



# Effects of International Health Electives on Medical Student Learning and Career Choice: Results of a Systematic Literature Review

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**BACKGROUND AND OBJECTIVES:** The present study reviewed the published literature to examine the effects of international health electives (IHEs) on medical student learning and career choice.

**METHODS:** A systematic literature review was conducted to identify key English-language articles on IHEs, using PubMed journal databases for the period 1990–2009. Article inclusion for this review was vetted by a rigorous evaluation of each article's study methods, content, and data quality. Pooled or aggregate information from 11 key articles, including information on type and duration of IHE, study and comparison group characteristics, and measured outcomes such as self-reported changes in cultural competency, clinical skills, and specialty choice, were extracted and summarized.

**RESULTS:** Findings suggest that having IHE experiences contributed to a more well-rounded training for medical students; students reported being more culturally competent and were more likely to choose a primary care specialty and/or a public service career.

**CONCLUSIONS:** Although IHE experiences appear to have educational benefits, the quality and availability of these electives vary by institution. Barriers to ensuring that students attain a safe and rich experience include the lack of consistent categorical funding, safety concerns when traveling, and limited faculty experience and resources to support and guide students during their rotations abroad.

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Global health is an increasingly important area of study for US medical students and physicians in training.<sup>1-6</sup> With the expansion of global travel and trade, the risk of rapid transmission and spread of infectious disease has never been greater.<sup>2,3</sup> The emergence of a public health threat in one country (eg, Avian flu, H1N1) quickly

becomes a grave concern throughout the world.<sup>2</sup> In addition, many developed and developing countries now share similar burdens of chronic disease as costly public health problems.<sup>1-4</sup> A growing number of US patients are immigrants or are descendants of first-generation immigrants from developing countries.<sup>4</sup>

The emerging relevance of global health is evident at most US medical schools, as more and more medical students express interest in international travel and training and/or have actually traveled to a third world country prior to graduation.<sup>2</sup> Since 2000, 23.1% of all medical students in the United States have participated in international training annually.<sup>4</sup> Although medical schools have begun to address this rising demand, the response has been slow.<sup>1-3</sup> Typically, the quality and availability of formal IHE programs have varied by institution.<sup>2</sup> A plausible reason for this is the lack of clarity in the current literature regarding IHEs' effects on medical student learning and career choice. Presently, there are few efforts that have specifically summarized the published evidence on IHEs' benefits to medical student education; albeit a previous study in 2003 had reviewed several studies on this topic for the period 1966 to 2000.<sup>7</sup>

The present systematic literature review updates existing evidence<sup>7</sup> by further examining the trends and potential role of IHEs in amplifying students' professional growth during undergraduate medical training

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(years 1–4 of medical school). The review limited its scope to only US medical schools because the training curricula in the United States differ substantially from those in other countries. It also limited its scope to undergraduate medical education because IHE opportunities in the graduate setting (ie, during internship and residency) have been described elsewhere.<sup>8–10</sup> This paper concludes by identifying and discussing research needs and other innovations that may aid medical educators in developing higher quality IHE programs at their respective institutions.

## Methods

To identify eligible studies for this systematic literature review, we searched PubMed journal databases (MEDLINE, Index Medicus, National Library of Medicine, etc, and www.pubmed.gov) for the period 1990–2009. Key terms used in this search included global health AND (medical student\*, medical education\*) AND elective NOT PBL. The term NOT PBL was used to exclude studies that specifically investigated problem-based learning, an instructional method that is commonly used in undergraduate medical education but not in IHEs. To augment our search, we selectively reviewed references cited in key articles identified in the initial search; this process yielded additional articles that were eligible for possible inclusion in our review.

Foreign language articles were excluded, and English-language studies were included if they met the following criteria: (1) the IHE, rotation, and/or clerkship took place outside of the United States and was taken for some form of credit, (2) study participants were undergraduate medical students in the United States, and (3) the study assessed at least one of the following outcomes: (a) attainment of clinical core competencies (eg, diagnosis and treatment, clinical decision making, and resource management), (b) changes in participants' cultural competency,

and (c) choice of specialty or career trajectory (eg, public health, public service).

