

A Global Health Elective for US Medical Students: The 35 Year Experience of the State University of New York, Downstate Medical Center, School of Public Health

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Abstract The School of Public Health at the State University of New York, Downstate Medical Center has sponsored a 6–8 week global health elective for fourth year medical students since 1980. The purpose of this elective is to provide students with an opportunity to observe the health care and public health delivery systems in low-income countries, provide medical service and have a cross-cultural experience. Over the course of the past 35 years, 388 students have participated in this global health elective in more than 41 low-income countries. The most popular sites include the Dominican Republic, Guatemala, India, Kenya and Thailand. Overall, interest in this elective has persisted throughout the course of time, sometimes temporarily increasing or decreasing with outside factors, such as the events of 11 September 2001 and the outbreak of Severe Acute Respiratory Syndrome in Asia. Recent annual applications for this elective have been as high as 44 out of a class of 200 students. Over the past 10 years, annual acceptance rates have varied, ranging from a low of 32 % in 2007–2008 to a high of 74 % in 2010–2011 and 2013–2014. Careful screening, including a written application, review of academic records and personal interviews has resulted in the selection of highly mature, adaptable and dedicated students who have performed well at overseas sites. Student rated satisfaction levels with this elective are almost universally high, with

most rating it the best experience of their medical school years. Students undergo extensive preparation prior to their travel overseas, including a review of individual health and safety issues, travel and lodging, and the nature of the host country culture, health care system and assignment site. Downstate medical students are especially experienced in cross-cultural understanding because of the unusual diversity of the patient population in Brooklyn, and the diversity of local hospital staff and the medical school class. The Alumni Fund of the College of Medicine has steadfastly supported this elective with both a philosophical commitment and financial grants to help defray costs since the very early years. The Dr. Michael and Lona B. Kennéy Endowment, the Joshua H. Weiner endowment, and the LSK Foundation have also provided financial support for this elective. Throughout the course of this elective, overseas preceptors have willingly given of their time and institutional resources to make these experiences available and meaningful for our students.

Keywords Global health electives for medical students · Public health electives in low-income countries · International medical education for US medical students

Introduction

Interest in global health has a long history among students in US medical schools and this interest has continued to grow over the past decades [1, 2]. Coupled with increasing student interest has been a call for more training and opportunities in global health in medical education [3, 4]. Despite the demand for more global health education, only 37 % (47 out of 128 medical schools) in the United States and Canada had a global health component in their

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curricula as of 2010 [5]. In addition, in 2012, 36 percent of graduating seniors from US medical schools reported that their instruction in global health issues was inadequate [6].

As the demand for medical education in the area of global health increases, the nature of these types of opportunities has continued to evolve. This is a result of the changing definition of international and global health over the course of the past few decades. Early international health opportunities for medical students often involved study in Europe and later included the South Pacific and North Africa. International health during this period was often defined within the broad context of tropical medicine [2]. At that time, medical school curricula included courses in tropical medicine/international health. In 1945, the Association of American Medical Colleges (AAMC) reported that 96 % of US medical schools taught tropical medicine/international health. By 1954, the AAMC reported that only 7 % of US medical schools were offering courses in these areas [2]. Competitive forces in medical school curricula and the perception that international health as a subject was of little relevance, except for a small number of students, was thought to be responsible for the overall decline in international health education in US medical schools.

Over time, international medicine evolved from being primarily under the realm of tropical medicine to encompass a broader scope, addressing wider areas of concern such as family planning, immunizations, infrastructure development, and the training of personnel. Course work in parasitology and tropical medicine evolved into overseas experiences, often in low-income countries. The focus of these experiences has also evolved to include broader domains, including public health, primary care, preventive medicine and the assessment of health care delivery systems.

US medical students rarely studied overseas in low-income countries until the 1960s. Contributing factors included the inaccessibility of low-income country sites, financial barriers, few institutionalized linkages between US medical schools and overseas sites, and the absence of elective time in the medical school curriculum. Another limiting factor to medical students studying overseas included significant travel time requirements prior to the availability of jet transport in the late 1950s. However, with the increasing ease of travel and changes that addressed the aforementioned barriers, the number of students performing electives overseas steadily increased.

In 1984, 6 % of graduating US medical students participated in an elective abroad [7]. The percentage of graduating US medical students who participated in a global health experience grew to 26 % by 2007 and 29 % by 2014 [8, 9]. The American Medical Student Association (AMSA) began publishing its International Health

Opportunities Directory in 1984. This directory is now solely online and updated regularly. AMSA also published the first edition of *A Student's Guide to International Health* in 1986 [10]. Today there are networks of organizations that provide assistance to medical students so they can access and participate in global health experiences. In 2013, in an effort to address the ongoing demand for these experiences, the AAMC developed the Global Health Learning Opportunities (GHLO™) Collaborative which serves as a resource to medical students and faculty throughout the country [11]. With these resources, there should be more opportunities for medical students to participate in international experiences.

