

# TOPICS IN TRAINING

## The International Orthopaedic Health Elective at the University of California at San Francisco: The Eight-Year Experience

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It is estimated that half of the world's population lacks access to adequate primary health care and that two-thirds of the population lacks access to orthopaedic care<sup>1</sup>. While opportunities for orthopaedic surgeons to volunteer internationally have existed for many years, only a small percentage of practicing orthopaedic surgeons in the United States do so. One reason for this low rate of volunteerism is that physicians who have recently finished residency training face substantial loan burdens. In addition, recent graduates need to establish and build their practices<sup>2,3</sup>. Residents at the University of California at San Francisco (UCSF) may elect to participate in an overseas volunteerism program as early as their third postgraduate year. This program is rooted in the hope that early exposure will encourage future participation in similar activities throughout the residents' professional lives. While reports on the early experience of this elective have demonstrated a trend toward increased future participation in

volunteerism, to date there have been no formal investigations of the long-term impact of this elective experience on orthopaedic surgery residents<sup>4,5</sup>.

International health electives are believed to impact residents-in-training in three ways: providing professional development, affecting health-care resource use, and impacting outlooks and attitudes toward the delivery of health care<sup>6</sup>. A recent investigation conducted by the Department of Internal Medicine at Yale University examined the effects of its international elective on resident training. The study found that participants in an international elective were more likely than nonparticipants both to switch from subspecialty medicine to general medicine and to care for underserved populations<sup>7</sup>.

While offering an international elective as a standard component of a residency training program may appear to benefit both residents and residency training programs, such electives require a substantial financial commitment from medical institutions

and departments, many of which are facing considerable financial strain<sup>8</sup>.

The aim of this study was to critically evaluate the effects of an international elective experience on the beliefs and practice habits as well as future volunteer activities of the trainees who completed the elective relative to trainees who had not participated in such an elective.

UCSF began incorporating overseas missions into its orthopaedic resident training program in 1998. In 2001, an overseas elective was established as a formal component of the curriculum. From 2001 through 2008, thirty-one of forty-six eventually graduating orthopaedic surgery residents participated in an overseas volunteer mission. The primary destination of these missions was South Africa, but some residents participated in missions in Nicaragua, Malawi, and China. These trips were conducted under the auspices of Orthopaedics Overseas (<http://www.hvousa.org>), a well-established nongovernmental organization whose

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mission is to enhance the availability and quality of health care through education and training. Currently, the UCSF orthopaedic international rotation is a month-long block that takes place during the fourth postgraduate year.

The majority of residents who have participated in this elective rotate at the Orthopaedics Overseas site in Mthatha, a small city located in the Eastern Cape of South Africa. Mthatha houses the Bedford Orthopaedic Center, which provides tertiary orthopaedic care to approximately four million residents of the former homeland of the Transkei. The hospital is affiliated with the Walter Sisulu University Medical School in Mthatha. As is standard with all UCSF orthopaedic rotations, the staff at Bedford Orthopaedic Center provides feedback to residents and returns a written evaluation following completion of the elective.

Regardless of the location, UCSF residents who participate in overseas electives are exposed to a wide variety of disorders typical of developing regions. The rotation allows ample time for residents to teach local care providers and interact with local physicians. The goals for the elective, as stated in the resident training manual, are to “foster a spirit of volunteerism; enhance surgical skills and decision-making through a unique experience; provide exposure to third world disorders; further cultural sensitivity; and strengthen teaching skills.”<sup>9</sup>

## Materials and Methods

### Study Group

The study group consisted of thirty-one orthopaedic surgeons who completed their residency training at UCSF and participated in the international elective between 2001 and 2008. The control group comprised ninety-three orthopaedic surgeons who, during the same eight-year period, graduated from residency programs where an international elective is not offered as a standard component of the residency program. These programs were Yale University, University of Pennsylvania, Stanford University, St. Mary's in San Francisco, Harvard-Massachusetts General Hospital Combined Orthopaedic

TABLE I Sociodemographic Data			
Variable	Participants in International Elective (N = 31)	Nonparticipants in International Elective (N = 93)	P Value
Mean age*	35.9 ± 2.8	36.0 (30.0-41.0)	0.30
Median age*	36.8 ± 3.3	37.0 (31.0-46.0)	
Sex†			0.31
Male	28 (90)	77 (83)	
Female	3 (10)	16 (17)	
Race†			0.58
White	20 (65)	65 (70)	
Black	1 (3)	8 (9)	
Asian	7 (23)	11 (12)	
Other	3 (10)	9 (10)	
Marital status†			0.69
Married or partnered	26 (84)	75 (81)	
Single	5 (16)	18 (19)	
Had children during residency†			0.05
No	25 (81)	57 (61)	
Yes	6 (19)	36 (39)	
Had children after residency†			0.75
No	14 (45)	39 (42)	
Yes	17 (55)	54 (58)	
Born in the United States†			0.042
No	1 (3)	17 (18)	
Yes	30 (97)	76 (82)	
Domestic volunteer prior to residency†			0.82
No	9 (29)	25 (27)	
Yes	22 (71)	68 (73)	
International volunteer prior to residency†			0.55
No	22 (71)	71 (76)	
Yes	9 (29)	20 (22)	