Information on important study characteristics were extracted and pooled from the studies described in the identified articles. These characteristics included the description of the IHE program or intervention, selection process for the IHE participants, number of years the study group participated in the IHE, name of the home institution(s), host countries visited, funding source, study design, size and type of intervention or comparison groups, assessment tools used to evaluate outcome measures in these studies, and response rates (if the studies were surveys). Interpretation of the pooled or aggregate information was carried out with reviewers reaching agreement on the information's quality and context. Consultation with a fourth reviewer was requested as needed to resolve differences in the interpretation.

Due to the variability of study methods and measured outcomes used across the different articles, a meta-analysis using advanced statistical methods to analyze the pooled data or aggregate information was not feasible. Thus, the present review is primarily a summary of the available evidence in the literature and not a statistical comparison of experimental IHE interventions.

## Results

### *Overview of the Search Results*

The PubMed search initially yielded 203 articles. However, only about one third of this total was relevant to the systematic literature review based on subsequent screening of the abstracts. Application of the inclusion criteria further narrowed the pool of articles to 11. Of these 11 key articles, two studies were from the same institution, but they covered different time periods, 1997–1998<sup>11</sup> and 1997–2003,<sup>12</sup> and used different evaluation tools and methods. In all, six studies, representing new IHE programs from four institutions, were identified after 2000.

### *Characteristics of Study Groups in Reviewed Articles*

Extracted information on study characteristics were pooled using data from each of the studies described in the key articles. Evaluated within this collective context, there were a total of 893 IHE participants in the studies reviewed. The sample size of the intervention group (or study group) in each of the studies varied, ranging from 12 to 154 participants. The participants came from diverse backgrounds and attained a range of unique IHE experiences. They were from at least 40 different institutions and traveled to at least 34 different countries. In some of the studies, home institutions<sup>13</sup> or specific host countries<sup>12,14,15</sup> were not specified.

Collectively, approximately 43% of the medical students who participated in an IHE were in their fourth year (386/893); this does not include fourth-year students who were not counted because the reviewed studies only specified a range.<sup>12</sup> In addition, 64 students did not indicate their year in medical school.

About 36% (4/11) of the studies used comparison groups.<sup>11,12,15,16</sup> Of these, two general types were used: (1) those who chose not to participate<sup>11,12,16</sup> and (2) the general population of practicing physicians.<sup>15</sup> In total, 136,407 medical students and physicians were included in this summary of comparison groups. A majority of this pooled number represents physicians from a single comparison group described in one article.<sup>15</sup> In this study, 58,484 of the 136,016 comparison group total were primary care physicians.

### *Characteristics of IHE Programs in Reviewed Articles*

In the present literature review, all studies provided descriptions of their IHEs.<sup>3,6,11–19</sup> Among them, eight had defined selection or application criteria for prospective students interested in IHEs.<sup>3,6,11,12,14–16,18</sup> Six had an orientation or preparatory course to prepare students for the international experience.<sup>3,6,14–17</sup> The most frequent duration of the

programs reviewed was 4 weeks, but the durations ranged from 4 to 32 weeks depending on the institution. The IHEs in the 11 studies took place predominantly in the regions of Africa, Asia, the Caribbean, Central America, and South America. Funding sources were specified in six studies. These sources included grants or small school loans to defray travel costs.<sup>3,6,11,15,16,19</sup>

The 11 studies included in the review were generally observational and similar in design: case cohort,<sup>11,12</sup> case cross-over,<sup>3,19</sup> cross-sectional case cohort,<sup>15</sup> descriptive,<sup>6,13,14,17,18</sup> and descriptive cohort.<sup>16</sup> The assessment tools used commonly in most studies were self-administered surveys or questionnaires.<sup>3,6,11,12,14-19</sup> One study included a validated scale to measure changes in the level of cultural competency among study participants.<sup>11</sup> Most assessments were administered anytime from before the IHE to 7 years after the elective. The response rates for these assessments ranged from 53% to 100%; two studies did not report response rates.<sup>17,19</sup>