In an environment of increasing demand for education in global health and accessible global health experiences, Downstate's global health elective has consistently provided medical students with a highly competitive, unique educational opportunity. As the field of global health has evolved, this elective has continued to emphasize primary care, preventive medicine and public health for the last 35 years. This 35 year experience is described in detail below.

Initiation of a Formal Fourth Year Elective in Low-Income Countries

In 1949, a 2-month elective period was introduced into the fourth year curriculum. However, prior to this time, individual students occasionally performed international health electives. Among these was Joshua H. Weiner of the SUNY Downstate (then the Long Island College of Medicine) class of 1941, who in 1940 studied tropical medicine in Puerto Rico as a fourth year student. Overseas electives prior to the late 1950s were nearly impossible because of the absence of elective curricular time and funding. By the early 1960s, approximately 5 % of the senior class traveled to Europe with most participating in clinical electives in Great Britain.

During the 1960s and 1970s, occasional fourth year students participated in electives in low-income countries, but the numbers remained small due to expense and lack of formal arrangements.

In 1972, Pascal James Imperato, MD, who had previously spent most of his senior year in Tanzania, was asked by Lewis M. Drusin, MD, MPH of the Department of Public Health at Cornell University Medical College to assist in the administration of a fourth year elective entitled "Health Care in Developing Countries." At that time, 6–10 Cornell medical students arranged for overseas placements or were placed through faculty members, notably by the late B.H. Kean, MD, who was then Clinical Professor of Public Health and Clinical Professor of Medicine (Tropical Medicine).

Dr. Imperato assumed the chair of the Department of Preventive Medicine and Community Health at the Downstate Medical Center in June, 1978. With the experience gained in the Cornell program, and his over 6 years in West Africa as an epidemiologist with the Centers for Disease Control and Prevention, Dr. Imperato initiated Downstate's elective, "Health Care in Developing Countries," in 1980. At that time there was no formal elective at Downstate for sending students overseas.

In 2001, a Master of Public Health (MPH) Program was established in the Department of Preventive Medicine and Community Health. Following the formation of the MPH Program, the SUNY Downstate School of Public Health was established in 2008, with Dr. Imperato as Dean. The Global Health elective continues to be administered by the School of Public Health and has been under the direction of Dr. Imperato since its inception in 1980. Dr. Bruno was appointed co-director in 2007.

Objectives of the Elective

This 6–8 week elective has three distinct but related objectives. These are: academic, service, and cultural in nature.

Academic Objective

The academic objective of the elective is to enable students to arrive at an understanding of the health care and public health delivery systems of the host country, and health disparities and health care inequities present there. Participants in the SUNY Downstate program are clearly instructed that it is more important for them to learn how people access care and to evaluate the quality of the care than to become proficient in diagnosing and treating parasitic diseases. This objective aligns with discussions of global health over the past 10 years where the importance of health care and public health systems, especially in low- and middle-income countries, has been given increased attention [12]. Clinical settings and clinical experiences often provide the basic framework within which students achieve the academic objectives of the elective. However, most students also participate in a broad range of public and community health programs where the emphasis is on prevention.

The essential academic purpose of this elective has received strong validation from student participants over time. Their end-of-elective final reports almost uniformly reflect not only a significant understanding of how health care and public health systems are structured and how they

function, but also useful insights about access and quality of care issues.

Service Objective

By rendering clinical and public health services, student participants contribute to the well-being of the people where they are serving, alleviate individual suffering, and provide valuable assistance to foreign medical hosts. We view this service component as essential. In return for learning about the health care and public health systems and gaining valuable clinical insights, students in turn give something of value back in terms of service.

This linkage of learning benefits to service provision is crucial to the success of programs of this kind which function in areas of the world where the exploitive aspects of the former colonial experience are still vivid memories for many. Students should not be burdens to their overseas hosts, nor should they behave in ways which are or which could be perceived as exploitive. For these reasons only fourth year medical students have been admitted to the program since its inception.

Cultural Objective

Students are provided with an excellent opportunity to have a meaningful cross-cultural experience. They are instructed to view health care within a larger cultural context and to arrive at an understanding of the social and economic determinants of disease. They are expected to approach different cultures with unbiased perspectives, patience, and understanding. Their behaviors and attitudes are quickly evident to hosts and crucial to the success of the cross-cultural experience.

Prospective participants are briefed that they are ambassadors of good will, representing both the US and their school. They have a unique opportunity to inform their foreign hosts about their own country and school, and to demonstrate a willingness to learn much about the new culture in which they find themselves. Their success in achieving these goals and in being of service greatly influence in-country perceptions of them. To facilitate their reaching the cultural objective of the elective, participants are encouraged to inform themselves about their destinations prior to departure and to take time while there to attend cultural events and visit places of historical and cultural importance. Even ordinary tourism, worked into the daily routine of service and learning, goes a long way in making students more aware of the larger cultural contexts in which they are functioning.