\*The values are given as the age in years and the standard deviation, with the range in parentheses. †The values are given as the number of respondents, with the percentage in parentheses.

Program, and Johns Hopkins University. In addition, residents in the UCSF orthopaedic surgery residency program who did not rotate overseas were included in the control group.

### Survey Procedure

After receiving approval for the study protocol from the University of California at San Francisco Committee for Human Research, a survey was sent in June 2007 to graduates of the UCSF residency program and the residency

directors of the above cited residency programs. Current e-mail addresses were obtained from the participating residencies and the online directory of the American Academy of Orthopaedic Surgeons. Physicians who did not respond to the first mailing received a reminder e-mail. Participants were given a \$10 coffee gift certificate for completing the survey. To allow tracking of responses, return envelopes were coded with a subject identification number. Confidentiality of the responses was maintained.

TABLE II Impact on Postresidency Volunteer Activities

Variable	Participants in International Elective (N = 31)	Nonparticipants in International Elective (N = 93)	P Value
Postresidency volunteerism*			
International volunteer experience	6 (19)	6 (6)	0.05
Domestic volunteer experience	18 (58)	24 (26)	0.048
Importance of providing charity care*			
Residency should include exposure to health care in the developing world	31 (100)	60 (65)	0.0001
Orthopaedic surgeons in practice should provide care to the medically indigent	21 (68)	34 (36)	0.013
Health care practices*			
Overutilization of computed tomography and magnetic resonance imaging in the U.S.	16 (52)	18 (19)	0.0068

\*The values are given as the number of respondents, with the percentage in parentheses.

### Survey Instrument

Similar questionnaires were used for the two study groups. Each instrument contained a number of structured questions requesting sociodemographic information, career decision and/or practice profiles, and attitudes toward health-care delivery. Open-ended questions were also included to obtain comments regarding the UCSF international health elective. Several items were adapted from the Yale Internal Medicine survey and were used with permission<sup>7</sup>. In addition to questions with nominal categories, questions were arranged with use of the format of a Likert scale, with -3 representing the strongest negative effect, 0 indicating no effect, and +3 representing the strongest positive effect. Time to complete the instrument was estimated to be between eight and ten minutes. All of the information for this study was collected from an online, self-administered survey instrument from SurveyMonkey (Portland, Oregon).

### Statistical Analysis

An initial analysis was undertaken to determine the characteristics of the study cohort. Comparisons between groups were then performed with use of chi-square tests and univariate regression analysis. The level for significance was set at the conventional value of  $p \leq 0.05$ .

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### Results

#### Study Participant Demographics

Sociodemographic information for the study groups is summarized in Table I. The median age of the respondents was thirty-seven years. There was no significant difference between the groups with regard to race, marital status, ethnic background, year of completion of residency, political affiliation, or area of subspecialty training. The nonparticipants were more likely to have had children during residency (39% [thirty-six of ninety-three] compared with 19% [six of thirty-one];  $p = 0.05$ ) and were more likely to have been born outside the United States than were the thirty-one participants (18% [seventeen] compared with 3% [one];  $p = 0.042$ ). No significant difference was detected between the groups with regard to domestic and international volunteer experience prior to starting residency. Approximately 68% (twenty-one) of the thirty-one participants stated that

the presence of an international orthopaedic elective was not an important factor in their decision to rank the UCSF residency favorably when applying for residency. The most important reasons for participation were desire for a cross-cultural experience (29%; nine participants), the opportunity to serve a less privileged population (45%; fourteen), and a desire to obtain experience in a setting with limited resources (10%; three). Within the UCSF cohort, the most important reason for nonparticipation was family (thirteen of fifteen nonparticipants). All of the residents who participated in the elective reported that if they could do it all over, they would definitely include an international elective experience in their residency training.