Most IHE evaluation results were based on self-reports, but there were a few studies that examined qualitative and non-survey data, including thematic information from interviews<sup>18</sup> and focus groups<sup>13</sup> and specialty matching rates in the National Resident Matching Program.<sup>14</sup>

### *Summary of Major Findings From the Review*

Key findings from the systematic literature review are summarized in Table 1. In general, findings from the review suggest that having an IHE experience contributed favorably to student learning and career growth in several ways. First, IHEs appeared to offer important opportunities for medical students to strengthen existing skills or learn new diagnostic skills, with less emphasis on the use of “high tech” instruments or interventions and more on history-taking and clinical reasoning. A majority of the studies included in the review found that medical students with an IHE experience

typically reported greater self-confidence in history-taking and in performing physical exams than their counterparts who did not complete an IHE during their training.<sup>6,16-18</sup>

Second, several studies indicated that participation in IHEs increased medical students’ knowledge of tropical disease and immigrant health, suggesting that this experience may help prepare students for treating imported diseases among immigrants or tropical diseases brought home by US travelers in the future.<sup>17,18</sup>

Third, in several of the reviewed studies, IHE participants were generally more likely than non-participants to report attitudinal changes, such as greater appreciation for the importance of cross-cultural communication (cultural competency), prevention, environmental health, public health interventions, and providing care to the underserved.<sup>3,6,11-15,18</sup>

Fourth, having IHE experience appeared to influence the career choices of many medical students. Several studies showed that IHE participants were more likely than non-participants to choose primary care specialties (eg, family medicine, internal medicine, pediatrics), seek employment in low-income clinics, and/or pursue graduate education in public health.<sup>6,12,15-17</sup>

### **Discussion**

In the present systematic literature review, we attempted to update the current understanding of IHEs’ potential contributions to undergraduate medical education. Our review highlights six additional published studies since the 2003 publication by Thompson and colleagues,<sup>7</sup> which reviewed eight studies on IHEs from 1966 to 2000 (six evaluated programs in undergraduate medical education), spanning a period of 30 years. Although the findings from 11 key articles may appear less than substantial, the additional evidence provided in this review confirms and suggests that having an IHE experience contributes favorably to

student learning and career choice. The present review also reveals that more research on program effectiveness using more rigorous evaluation methods are needed to aid medical educators with developing and implementing higher quality IHEs at their respective institutions.

### *Challenges to Developing and Implementing IHEs*

Although most medical educators would agree that IHEs can provide numerous personal as well as educational benefits to medical students,<sup>2,4-7,9,20</sup> few have reached consensus on how best to design and implement institution-specific curricula. Several factors pose particular challenges to this process.<sup>2,3,7,10,21-24</sup> Haq and colleagues<sup>3</sup> reported previously, for example, that students who visited an international location for the short-term (ie, a few months) were frequently unable or were not prepared to assist the hosting facilities with their clinical workload. This barrier, however, can be mitigated by instituting stronger preparatory instruction on basic clinical skills prior to travel, limiting IHE participation to third- or fourth-year medical students who have attained some clinical experience, or by requiring better oversight from a supervising faculty who is familiar with or has an established working relationship with the foreign location.

Another significant challenge to establishing an IHE program is personal safety.<sup>2,4,7</sup> Since many of the available IHEs lack formal structure, many students are responsible for all aspects of their overseas experience. Thus, home institutions are usually not informed of the details of students’ trips nor are they given updates on the progress of the IHE participants. Such safety concerns can be alleviated by establishing a standard communication protocol that requires IHE participants to keep in touch with their home institutions via personal or institutionally approved telecommunication channels (eg, e-mail, cell phone).