Screening Process

This elective is restricted to fourth year medical students who have successfully completed all formal academic requirements of the first 3 years of the medical school curriculum. Fourth year students are able to make significant medical service contributions in their host countries by reason of the knowledge and clinical skills they have acquired during their third year clerkships. Also, they have received training in universal precautions, especially critical at overseas sites where there is a high prevalence of HIV and Hepatitis C. Students at earlier stages of their training do not possess either the requisite medical and public health knowledge nor the clinical skill to derive maximum benefit from this overseas experience.

The screening process consists of several steps that aim at assessing intellectual and emotional abilities to meet the demands of the elective, including motivation, commitment to a career in public health, preventive medicine or primary care, and a commitment to future medical service overseas. Currently the screening committee is made up of six full-time faculty members from the School of Public Health. The screening process consists of four stages as outlined in Table 1.

The application form, which must be submitted by December 31st of the student's third year, elicits basic descriptive information, including motivation and reasons for participating in the elective. Some applicants manage to eliminate themselves even at this early stage by commenting that their interest in a particular area of the world is primarily driven by a sporting or leisure interest or their purpose is to provide surgical expertise at what they

assume to be low technology medical facilities. The second stage involves a review of a student's academic record to date. Since third year students begin their clinical clerkships after completion of the second year, several months of clinical evaluations are available and the co-directors review these, as well as all transcripts. Students who have had academic or inter-personal difficulties in third year clerkships are generally not admitted to the elective. Such students are often required by the College of Medicine to remediate clerkships or spend their fourth year at the clinical campus. Both the nature of these issues and schedule problems do not make it possible for them to participate in this elective. Students with academic difficulties in the first 2 years are considered for the elective provided they have not had additional such problems in the third year.

The personal interview is an evaluative effort in which a number of applicant characteristics are assessed. Interviews are conducted in February and March by members of the screening committee who also answer any questions that the students may have. Each interviewer completes an interview form that describes the student's ability, motivation, interpersonal skills, level of language training (if a student wishes to go to a non-English-speaking country), commitment to a career in public health, preventive medicine or primary care, and commitment to future overseas medical service. Interviewers are especially alert to those who wish to go to a low-income country primarily to perfect surgical skills or physical diagnostic skills in low-technology settings. These are unacceptable motivations for this elective, and students expressing them are not accepted into the elective.

Interviewers also write up brief narratives about each student and assign an overall ranking. The rankings range from 1 to 6, with the former being the highest. Depending on the number of applicants, each interviewer may see from 4 to 6 applicants. The applicants are randomly assigned to interviewers. When the screening committee meets, interviewed candidates are presented and discussed. Each interviewer is required to assign a rank order to the group of candidates they have seen. This was instituted not only to facilitate the selection process, but also to prevent interviewers from becoming biased advocates for all the candidates they have interviewed.

The screening committee attempts to select the best 10–25 candidates from among the pool of applicants. Acceptance rates have ranged from a low of 27.2 % (1995–1996) to a high of 81.8 % (1987–1988). The acceptance rates over the past 10 years have ranged from a low of 32 % in 2007–2008 to a high of 74 % in 2010–2011 and 2013–2014. The total number of participants in a given year represents approximately 10 % of the graduating class.

Table 1 Screening process for candidates for the Global Health Elective of the State University of New York, Downstate Medical Center

Stages of process	Purpose
1. Application by student	To elicit basic descriptive information about the applicant
2. Review of academic record to date	To ascertain if the student has consistently been in good academic standing, and to assess ability to work well with peers and teachers
3. Personal interview	An evaluative effort to assess commitment to the goals of elective, commitment to a career in preventive medicine, public health or primary care, ability to function under difficult living and working conditions in low-income countries, and ability to adjust to alien cultures
4. Meeting of Screening Committee	To discuss candidates, assess their suitability for the elective, and to make final selections

Profile of Accepted Students

Since the inception of the program, more women than men (226 vs. 162), have participated (Table 2). There have been wide variations in the relative gender proportions from year to year. In the past 10 years, there was a high of 57 % male participants in 2009–2010, compared to 2010–2011, where a high of 93 % of participants were female. Minority

Table 2 Participants in the global health elective of the State University of New York, Downstate Medical Center by year and gender, 1980–2015

