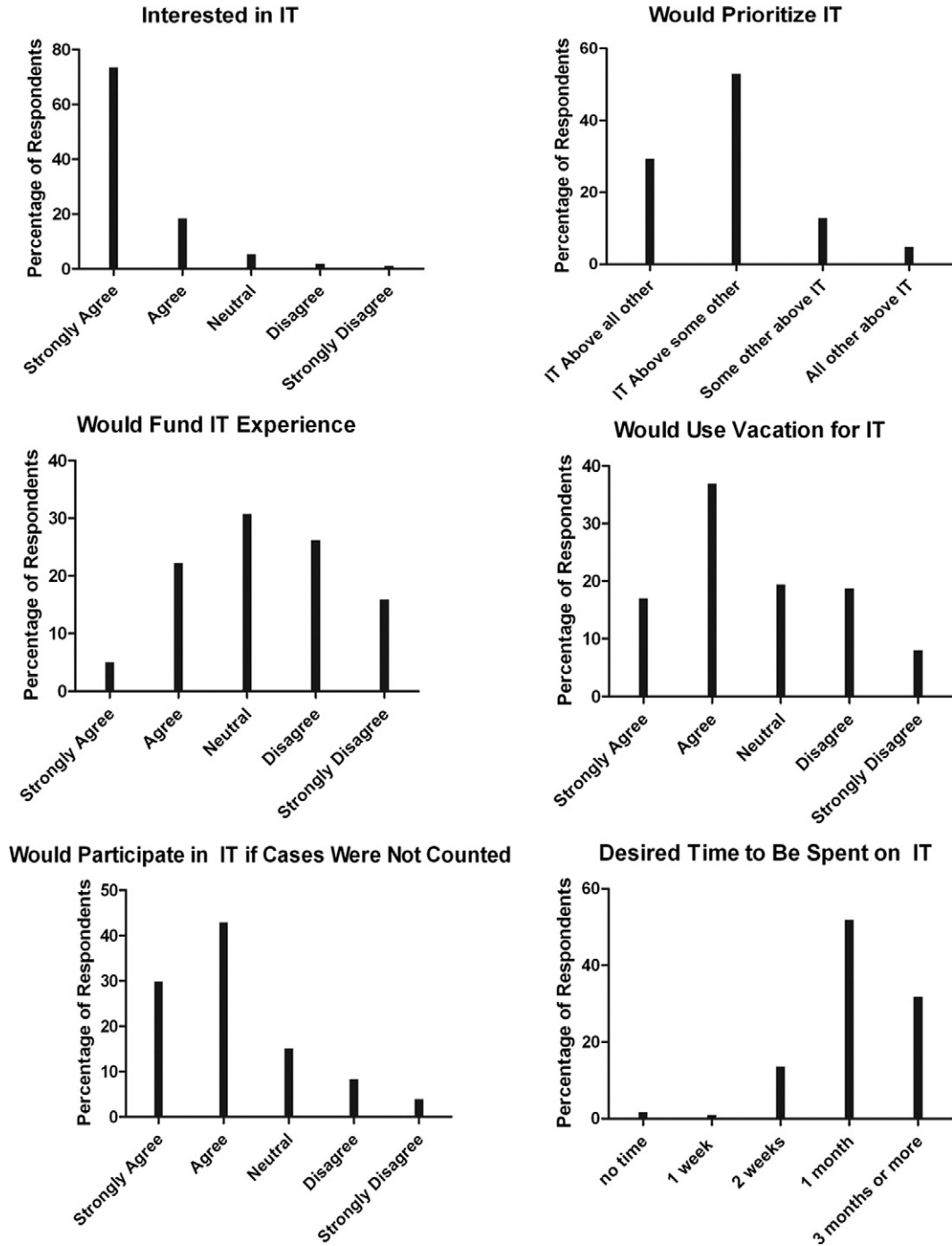


Figure 2. Measures of respondent interest in and commitment to international training (IT).

tries and the African region than in high income countries and the Americas regions. Injuries account for 63 deaths per 100,000 population in the Americas regions versus 133 deaths per 100,000 population in the African region.<sup>9</sup> Conversely, physicians and hospital beds are in much shorter supply in low income regions and the African re-

gion than in high income regions and the Americas.<sup>11</sup> In the 2006 annual report of the organization, WHO reported that 36 of the 57 countries worldwide unable to meet a prescribed minimum standard of health workforce were in sub-Saharan Africa, and that an increase of 140% was required to meet these needs.<sup>12</sup>

**Table 3.** Expectations of and Barriers to International Training

	RAS-ACS, %*
Expectation	
Cultural experience	90
Technical/clinical skills	83
Fulfilling personal goals	75
Altruism	65
Language skills	63
International contacts	60
Other	4
Barrier	
Scheduling conflicts	66
Financial	61
Family/social concerns	36
Fear of missing training opportunities at home institution	26
Lack of equipment	25
Hospital conditions	23
HIV	20
Personal safety	17
Other	14
Fear of inexperience	13
Medical safety	7

\*Percentage of respondents agreeing with the expectation or barrier (respondents were allowed to check as many boxes as needed).