**Table 1: Characteristics and Effects of International Health Electives During Preclinical and Clinical Years in US Medical Schools**

Undergraduate Medical Education Programs			
Study	1990 Smilkstein and Culjat <sup>19*</sup> <i>Academic Medicine</i>	1992 Pust and Moher <sup>14*</sup> <i>Academic Medicine</i>	1994 Bissonette and Route <sup>18*</sup> <i>Family Medicine</i>
	“An International Health Fellowship in Primary Care in the Developing World”	“A Core Curriculum for International Health: Evaluating Ten Years’ Experience at the University of Arizona”	“The Educational Effect of Clinical Rotations in Nonindustrialized Countries”
<b>International Health Elective, Years Examined (Home Institution)</b>	32-week international health fellowship (IHF) in primary care at hospitals in international sites, 1989. (University of Louisville)	Intensive, 3-week orientation course and 75 contact hours (half of these hours are in small groups) before spending an average of 6–12 weeks in less-developed country clinical sites, 1982–1990. (University of Arizona)	A full-time rotation of no less than 6 weeks with on-site supervision by an American-trained physician and an emphasis on patient care; participants must be able to communicate in the host country’s language, 1984–1991. (State University of New York at Buffalo)
<b>Selection Process</b>	Not specified	Application: selection based on documentation that student is actively arranging a clinical site in a less developed country	Good academic standing; if able to describe where the student wants to go and why in a preliminary interview; agree to provide data; and able to meet criteria of rotation host
<b>Funding</b>	Pew Trust, USA for Africa	Not specified	Not specified
<b>Host Country</b>	Ghana, Nigeria	Not specified (Regions: Africa, Asia-Pacific, Latin America-Caribbean)	Haiti, Ivory Coast, Kenya, Liberia, Swaziland, Taiwan
<b>Study Design</b>	Case cross-over	Descriptive	Descriptive
<b>Study Group, School Year</b>	Students, year not specified (n=12)	Students, fourth-year (n=154)	Students, fourth year (n=28)
<b>Comparison Group</b>	None	None	None
<b>Assessment Tool (Response Rate)</b>	Evaluation of 19 knowledge and skill variables pre- and post-IHF (including economic factors, environmental factors, and political factors in health care) (response rate not reported).	Four-page, 28-item survey that asks for demographic and career-planning updates, subsequent clinical experiences in developing countries, and match rate for specialties in the National Resident Matching Program (80%).	Interviews conducted pre-rotation and questionnaire consisting of seven short-answer questions for location information and 20 open-ended, short-essay questions given in the last week of rotation. Content analyses were conducted on these interviews to identify and examine recurring themes and domains (93%).
<b>Findings</b>	Students achieved significant gains in knowledge and skills in 18 of the 19 evaluation areas ( $P < .002$ )	<ul style="list-style-type: none"> <li>Specialty choices of participants: family medicine 46%, pediatrics 19%, internal medicine 13%, medicine/pediatrics 3%, preventative medicine 4%, OB-GYN 4%, surgery 4%, emergency medicine 3%, psychiatry 2% (higher percentage than NRMP for entering family medicine and pediatrics; lower percentage than NRMP for entering internal medicine and non-primary care specialties)</li> <li>27% of respondents stated they planned to obtain a Masters of Public Health (MPH)</li> <li>81% planned to incorporate international health work into their future careers</li> <li>73% of respondents participated in an international health field experience after completing the course</li> </ul>	<b>Educational outcomes:</b> <ul style="list-style-type: none"> <li>Clinical judgment: 100% reported increase in perceived importance of history and physical examinations in diagnosis</li> <li>Public health and patient education: 100% reported increased awareness of public health and patient education issues</li> <li>Cost containment: 78% reported heightened awareness of cost issues</li> <li>Cultural sensitivity: 57% stated cultural/religious norms played prominent role in health care</li> <li>Family support: 61% recognized the greater role patients’ families had in host countries in comparison to the US</li> </ul> <b>Career influence:</b> <ul style="list-style-type: none"> <li>70% of participants eventually entered residencies in family medicine, general internal medicine, or general pediatrics</li> </ul>