Academic year	Total number of participants	Male participants number	%	Female participants number	%
1980–1981	1	0	0	1	100
1981–1982	0	0	0	0	0
1982–1983	2	2	100	0	0
1983–1984	5	2	40	3	60
1984–1985	3	0	0	3	100
1985–1986	5	3	60	2	40
1986–1987	5	3	60	2	40
1987–1988	9	6	67	3	33
1988–1989	9	6	67	3	33
1989–1990	5	3	60	2	40
1990–1991	7	4	57	3	43
1991–1992	6	2	33	4	67
1992–1993	5	3	60	2	40
1993–1994	9	2	22	7	78
1994–1995	9	3	33	6	67
1995–1996	9	5	56	4	44
1996–1997	9	5	56	4	44
1997–1998	12	3	25	9	75
1998–1999	11	8	73	3	27
1999–2000	12	7	58	5	42
2000–2001	15	6	40	9	60
2001–2002	17	6	35	11	65
2002–2003	14	4	29	10	71
2003–2004	16	7	44	9	56
2004–2005	20	5	25	15	75
2005–2006	23	8	35	15	65
2006–2007	17	5	29	12	71
2007–2008	14	4	29	10	71
2008–2009	20	5	25	15	75
2009–2010	21	12	57	9	43
2010–2011	14	1	7	13	93
2011–2012	19	10	53	9	47
2012–2013	18	8	44	10	56
2013–2014	14	8	57	6	43
2014–2015	13	6	46	7	54

groups comprise the majority of the medical school's students, a distribution also reflected in the participants in this program.

Overseas Placement

During the 35 years that this program has been in existence, we have endeavored to place students at overseas sites where the three objectives of the elective can be met. In addition, we have chosen sites that provide contemporaneous supervision and pedagogical structure. Most of the sites have been chosen on the basis of the personal contacts of Dr. Imperato and other faculty who have been involved in global health programs. Personal familiarity with the sites assures us that the objectives of the elective can be met. Downstate Medical Center students have regularly gone to certain sites each year for over three decades. Each student meets with the course co-directors on their return to the United States and they assess how the elective's objectives were met.

A small proportion of students find overseas sites on their own. Once they do so, the screening committee attempts to determine the adequacy of these sites in meeting the elective's objectives. We enter into direct contact with the proposed preceptors to facilitate this determination.

In placing students at overseas sites, the screening committee has held to a firm policy regarding assignment to countries where English is not a major spoken language. Only students who have adequate communications skills in the principal language, e.g., French, Spanish, etc., are assigned to such countries. The committee does not consider routine high school or college foreign language requirements as adequate preparation for working overseas. This language requirement has not proven to be a major problem either for student applicants or for the screening committee. Most students expressing a preference for non-English-speaking countries have generally had a fair level of fluency in the national language. This has often been gained through residence or study in non-English speaking areas, for example, or previous overseas service with an organization such as the Peace Corps. Some students possess second language fluency as a result of being either immigrants or the children of immigrants.

In placing students overseas, the committee takes into account their expressed preferences. These are brought to the committee's attention on both the application form and during the personal interview.

The overseas placements by year for this elective for the period 1980–2014 are shown in Table 3. India, Kenya, and Thailand have together accounted for the majority of all placements. This reflects long-standing relationships with institutions in these countries. The five students placed in

Table 3 Overseas sites of students participating in the global health elective of the State University of New York, Downstate Medical Center by year, 1980–2015

Academic year	Overseas sites	Number of participants at sites
1980–1981	Kenya	1
1981–1982	–	–
1982–1983	Nicaragua	1
	Jamaica	1
1983–1984	Haiti	1
	Jamaica	3
	Kenya	1
1984–1985	Jamaica	3
1985–1986	India	2
	Jamaica	1
	Mexico	1
	Trinidad	1
1986–1987	India	1
	Jamaica	1
	Peru	2
	Senegal	1
1987–1988	Australia	1
	India	2
	Jamaica	2
	Mexico	1
	Peru	1
	Senegal	1
	Tanzania	1
1988–1989	Australia	1
	Guatemala	1
	India	2
	Jamaica	3
	Mali	1
	Nicaragua	1
1989–1990	Dominican Republic	1
	Ghana	1
	India	1
	Indonesia	1
	Mexico	1
1990–1991	Australia	2
	Barbados	1
	Botswana	1
	India	1
	Kenya	1
	Thailand	1
1991–1992	Argentina	1
	Australia	1
	India	2
	Montserrat	1
	Thailand	1

Table 3 continued

Academic year	Overseas sites	Number of participants at sites
1992–1993	Dominican Republic	1
	India	1
	Jamaica	1
	Kenya	1
	Thailand	1
1993–1994	India	4
	Kenya	1
	Mali	1
	Mexico	1
	Thailand	1
	Trinidad	1
1994–1995	India	2
	Jamaica	1
	Kenya	2
	Mali	1
	Mexico	2
	Thailand	1
1995–1996	Costa Rica	1
	India	3
	Kenya	1
	Mali	1
	Philippines	1
	Thailand	3
1996–1997	Dominican Republic	1
	India	3
	Kenya	3
	Mali	1
	Romania	1
1997–1998	Brazil	1
	Columbia	1
	Dominican Republic	3
	India	5
	Kenya	1
	Thailand	1
1998–1999	Haiti	1
	India	5
	Kenya	1
	Philippines	1
	Thailand	2
	Zimbabwe	1
1999–2000	Dominican Republic	1
	Haiti	1
	India	4
	Kenya	1
	Philippines	1
	Thailand	4