RAS-ACS, Resident Associate Society-American College of Surgeons.

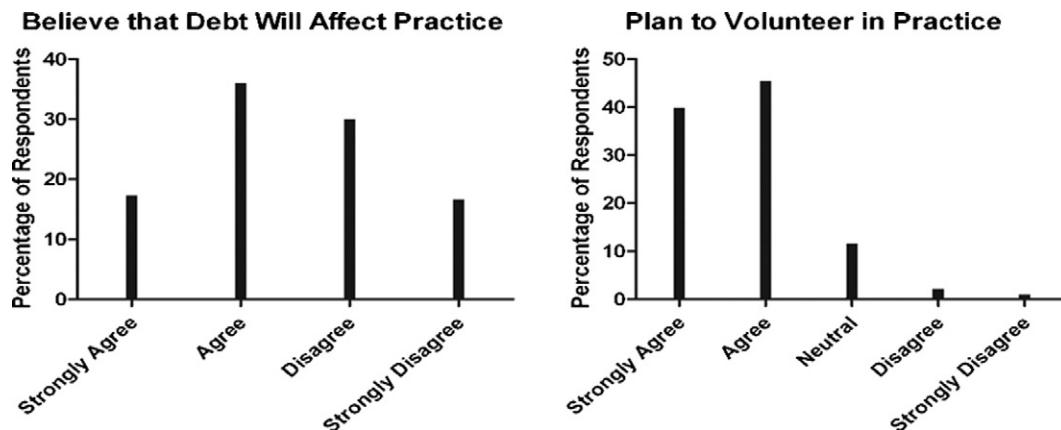
Debas and colleagues,<sup>7</sup> writing for a publication of the World Bank in 2006, made specific estimates of the burden of surgical disease based on WHO 2002 data, survey data, and estimates. They used disability-adjusted life years (DALYs), a measure that combines years of life lost because of disease and years of healthy life lost<sup>13</sup> to approximate the overall burden of surgical disease. Surgical DALYs per 1,000 population were 38 and 21 for Africa and the Americas, respectively, representing 7% and 12%, respectively,

of total DALYs.<sup>6</sup> Injuries and maternal complications accounted for the first and second highest causes of African surgical DALYs, respectively.<sup>6</sup> In addition, WHO predicts road-traffic accidents as the seventh leading cause of death in 2030 for low income countries; traffic accidents are not included in the predicted top 10 causes of death for either high or middle-income countries.<sup>14</sup>

Efforts to redress long-overlooked surgical services in favor of other public health initiatives such as infection control in lower and middle income countries led to the establishment of the Global Initiative for Emergency and Essential Surgical Care in December 2005<sup>7</sup> from the Clinical Procedures Unit (CPR) of WHO. The Global Initiative for Emergency and Essential Surgical Care is charged with overseeing implementation of initiatives directed at improving access to surgical care, and considers "safe and timely surgery/anesthesia as a human right."<sup>8</sup> Challenges to delivering this care in resource-constrained environments are many, including lack of data about surgical need, mechanisms with which to collect the data, infrastructure, health care workforce, training, equipment, and others.<sup>6-8</sup>

To date, international training opportunities, much like public health initiatives in developing countries, have been primarily the province of nonsurgical disciplines, such as internal medicine, pediatrics, and family medicine.<sup>15</sup> But the high need for surgical workforce and services, and emerging understanding of the cost-effectiveness of such care<sup>5,6</sup> present an opportunity for North American surgeons and residents to become involved. Although there are many individual examples of surgical programs initiating international training experiences,<sup>2,15</sup> no standard approach exists.