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Table 1: Continued

Study	1995 Chiller et al <sup>16*</sup> <i>Infectious Disease Clinics of North America</i> “International Health Training: The Tulane Experience”	2000 Haq et al <sup>3*</sup> <i>Family Medicine</i> “New World Views: Preparing Physicians in Training for Global Health Work”	2001 Esfandiari et al <sup>17</sup> <i>Academic Medicine</i> “An International Health/Tropical Medicine Elective”
<b>International Health Elective, Years Examined (Home Institution)</b>	8-week elective at international sites, includes a 1-week orientation, 1990-1993. (Tulane University School of Medicine)	2-week preparatory course at one of three US medical schools, 6- to 8-week field experience at one of seven international medical schools in developing countries, 1995-1996. (IHFP consortium: University of Wisconsin, University of Colorado, and University of Rochester)	6-week combined classroom and clinical experience: 2-week introductory classroom session, 4-week clinical clerkship in tropical country, 1987-1988. (Charles R. Drew University of Medicine and Science)
<b>Selection Process</b>	Obligated clerkship in community medicine. Students can choose from 1 month of lectures and seminars at school, 1 month at a national site, or 2 months at an international site	Applicant required to be in good standing. Application included: essay regarding interest and motivations for international, community, and cross-cultural health training, brief community health project, and two letters of recommendation; participants selected based on commitment to international, cross-cultural, or community-oriented primary health care and letters of recommendation	Not specified
<b>Funding</b>	Students responsible for the costs of travel and living expenses; if necessary, with small loans from the university	2-year grant from the National Security Education Program (NSEP); each fellow received \$2,000 to defray travel costs	Not specified
<b>Host Country</b>	Belize, Costa Rica, Guatemala, Jamaica, Saint Lucia, US Virgin Islands	Colombia, Honduras, India, Kenya, Pakistan, South Africa, Thailand	Colombia, Costa Rica, India, Kenya, Mexico, Peru, Puerto Rico, Zimbabwe
<b>Study Design</b>	Descriptive cohort	Case cross-over	Descriptive
<b>Study Group, School Year</b>	Students, fourth-year (n=103)	Students, fourth year (n=59)	Students, year not specified (n=52)
<b>Comparison Group</b>	Students who did not travel to international sites and remained in New Orleans (n=211)	None	None
<b>Assessment Tool (Response Rate)</b>	Survey distributed before community health rotation and analyzed after rotation (73%). Follow-up questionnaire given to class of 1990 three years after graduating from medical school (53%).	Students polled before and immediately after preparatory course, immediately after elective, and 1-2 years after elective with self-assessment questionnaire containing 64 statements (98%).	Post-elective survey (response rate not reported, convenience sample)
<b>Findings</b>	<u>Immediately after the community medicine rotation:</u> <ul style="list-style-type: none"> <li>72.8% of students who traveled to international sites planned to provide health care to the indigent, compared to 80.6% of students who remained in New Orleans for their community medicine clerkship.</li> </ul> <u>Three years after graduating from medical school:</u> <ul style="list-style-type: none"> <li>100% of students who participated in the community medicine rotation considered their experience valuable, compared to 77.8% of those who did not participate in the rotation.</li> <li>23.1% of students who participated in the community medicine rotation planned to work in resource-poor areas, compared to 5.6% of students who did not participate in the international rotation.</li> <li>After graduation, the number of students who desired to work in resource-poor areas decreased. However, among those with this desire, there was four times the number of students who participated in the international rotation as compared to those who did not.</li> </ul>	<ul style="list-style-type: none"> <li>At the end of the fellowship, a majority of participants noted that the exposure affected them in the following ways: changed world views; increased cultural sensitivity; enhanced community, social, and public health awareness; enhanced clinical and communication skills; more appropriate resource utilization; changes in career plans; and greater understanding of the challenges of working in areas with scarce resources.</li> <li>According to student self-assessments, the elective helped to significantly improve core medical skills (<math>P &lt; .01</math>).</li> <li>83% of the students said the experience changed how they practiced medicine</li> <li>96% of the students recommended international health electives to other students</li> <li>80% of the students planned to primarily practice in the US and spend some time overseas</li> </ul>	<ul style="list-style-type: none"> <li>66% of participants joined a national or international organization (eg, WHO, Doctors Without Borders, Global 2000) and 80% returned to the same area of their clerkship at least once after the completion of their rotation.</li> <li>100% of responses stated the elective clerkship had improved their clinical diagnostic skills and reduced their dependence on laboratory and other procedures.</li> </ul>