Table 3 continued

Academic year	Overseas sites	Number of participants at sites
2000–2001	Cuba	1
	Dominican Republic	1
	India	6
	Kenya	3
	Peru	1
	Thailand	3
2001–2002	Cuba	1
	India	5
	Kenya	4
	Papua New Guinea	1
	Senegal	1
	Thailand	5
2002–2003	India	2
	Kenya	4
	Mali	1
2003–2004	Thailand	7
	India	2
	Kenya	4
	South Africa	2
2004–2005	Thailand	7
	Viet Nam	1
	Brazil	1
	Dominican Republic	3
	India	7
	Kenya	4
	Nigeria	1
	Panama	2
South Africa	2	
2005–2006	Thailand	2
	Kenya	5
	Thailand	2
	India	7
	Rural Alaska	1
	Bangladesh	1
	Dominican Republic	5
	Jamaica	1
South Africa	1	
2006–2007	India	5
	Thailand	2
	Peru	1
	Kenya	5
	Dominican Republic	4
2007–2008	India	4
	Dominican Republic	6
	Egypt	1
	Thailand	2
	Tanzania	1

Table 3 continued

Academic year	Overseas sites	Number of participants at sites
2008–2009	India	7
	India (Punjab)	1
	Dominican Republic	5
	Thailand	2
	Kenya	4
	Ecuador	1
	Thailand	3
2009–2010	Dominican Republic	4
	India	6
	Nigeria	1
	Ghana	1
	Tibet (China)	1
	Malawi	3
	Brazil	1
2010–2011	Barbados	1
	India	6
	Thailand	2
	Guinea	1
	Dominican Republic	4
2011–2012	Ecuador	1
	Dominican Republic	6
	Thailand	2
	India	9
	Taiwan	2
2012–2013	Dominican Republic	4
	Thailand	2
	India	10
	Taiwan	2
2013–2014	Dominican Republic	2
	Thailand	2
	India	5
	Guatemala	1
	Taiwan	2
	Bangladesh	1
	Mozambique	1
2014–2015	India	4
	Guatemala	5
	Thailand	2
	Taiwan	1
	Brazil	1

Australia all served on remote aboriginal reserves. Participants have worked in settings as diverse as large city hospitals and remote rural clinics. One was privileged to assist Mother Theresa in caring for the sick poor in Calcutta.

Once students are accepted into the elective, plans are begun to secure their overseas sites. Each student is invited to meet with the course directors at which time the dates of the elective are finalized. Currently the dates of the elective are set in a 6 week period from late March to early May. The required educational content of the fourth year in addition to the required USMLE test of clinical competency, given in Philadelphia for our students, have greatly restricted the time period during which students can perform this elective. This timing allows the students to remain on campus for notification of residency matching program results and to return in time to finalize any outstanding obligations prior to commencement. Historically, performance of the elective prior to January 1st is not possible because fourth year students are usually busy with residency applications and interviews from September through December and in recent years even in January.

The constriction of the available time period for participation in this elective has created challenges regarding the overseas placement process. In the early years of this elective, students could be staggered at a site over a period of 4 months. Now all students are clustered in the same 6-week period. Thus, an overseas site that once accepted three students for 6 week periods between January and early May is now being asked to accept all three at once in April through early May. While some sites have the ability to do so, others do not. In addition, following the terrorist attacks of 2001, American students who once participated in electives of this kind in areas of North Africa, the Middle East, and parts of Asia, based on the US Department of State's travel advisories, no longer wish to do so. Consequently, both American and European medical students have since 2001 been narrowing their options for electives such as this to what they consider to be "safe countries." Facilities in some such places are being overwhelmed by requests for placement from medical schools in the United States and Europe.

Once dates are confirmed, students are formally registered on fourth year elective enrollment forms that are submitted to the Registrar's office. Overseas site preceptors are then contacted and requests made to accept students for the periods of time chosen. If the time or sites are not available, then alternative plans are made. When overseas preceptors accept students, formal application forms must often be completed, and official government clearances obtained. These procedures often take several months, and have become increasingly more detailed, time-consuming and costly. In some instances, security clearance is required at the time of the application. For these reasons, we begin the process of requesting acceptance in March and April, fully a year before any students plan to go overseas.

Students are routinely told that they cannot change dates once they have been requested of an overseas site. Flexibility

at these sites is variable. However, few are so flexible that they can change time periods on short advance notice.

Preparation of Students

In 1991, Heck and Wedemeyer [13] found that few medical schools adequately prepare their students for overseas experiences. By contrast, our students undergo extensive preparation. In preparing them for an overseas elective in a low-income country, we have found that four broad areas need to be addressed. These are: health preparations and precautions for participants, issues concerning travel and lodging, the general nature of the host country health care and public health systems and specifics about the assignment site, and characteristics of the host country culture. Given recent global events, including increased reports about violence against women in India, among others, safety precautions specific to each site are addressed in great detail.