#### Attitudes Toward Health-Care Delivery

We examined respondent attitudes toward health care in developing countries in terms of physician practice and medical training. Participants were more likely than nonparticipants to believe that physicians have an obligation to the medically underserved (55% [seventeen of thirty-one] compared with 35% [thirty-three of ninety-three];  $p = 0.017$ ). Participants were more likely to believe that residency training should include exposure to health care in the developing world

(100% [thirty-one] compared with 65% [sixty];  $p = 0.0001$ ). Finally, more of the participants reported a commitment to treating indigent patients in their medical practice (68% [twenty-one] compared with 36% [thirty-four];  $p = 0.013$ ).

The respondents' opinions regarding the use of health-care resources in the United States were also evaluated. Both participants and non-participants believed that physicians in the United States underutilize the physical examination. Participants were more likely to believe that physicians in the United States overuse sophisticated diagnostic tests such as magnetic resonance imaging and computed tomography scans (52% [sixteen of thirty-one] compared with 19% [eighteen of ninety-three];  $p = 0.0068$ ). Additionally, participants were more likely to rate alternative medicine practices as useful for treating musculoskeletal disorders. Participants more frequently endorsed acupuncture ( $p = 0.02$ ), herbal remedies ( $p = 0.0028$ ), yoga ( $p = 0.017$ ), and folk medicine ( $p = 0.034$ ) as useful adjuvant treatments for orthopaedic disorders.

#### *Impact on Postresidency Volunteer Activities*

Participants were more likely to consider volunteering internationally in the future than were nonparticipants. Most importantly, 19% (six) of the thirty-one participants had participated in additional international trips since the completion of residency compared with 6% (six) of the ninety-three nonparticipants ( $p = 0.05$ ). Participants were also more likely to engage in domestic volunteer efforts than were nonparticipants (58% [eighteen of thirty-one] compared with 26% [twenty-four of ninety-three];  $p = 0.048$ ) (Table II). A univariate logistic regression analysis was performed with the primary outcome of international or domestic volunteerism following residency. International elective participation was a strong predictor of future volunteerism (odds ratio, 3.1; 95% confidence interval, 1.32 to 7.1;  $p < 0.05$ ).

#### **Discussion**

The importance of sending physicians-in-training abroad to enhance medical training is not a novel idea. A 1969 editorial in *The Journal of the American Medical Association* stated, "If, as a routine, young American doctors were encouraged to spend some months working in a developing country before they become tied to the responsibilities of practice, the result could only be better medicine at home and abroad."<sup>10</sup> International electives benefit not only the residents who participate but also the residency program. Such electives promote several of the core competencies put forward by the Accreditation Council for Graduate Medical Education, including professionalism, patient care, medical knowledge, practice-based learning, interpersonal and communication skills, and system-based practice. In recent years, there has been considerable interest in introducing more formal methods of teaching professionalism in orthopaedic residency. John Racy, in an essay on professionalism, suggested that "[a] profession is a socially sanctioned activity whose primary object is the well being of others above the professional's personal gain."<sup>11</sup> Professionalism is most commonly taught in residency through modeling, whereby mentors provide examples of moral and virtuous behavior. Given the heavy workloads facing orthopaedic surgeons in training, residents often focus their efforts on acquiring the knowledge and skills necessary to provide technically sound medical care at the expense of other core competencies such as professionalism<sup>12</sup>. Experiences abroad can inspire residents, encourage professionalism, and help residents to hone their patient care and communication skills.

Along with professionalism, providing culturally competent care has emerged as a central educational goal of orthopaedic residency training programs. Such care requires tailoring the delivery of high-quality medical care to the social, cultural, and linguistic needs of the patient<sup>13</sup>. International electives expose residents to different cultures and offer opportunities to approach

orthopaedic problems in a culturally sensitive manner. While working alongside local physicians, residents witness the way in which host orthopaedic surgeons tailor their care to meet the needs of their patients. Many orthopaedic surgery residency programs provide rotations in inner city hospitals where residents are exposed to indigent patients and patients from a variety of ethnic backgrounds. While these experiences may have a similar impact on residents in training, the pathology, level of poverty, and resources are not the same.

The UCSF orthopaedic residency program incorporated the international elective into its curriculum with the hope that early exposure would have a lasting impact on the practice habits, beliefs, and subsequent volunteer efforts of the residents who participated. Our quantitative and qualitative data suggest that international health experiences may play a positive and influential role in the education of residents. The participants were more likely than nonparticipants to volunteer, both internationally and domestically, following the completion of residency. Furthermore, participants were more likely to believe that practicing medicine in a developing country is a rewarding experience that should be included in residency training programs.