Table 1: Continued

Study	2001 Godkin and Savageau <sup>11</sup> <i>Family Medicine</i>  "The Effect of a Global Multiculturalism Track on Cultural Competence of Preclinical Medical Students"	2003 Godkin and Savageau <sup>12</sup> <i>Family Medicine</i>  "The Effect of Medical Students' International Experiences on Attitudes Toward Serving Underserved Multicultural Populations"	2004 Ramsey et al <sup>15</sup> <i>Family Medicine</i>  "Career Influence of an International Health Experience During Medical School"  (Follow-up study to Haq et al <sup>3</sup> in 2000)
<b>International Health Elective, Years Examined (Home Institution)</b>	6 weeks of language immersion abroad and three domestic components: time with a local immigrant family, a community service project, and a seminar series, 1997–1998. (University of Massachusetts Medical School)	At least 6 weeks duration for preclinical students and 4 to 8 weeks for more than 95% of clinical students, Classes of 1997 to 2003. (University of Massachusetts Medical School)	2-week preparatory course at one of three US schools, 6- to 8-week field experience in developing country, 1995–1997. (IHFP consortium: University of Wisconsin, University of Colorado, and University of Rochester)
<b>Selection Process</b>	Application evaluated on interest in working with underserved and multicultural populations, prior service with these populations, public service experiences, experiences with international education, rationale for participation, language interests and proficiencies, and ideas for a required community service project	Application: student must be in good academic standing and agree to a site considered appropriate by director; nearly all applicants were accepted	Applicant selected based on commitment to international, cross-cultural, or community-oriented primary health care and letters of recommendation
<b>Funding</b>	Grant supported by the Massachusetts Division of Medical Assistance (DMA), a state agency that covers medical services for persons eligible for Medicaid	Not specified	2-year grant from the National Security Education Program
<b>Host Country</b>	Brazil, China, Chile, Costa Rica, Cuba, Ecuador, Guatemala, Honduras, Mexico, Nicaragua, Puerto Rico, Thailand, Vietnam	Not specified (Regions: Africa, Asia, Latin America, Western Europe)	Not specified
<b>Study Design</b>	Case cohort	Case cohort	Cross-sectional, case cohort
<b>Study Group, School Year</b>	Students, second year (n=26)	Students, preclinical and clinical (n=146)	Students, fourth-year (n=42)
<b>Comparison Group</b>	Non-track students (n=104)	Students who were non-travelers (n=76)	All US physicians under the age of 35 (n=136,016, where 58,484 were primary care specialists)
<b>Assessment Tool (Response Rate)</b>	Cultural Competence Self-Assessment Questionnaire (CCSAQ) to measure cultural competence pre- and post-experience (100% among study group, 68% among comparison group).	Self-administered pre- and post-travel questionnaires. Instrument included four domains and 20 items related to attributes of physicians caring for underserved multicultural populations (83% among study group, 94% among comparison group)	Survey administered 4-7 years after elective experience (2001–2002). Results compared with historical data from multiple sources (70% among study group).