The amount of preparation in these specific areas is highly variable, depending on the student and the country to which they are going. In general, it has been our experience that students who require the least amount of overall preparation are those with previous overseas living or travel experiences. The proportion of these is high today because of overseas programs available at the high school and college levels, and increased overseas travel in general.

Health Preparations and Precautions

All students are provided with comprehensive written information about immunizations and malaria prophylaxis and general precautions to be taken to preserve health. Each student is also individually counseled by the course directors about immunizations and malaria prophylaxis thought necessary for their particular overseas site. While most immunizations are available at the University's Student and Employee Health Services, others are obtained from commercial travelers' clinics in New York City. Students are given detailed information about these providers. Updated, country-specific immunization requirements are obtained from the US Centers for Disease Control and Prevention (CDC) and communicated to students. In addition, since some members of the faculty involved in this elective are specialists in both infectious disease and tropical medicine, we are able to make country specific recommendations beyond the required immunizations.

In the late 1990s, we significantly revised our procedures concerning health preparations in order to address the risk of HIV/AIDS and blood borne diseases such as Hepatitis C. We established HIV prevention procedures and

guidelines that essentially reflect current CDC guidelines for post-exposure HIV prophylaxis including immediate notification of the directors of the elective and the director of the Student and Employee Health Services. Following exposure, students are required to immediately return for further evaluation and management and to begin post-exposure triple therapy, even in instances where doubt exists about exposure severity. Each participating student is given a 5-day supply of post-exposure chemoprophylaxis to cover themselves enroute home. Importantly, we require students to sign an attestation and agreement concerning universal precautions and HIV post-exposure prophylaxis.

In order to reduce the risks inherent in the management of patients with HIV/AIDS and Hepatitis C, we require that students not participate in invasive and surgical procedures that involve exposure to bodily fluids. We adopted this position for two principal reasons. The first is that we found that universal precautions are often not practiced in a number of resource-poor health care settings. Our students found it difficult to do so in a setting where non-observance of these precautions by many local providers created an environment of greatly increased risk. Secondly, a major objective of our elective is to enable our students to observe and study a local and country wide health care system and to provide service through primary care.

As part of our effort to assure maximum health protection, we also require that students purchase medical evacuation insurance which is available through the university at a very modest cost and provide us with the contact information of their next of kin in the event of an emergency.

While we continue to give one on one advice on immunizations and malaria prophylaxis based on the more recent CDC recommendations, we also suggest that students access the CDC website, www.cdc.gov and International Travelers' hotline for the most up to date information. In addition, we require that the students appear for a debriefing within a few days of their return so that we can assess their health status.

Legal Issues

In most low-income countries, medical malpractice is virtually unknown. While informing students of this, we also tell them that the University-sponsored malpractice/liability coverage is not in force overseas. Our emphasis on an observational role and service in a primary care setting greatly reduces the risk of malpractice were it to exist.

Beginning in 1999, we adopted an Agreement and Release form which all participants must sign. This document was approved by the office of the University Counsel and is based on one used by Cornell University. In this agreement, students assume all risks and responsibility for

health and safety and release from liability all officers, trustees, agents and employees of the University. Students also acknowledge the requirements for accident and medical insurance and agree to abide by the laws and regulations of the host country and the laws of the US, New York State and the host country concerning the possession, use or sale of controlled substances and that they are responsible for ascertaining the lawful age for the possession and consumption of alcoholic beverages in the host country. Finally, students acknowledge that they are responsible for all medical and related expenses while participating in the program.

A great deal of time and effort go into preparing our students for healthy and safe living overseas. Of the 388 students who have participated in this elective over 35 years, we have only had five students experience an adverse event. One student suffered a serious gastrointestinal illness requiring transport and hospitalization, three students were victims of a physical assault and robbery, and one student was the victim of an ATM scam.

Travel and Lodging

From the time of acceptance into the elective until the time of departure, a period of 9–11 months, students meet individually with the course directors several times. Numerous details about travel, visas, lodging, host country, etc., are addressed during these meetings. The course directors and staff of the School of Public Health invest much time and effort communicating with overseas sites, addressing even minor details such as projected times of arrival. In recent years, this communication has been facilitated with email and Internet access. Communications from rural sites that were not well serviced by mail or telephone and had previously taken a few months are increasingly more efficient.

The Nature of the Host Country Culture, Health Care System and Assignment Site

Students are informed about the overseas sites where they will be working, and usually put into direct contact with the preceptors who will be supervising them. Preceptors often send students detailed advance information about the site, prevalent disease, local public health issues, and provide week-by-week schedules of projected activities.