As noted in the Results section, residents who participated in the international orthopaedic elective were also more likely to believe that sophisticated imaging modalities are often overutilized in the United States. Given the current health-care budget crisis and dire need to curb health-care costs, reducing the unnecessary use of imaging tests may help to accomplish this goal. Additionally, residents who completed the elective were more likely to endorse alternative medicine practices, including yoga, acupuncture, herbal remedies, and folk medicine, as a useful complement to traditional western medicine for treatment of musculoskeletal disorders. Whether such alternative medicine increases or decreases medical costs overall, and whether the

cost burden of such treatments should be covered by the patient or the insurer, are topics that merit further research and discussion.

Studies supporting the position that training programs influence physicians, especially in terms of future career decisions, have been criticized for failing to account for preexisting characteristics of the residents<sup>14,15</sup>. The potential for selection bias in the current study was addressed in several ways. First, we found that the participants and nonparticipants demonstrated no significant difference with regard to basic demographic variables, including age, marital status, number of children, and political affiliation, although nonparticipants were more likely to have children and to have been abroad. The two groups were equivalent with regard to exposure to domestic and international volunteerism prior to starting residency, suggesting that the baseline interest in volunteerism was similar between the two groups of residents. We also found that the majority of participants indicated that the international elective did not influence how they ranked UCSF when applying for residency, again suggesting that the UCSF residents are not necessarily more interested in international volunteerism prior to residency. Finally, the assignment of residency programs by a match system limits the free choice of each resident, thereby further mitigating the impact of selection bias.

Despite the fact that both study groups appeared to enter residency with an equivalent level of interest in volunteerism, those who choose to participate in an overseas rotation will always be a self-selected group and, thus, selection bias will exist in any study of the impact of international training on future physicians. The only way to eliminate this potential bias would be to randomly assign residents to an international rotation. Such a study, in which an international elective is imposed on residents without regard to the desire to participate in such training, would be fraught with difficulties. Specifically, students who

travel to impoverished overseas locations expose themselves to potential health risks such as malaria, human immunodeficiency virus, and hepatitis C. Furthermore, many residents are forced to leave behind their families for an extended period of time. The likelihood of a medical school administration and the human subjects committee agreeing to mandate such an experience is therefore low.

In addition to this selection bias, the other important limitations of our study stem from reporter bias and the limitations surrounding generalizing the results to residents from other training programs. As with any survey, reporter bias may have existed. For this reason, our results focus largely on objective variables rather than on subjective experiences and beliefs. We also recognize that the response rates between the groups were markedly different. While 100% of the UCSF overseas elective participants responded, we cannot accurately calculate the response rate of the nonparticipants. Citing privacy concerns, the residency programs sent surveys directly to their graduates, a pool of 312 possible residents, from whom we received seventy-eight responses (a response rate of  $\geq 25\%$ ). The differing response rates of the participants and nonparticipants, along with the finding that nonresponders were more likely to be nonparticipants, may impact our statistical analysis. Furthermore, given the unique components of the residency training program, the institution, and the study period, our findings may not be generalizable to other populations. With time, as more programs incorporate international electives into their curricula, a multicenter study evaluating the experience of residents from across the country could help to address the issues of reporter bias and generalizability.

Despite the limited scope of the current study, our findings point to an association between exposure to international electives and postresidency volunteer efforts. While it is possible that our study merely reflects inherent differences between the study groups, it

appears that the differences we found stem at least in part from the influence of the elective. If we assume that the elective does have an impact, whether the elective inspires new interest or affirms and reinforces residents' inherent interests is of secondary importance. It has been shown that idealism and the desire to work with underserved populations wane as medical students progress from preclinical training through residency<sup>8</sup>. Whether the participants represent residents who have a strong inherent interest in charity care, those who completed the elective were more likely to go on to volunteer after residency both within the United States and in the developing world. They were also more likely to endorse a commitment to serving indigent patients in their practice, an attitude which has been shown to be in steep decline with the recent increased penetration of managed care plans<sup>16</sup>.

Eight years after it was created, the international elective at UCSF has become the longest standing international orthopaedic elective of its kind in the United States. It is routinely described by past residents as the most valuable month of their residency training. The success of the program is best expressed in the words of the residents themselves. One of the residents surveyed reflected: "I realized that one doesn't have to travel halfway around the globe to find people who are desperately in need. I began to volunteer at a drop-in clinic for the homeless located in the worst part of downtown. The problems of isolation, hopelessness, lack of education, and cultural/behavioral barriers are very similar. I hope to engage in volunteer work of some kind after residency ends, not just for purely altruistic reasons, but also because I firmly believe that it helps me to become a more effective physician."<sup>17</sup>

Currently, there is unprecedented interest in global health among orthopaedic surgeons. International electives may reinforce this interest among surgeons in training and, as demonstrated by this study, inspire participa-

tion in global efforts throughout their professional careers.

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