<b>Findings</b>	<ul style="list-style-type: none"> <li>Track students had a higher level of cultural competence both at the beginning and at the end of the program versus non-Track classmates (<math>P&lt;.1</math>).</li> <li>Track students had a significantly higher mean score for the following CCSAQ items: feeling more comfortable with patients from different cultural backgrounds, a desire to serve underserved populations, having higher levels of compassion (toward neglectful patients), and having greater respect for patients overall, as compared with non-Track classmates (<math>P&lt;.05</math>).</li> <li>Track students reported greater self-awareness about their role as providers and about the need to understand patients' cultural beliefs, health beliefs, barriers to accessing health care, language, and common health needs, as compared with non-Track classmates (<math>P&lt;.05</math>).</li> </ul>	<p><u>Pre- and post-experience</u></p> <ul style="list-style-type: none"> <li>Preclinical students reported a statistically significant increase in interest in international (<math>P&lt;.001</math>) and public health (<math>P&lt;.01</math>), perceived need to understand cultural differences (<math>P&lt;.01</math>) and know a second language (<math>P&lt;.001</math>), and perceived need to be advocates for communities after their international experience (<math>P=.03</math>).</li> <li>Clinical students reported a statistically significant increase in need to understand cultural differences (<math>P&lt;.001</math>), enthusiasm about career (<math>P=.03</math>), and sense of idealism for their role in society (<math>P&lt;.001</math>) after their experience abroad. However, clinical students reported a statistically significant decrease in their overall awareness of their future role (<math>P=.04</math>) and the need to work collaboratively with other health care professionals (<math>P=.02</math>).</li> </ul> <p><u>Compared to non-travelers:</u></p> <ul style="list-style-type: none"> <li>Those who completed an IHE (travelers) reported greater interest in working with the underserved, careers in international or public health, and in primary care (<math>P</math> value range: .043 to <math>&lt;.001</math>).</li> <li>Travelers reported greater sense of idealism about role as physician (<math>P&lt;.001</math>).</li> </ul>	<p><u>Participants' careers:</u></p> <ul style="list-style-type: none"> <li>46% practice in inner city, 26% in urban, 23% in rural, 5% in suburban, and 15% in Health Professional Shortage Area</li> <li>67% involved with community health activities</li> <li>48% had given talks or presentations in international health</li> <li>33% helped create international health electives for other physicians</li> <li>57% did additional work in developing countries</li> <li>60% planned to work in developing countries</li> <li>67% agreed that the elective experience influenced their careers</li> </ul> <p><u>Compared to comparison group (all US physicians &lt; 35 years of age):</u></p> <ul style="list-style-type: none"> <li>74% in primary care versus 43% of comparison group</li> <li>36% in family medicine versus 11% of comparison group</li> <li>29% had/were obtaining an MPH versus 3% of comparison group</li> </ul>