The general preparation of students includes candid explanations of what to expect at overseas sites in terms of medical facilities and living conditions. What has proven to be extremely useful in this regard are the required elective reports written by previous student participants. Site-

specific student reports from previous years are made available to participants following their acceptance. In addition, we place prospective participants in direct contact with graduates who previously participated in the elective at the same site. These graduates are able to provide prospective participants with up-to-date information and much useful advice. Because almost two-thirds of our overseas sites have hosted our students over a period of many years, most prospective participants greatly benefit from this effort.

Other Forms of Preparation

Students are encouraged to do independent reading about the countries they will be visiting, covering topics as diverse as politics and natural resources. This enables them to view health and the health care system within a broader context.

Student sensitivity to the values of others and an ability to understand and respect different belief systems and cultures is essential in this elective. Downstate students are especially experienced in this regard since they live and work in Brooklyn which is culturally very diverse. Of Brooklyn's 2.5 million people, 40 % were born outside of the US. Much of their clinical training takes place at hospitals whose patient populations include many recent immigrants from Africa, Asia, the Caribbean, and Central and South America. The work force in these hospitals is also culturally diverse. Our students have intense and extensive exposure to many diverse cultures during their third year clerkships. This gives them a unique experiential background in cross-cultural understanding that builds upon that which they already possess from being in a culturally diverse medical school class. Many of our student participants have reported that their multi-cultural experiences in medical school best prepared them for cross-cultural understanding overseas.

In summary, over a period of several months, individual participants are prepared for the medically and culturally different environments in which they will function. The emphasis on individualized preparation and site-specific information is human resource demanding. However, it prepares students extremely well for their overseas experience.

Funding Support From the Alumni Fund of the SUNY Downstate College of Medicine

Since 1983, the Alumni Fund of the College of Medicine has consistently supported this elective with an annual grant. The purpose of this block grant, initially to the

Department of Preventive Medicine and Community Health, and now to the School of Public Health, is to help students defray travel costs to and from overseas sites. The Alumni Fund's level of support has steadily risen over the years. This reflects not only an increase in the number of annual student participants, but also the fact that they have been traveling to more distant sites in Africa and Asia. Airfares to these areas are almost threefold those to sites in the Caribbean and Central America.

The absence of any funding to help students defray the cost of travel greatly limited participation in the early years of the elective. Once funding became available, in 1983, the numbers of applicants steadily rose (Table 4). Thus the financial support of the Alumni Fund has enabled this program to flourish.

A formal request for funding is made of the Alumni Fund each April, once the participants have been chosen for the succeeding academic year. The request is based on the prospective number of participants and on the estimated airfares to overseas sites.

In return for its support, the Alumni Fund requires that each student write a brief report describing his or her experiences. These reports are submitted to the Alumni Fund and excerpts of them published in the Alumni magazine, *Alumni Today*.

In April or May of each year, the Chair of the Board of Trustees of the Alumni Fund informs the course directors of the Board's decision concerning funding. Students are informed of their individual travel grants in November. These are based on careful consideration by the directors of the costs of air travel to and from individual overseas sites and additional costs, including housing, application fees, among others. In the past, a ceremony was held in the first week of November in which the Chair of the Board of Trustees of the Alumni Fund presented the students with their travel grants. Currently, with changes to the medical school curriculum, and increasing numbers of students traveling for residency interviews, the ceremony is held in March, a few weeks prior to the start of the elective.

The Alumni Fund's support of this elective has not only been financial. The trustees of the fund have also strongly supported the essential objectives of the elective and the basic principles on which it was established. In providing these diverse forms of support, they have made available to medical students at Downstate a unique experience to learn and serve.

Other Funding Support

During the 1980s, Mrs. Lona B. Kennéy provided annual financial support for the elective. She and her then late husband, Dr. Michael Kennéy, Professor of Pathology at

Table 4 Applicants and participants in the global health elective of the State University of New York, Downstate Medical Center by Year, 1980–1920

Academic year	Number of applicants	Number of participants	Percent of applicants accepted
1980–1981	1	1	100
1981–1982	0	0	0
1982–1983	2	2	100
1983–1984	5	5	100
1984–1985	3	3	100
1985–1986	13	5	38.5
1986–1987	9	5	55.6
1987–1988	11	9	81.8
1988–1989	14	9	64.3
1989–1990	18	5	27.8
1990–1991	18	7	38.9
1991–1992	16	6	37.5
1992–1993	14	5	35.7
1993–1994	16	9	56.3
1994–1995	19	9	47.4
1995–1996	33	9	27.2
1996–1997	20	9	45.0
1997–1998	30	12	40.0
1998–1999	25	11	44.0
1999–2000	25	12	48.0
2000–2001	28	15	53.6
2001–2002	35	17	48.6
2002–2003	18	14	77.8
2003–2004	29	16	55.2
2004–2005	33	20	60.6
2005–2006	37	23	62.2
2006–2007	36	17	47.2
2007–2008	44	14	31.8
2008–2009	50	20	40.0
2009–2010	29	21	72.4
2010–2011	19	14	73.7
2011–2012	40	19	47.5
2012–2013	29	18	62.1
2013–2014	19	14	73.7
2014–2015	21	13	61.9