The data from the current survey demonstrate that most respondents are highly motivated to participate in international training; 82% would prioritize the elective over all or some other available electives. Many residents were willing



**Figure 3.** Beliefs about future practice plans.

**Table 4.** Free Text Responses Organized by Category

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A.	Perceived current logistical problems with international training
1.	Scheduling/service needs I feel that my program would not support me if I chose to do so anytime outside of my personal vacation time, which, right now, is a maximum of 2 weeks at a time . . .
2.	Finding opportunities <ol style="list-style-type: none"> <li>a. Medical missions would be great if I could find out which ones didn't proselytize.</li> <li>b. I would welcome any type of more formalized international elective. I attempted to set up a 1-month elective in [a foreign country] during my PGY-2 year. After 10 months of applications and payments made to various [foreign country] health authorities I had nothing to show for my time, effort, and money. I was deeply frustrated by the entire process.</li> <li>c. Finding a central source of information for working internationally would be helpful, as it has been difficult finding information about opportunities. . . .</li> </ol>
3.	Funding <ol style="list-style-type: none"> <li>a. Funding is a big concern as I have significant educational debt.</li> <li>b. Asking residents who get paid very little and have increasing amounts of debt (either due to accumulating interest or tuition increases when in school) after 8 years of schooling to pay more is not a suitable way to encourage interest in international training. One could also consider having as many or more scholarships/fellowships available (through the ACS or other surgical organizations) for international research/training as compared to basic science research.</li> </ol>
4.	Personal safety. I also have a concern for personal safety, particularly in areas of conflict.
B.	Value of the experience
1.	My experience with Operation Smile as a medical student certainly shaped my career plans.
2.	International training for US residents will improve their clinical judgment and make them less reliant on expensive imaging and lab tests. Moreover, it will make them cost-conscious.
3.	Residents and residency programs benefit from these experiences in many ways. Working in resource-poor settings is a new challenge: demanding more clinical independence, physical exam and diagnostic skills, and approaches to new problems based on first principles. The impact of such experiences on residents' perception of themselves and the possibilities of their skills and careers is frequently profound. The interaction with local surgeons is invigorating, challenging our algorithms and revealing the relatively narrow scope of our training and competencies. Programs benefit from residents rejuvenated by these experiences, returning with the clinical and cultural perspectives revealed by working in the settings where most of the world's surgical disease resides.
4.	Given the changing cultural demographics across America, all of us would benefit from international experience—even here at home.
5.	It reminded me why I wanted to become a doctor in the first place.
6.	As a discipline that traditionally has regarded commitment and service as priorities, surgical training in international settings is strangely absent.

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to sacrifice vacation time (54%), and some were even willing to finance the experience (27%). It is not clear why there is a discrepancy between the number of respondents who would prioritize the experience and those who would use vacation and finance; no specific questions were designed to capture the rationale behind these attitudes. The lower number of residents willing to finance the experience may be because of realities of financial constraints during residency, with limited salaries and loan repayment obligations (more than half of respondents carried debt greater than \$100,000). Concerning the use of vacation, residents may believe that this is a training opportunity, and as such, should be included within the training schedule.

The respondents were altruistic; both having done previous volunteer work and planning to incorporate it into their practice, despite heavy debt loads. Most residents expected to acquire technical and clinical skills; many of the free text comments reflected a desire to hone physical diagnosis skills in an environment where imaging and laboratory tests are limited. In addition to these expectations, many respondents described wanting to participate to ful-

fill altruistic desires, as shown in Table 4, section B. One respondent remarked succinctly, “[a previous international experience] reminded me of why I wanted to become a doctor in the first place.”

The national respondents identified funding and logistics as the major challenges to such a program. Although many respondents would still participate regardless of whether cases were counted for graduation requirements, allowing the cases to count would make the experience more available to all residents. Scheduling conflicts with other training obligations and staffing needs can be significant. Safety issues must also be considered and addressed.

Funding is a major challenge, given limited money for many different training priorities. A similar survey conducted in Canada also concluded that funding is a barrier.<sup>16</sup> A Web-based survey was administered to 378 general surgery residents registered with the Canadian Association of General Surgeons. The response rate was 27%, with 103 respondents completing surveys. Sixty-three percent and 89% of these respondents were interested in an international elective during their training and were planning to

incorporate international surgery into their practice plans, respectively. Although the Royal College of Physicians and Surgeons of Canada allows up to 3 months of training in an institution not approved by the Royal College,<sup>17</sup> only a few of the respondents had participated in an international elective as residents. Respondents most frequently identified cost and lack of opportunity or information as barriers; there remains no standard funding approach in Canada to securing this training.<sup>16</sup>