Ultimately, funding remains the key limiting factor.<sup>7,21,22</sup> Without earmarked, categorical funding to subsidize participants, costs associated with IHE training and travel can be prohibitive for many students who do not have access to other funding sources. Moreover, for most institutions to continually invest and sustain an IHE program, the expense of establishing and maintaining the curriculum must be justified. There is a need to better define and quantify the impacts of IHEs on clinical knowledge, clinical skills, and patient care in the long term using objective measures of patient care and physician practices. In the present literature review, most of the studies in the reviewed articles used observational designs;<sup>3,6,11-19</sup> these studies primarily used self-reported measures to collect information on participants, with limited to no corroborating evidence from clinical observation, test scores, medical chart reviews, or simulated assessments of clinical skills using standardized patients.

### Future Directions and Research Needs

In the future, development of additional outcome measures (other than self-reports) focusing on provider behavior and quality of patient care are needed to help augment standard measures already in use to assess the learning process and student experience. More interval follow-ups of IHE participants after medical school and consideration of other outcome measures that extend beyond self-reported indices such as participant satisfaction or career choice are necessary. Measures that better assess the impacts of IHEs on practice characteristics (eg, type of practice, type of care delivered, compensation), provider behavior (eg, case mix, customary practices in the clinical setting, compliance

with recommended targets for preventive services), and patient-level outcomes (eg, self-reported health status, patient satisfaction scores) are important indicators of evidence-based practices that can aid medical educators in coordinating IHE programs at their respective institutions. Similarly, analyses of costs and determinants of career longevity in public service can help further characterize cost/benefits of IHEs to student education in the long term. These analyses can provide additional evidence in support of this curricular intervention's positive return on investment; thus, offering a

more convincing argument to deans and administrators of US medical schools that investing in these programs will pay dividends in the long run.

### Limitations

The present systematic literature review has several limitations. The studies identified in our review, for example, were mostly observational and frequently presented only favorable outcomes (ie, publication bias). In addition, **most of these studies** utilized only self-administered questionnaires for assessing IHEs' impacts; few corroborating measures

Table 1: Continued

<b>Study</b>	<b>2006</b> Smith and Weaver <sup>6</sup> <i>Annals of Family Medicine</i> "Capturing Medical Students' Idealism"	<b>2007</b> Mao et al <sup>13</sup> <i>Family Medicine</i> "A Gain in Cultural Competence Through an International Acupuncture Elective"
<b>International Health Elective, Years Examined (Home Institution)</b>	1 week of didactics, 3 weeks as part of multidisciplinary medical team in rural international site, 1997–2005. (University of Texas Medical Branch)	4-week elective that teaches medical students about acupuncture in its native cultural environment, July 2005 rotation. (27 US medical schools collaborating with China International Acupuncture Training Center)
<b>Selection Process</b>	Application and personal statement reviewed	Not specified
<b>Funding</b>	Students responsible for travel expenses, but majority received some financial support through the Dean of Medicine's Global Health Scholarship fund or through the Hispanic Center for Excellence	China International Acupuncture Training Center was sponsored by the World Health Organization, but funding for trips to China from the US were not specified
<b>Host Country</b>	Nicaragua	China
<b>Study Design</b>	Descriptive	Descriptive
<b>Study Group, School Year</b>	Students, first year (n=62)	Students, first year (n=17)
<b>Comparison Group</b>	None	None
<b>Assessment Tool (Response Rate)</b>	Four open-ended survey questions conducted post-completion of international health elective, analyzed for common themes (94%).	Three focus groups, guided by a semi-structured discussion script, conducted to elicit students' description of their experiences.
<b>Findings</b>	<u>After completion of the elective, data from the survey suggest that students had:</u> <ul style="list-style-type: none"> <li>• Increased self-awareness and a broadened global perspective</li> <li>• Increased interest in volunteerism, humanitarian efforts, and working with underserved populations</li> <li>• Heightened awareness of social determinants of health and public health</li> <li>• Improved clinical skills, particularly history and physical examination and communication skills</li> </ul>	<ul style="list-style-type: none"> <li>• The students' reflections on this experience indicated that the study of an alternative medical system, in its own cultural setting, helped the students become open to other medical practices and beliefs and realize the importance of culture in the delivery of health care.</li> <li>• Being linguistically isolated helped the students to experience what it is like for those patients with limited language proficiency.</li> </ul>

\* included in a previous study (Thompson et al, 2003)<sup>7</sup>

Case cohort=cases determined prior to administering assessment tool

Case cross-over=cases serve as both cases and controls (by pre- and post-intervention evaluations)

(eg, feedback from hosting institutions, National Board exam scores, clinical skills performance testing) were available to address potential self-reporting bias. Many studies also did not have control groups, and among those with comparison groups, the non-study participants were not always directly comparable to study participants, suggesting substantial selection bias. Finally, there was significant variation in the duration, layout, and preparation for the IHEs, implying that the results of the studies from the literature review could be institution-specific and may not be generalizable to the larger community of medical students in the United States.

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