These data have limitations. The survey pool consisted only of resident members of the American College of Surgeons; this is a limited cross-section of overall surgical residents and is heavily weighted toward general surgery. The response rate was only 11%; this likely speaks to "survey fatigue" because residents are surveyed frequently and from many sources. As evidenced by the percentage of respondents who had family abroad with whom they communicated or visited regularly (41%), spoke another language (65%), and who were originally from countries other than the United States or Canada (13%), the respondent pool was quite diverse. In addition, most respondents had done previous volunteer work and were planning to do so while in practice. Given these data, the respondents may have been predisposed toward volunteerism; we may not have captured those residents for whom international training and volunteerism were not a priority. It would also have been helpful to have a larger representation of respondents planning careers outside of general surgery. Finally, a more robust examination of interest in domestic volunteerism would have been useful. Despite the limitations of these data, this is still the largest survey with the broadest cross-section of surgical residents conducted to date.

Given both single-institution and national data revealing residents to be highly motivated to pursue international training and volunteerism, and data revealing unmet worldwide surgical needs, it may be reasonable to begin discussions about the feasibility of international training during surgical residency. Such a program would need to benefit all involved, with three primary goals.

First, international training electives should enable North American faculty and residents to assist surgeons and other health care workers in developing countries to deliver surgical care. In addition to simply providing manpower, a more lasting benefit will be realized with exchange of information and ongoing collaborations. It is important to note that 73% of residents would prefer that home faculty accompany them on training missions. With faculty presence, cross-training among foreign and national faculty can occur. Formal, standardized programs between institutions can facilitate mutually beneficial ongoing

training between both North American and international faculty. One example of such an educational exchange is the Ptolemy project, in which surgeons from East Africa have access to electronic resources at the University of Toronto.<sup>18</sup>

The second goal of international training electives is resident education. Such training experiences can allow residents to develop their clinical skills more fully, give them a sense of cost-consciousness, provide an opportunity for service, and expose them to the increasingly global world of medicine. Beyond their immediate education during the experience, these experiences may also encourage volunteerism in future practice, both at home and abroad. Faculty participation may also help standardize the didactic component of these experiences for North American residents, although this must be done within the framework of different cultural contexts and may not strictly parallel usual North American paradigms.

Third, beyond their immediate education, these experiences may also encourage surgical volunteerism in future practice, at home and abroad. Volunteerism may occur in both ongoing and episodic contexts, such as in disaster response; the skills acquired in resource-limited contexts may be applied to both of these settings. Both of these contexts are important and offer a diversity of experiences that allow for different levels of time availability and interest. In addition, surgeons are sometimes stereotyped as uncaring, aloof, or impersonal.<sup>19</sup> The inclusion of volunteerism in training and expansion of the pool of surgical volunteers may help to dispute this incorrect stereotype.

Of note, one respondent commented, "There is such a great need for our skills within our own borders. [Can we consider] rotations in underdeveloped and economically disadvantaged areas of the United States?" We appreciate and agree with this viewpoint. One of the survey questions asked residents about their interest in a rotation with the Indian Health Service; 48% of respondents would consider such a rotation. But as noted earlier, a more detailed examination of interest in domestic volunteer opportunities would be helpful in the future to fully understand resident attitudes toward volunteerism in general. Rotations providing experience with surgical care among the underserved in the US and Canada, perhaps with the Indian Health Service and its Canadian counterpart, The First Nations and Inuit Health Branch,<sup>20</sup> or programs like Operation Access, which provides donated surgical care to the underserved in San Francisco,<sup>21</sup> may be logistically easier to initiate than overseas electives. Regardless of location, the opportunity to work with the underserved during surgical residency may assist surgical specialties in attracting candi-

dates who, without these opportunities, may otherwise be lost to other fields in which international training and volunteerism have a more established presence.

This is a timely project because both the WHO's Global Initiative for Emergency and Essential Surgical Care and the World Bank's Disease Control Priorities Project have identified improving access to surgery as a major priority and are currently developing initiatives to improve surgical training, research, workforce, and cost-effectiveness of surgical interventions.<sup>6-8</sup> It is time for North American surgical organizations to more fully participate in these global initiatives to improve care both at home and abroad. A plan to include residents in programs for the underserved will help provide the surgeons of tomorrow with the skills needed to participate in the global surgical world. A consensus among the stakeholders in North American surgical residency training, including representatives from the American Board of Surgery (and subspecialty credentialing bodies), the Canadian Association of General Surgeons, the Royal College of Physicians and Surgeons of Canada, the ACS, the Association of Program Directors in Surgery, faculty, residents, and other surgical education bodies, is necessary to formalize a system for underserved training within the residency framework that can meet these educational and service goals and overcome the current barriers.

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