Downstate, had spent several years in the then Belgian Congo [14]. Dr. Kennéy was an internationally respected parasitopathologist [15, 16]. In 1998, Joshua H. Weiner of the Class of 1941 created a generous endowment in the Alumni Fund of the College of Medicine for the purpose of supporting students participating in this elective. Since 1998–1999, this gift has provided part of the financial support for student travel associated with this elective. Dr. Weiner was moved to make this gift after reading about

the elective in the Alumni Association's *Alumni Today* publication. As a fourth year medical student in 1940, Dr. Weiner participated in an overseas elective in Puerto Rico, sailing from New York aboard the *S.S. Coamo*. At that time, Puerto Rico was a third world environment where malaria, schistosomiasis, filariasis, and intestinal parasites were endemic. The faculty at the University of Puerto Rico's School of Tropical Medicine not only provided laboratory and clinical experiences for Weiner and the other medical students in his group, but also had them work in the environments where parasitic diseases were transmitted. Other alumni of the College of Medicine have made contributions to the Alumni Fund for the purpose of supporting the elective.

In 2001, Sonja K. Binkhorst, MD, Assistant Professor of Psychiatry at the Downstate Medical Center informed us of the wish of the LSK Foundation to provide some financial support for three women medical students participating in the elective. She further informed us that this support would be provided through the American Medical Women's Association (AMWA). Since that time, the LSK Foundation grant has provided support to 3–5 women medical students each year.

Evaluation of Student Performance

Where possible, overseas preceptors are asked to fill out a standard student elective evaluation form and to return it to the course directors. In other instances, preceptors write evaluation letters in which they summarize performance. Some students perform or participate in research projects while at an overseas site, and this provides yet another performance measure. Finally, a requirement of the elective is that students present verbal and written reports on their electives within 2 weeks of returning to the campus. The written report, which must be from 1,500 to 3,000 words, also satisfies the report requirement of the Alumni Fund.

Student Evaluation of the Elective

On their return, students are asked to anonymously complete a form evaluating the elective. Most students have rated the elective as the best experience of their medical school years. Rare exceptions include one student who returned early after being unable to adjust to life at a site, or another who returned after being the victim of an ATM scam. The enthusiasm which most students feel about this elective is reflected in their report comments and also in any articles which they have written.

Discussion

The global health elective at the Downstate Medical Center provides a unique opportunity for medical students to serve in areas of the world where poverty and lack of economic development are major determinants of disease. This program, with its emphasis on learning, service and cross-cultural experiences, complements the multi-ethnic and inner-city-based medical education to which these students have been previously exposed. Those who participate in this elective are generally students who have a strong social commitment.

During the 35 years since this elective was created, newer challenges have arisen. These include safety and security in a world made more dangerous by political instability, terrorism, HIV/AIDS, and emerging and re-emerging infections such as Severe Acute Respiratory Syndrome (SARS), Ebola Virus disease, and drug resistant tuberculosis. These and other issues have required newer preparation initiatives on our part to assure that our students have a safe, healthy and rewarding overseas educational experience.

Dedicated overseas preceptors who have willingly given of their time and their facilities have sustained this elective. It has also been strongly supported by the Alumni Fund of the College of Medicine and others, without whose help these unique experiences would be inaccessible to most of our students. Over the years, student participants have rendered much valuable medical service to the world's poor, have been good will ambassadors for their school and country, and have given solace and hope to those most in need. This is all very strong testimony to the dedication and commitment of these young people. Many of them are from working-class families, and most carry heavy educational debts. Their willingness to help those poorer than themselves under trying conditions of climate and resources speaks of their fine inner values, resilience, and the common bonds they share with all humanity.

Conflict of interest The authors declare that they have no conflict of interest.

References

- Imperato, P. J. (1996). A Third World international health elective for U.S. medical students. The 16-year experience of the

- State University of New York, Health Science Center at Brooklyn. *Journal of Community Health*, 21(4), 241–268.
- Imperato, P. J. (2004). A third world international health elective for U.S. medical students: The 25-year experience of the State University of New York, Downstate Medical Center. *Journal of Community Health*, 29(5), 337–373.
- Drain, P. K., Primack, A., Hunt, D. D., Fawzi, W. W., Holmes, K. K., & Gardner, P. (2007). Global health in medical education: A call for more training and opportunities. *Academic Medicine*, 82(3), 226–230. doi:10.1097/ACM.0b013e3180305cf9.
- Smith, J. K., & Weaver, D. B. (2006). Capturing medical students' idealism. *Annals of Family Medicine*, 4 Suppl 1, S32–S37; discussion S58–60. doi: 10.1370/afm.543.
- Anderson, M. B., & Kanter, S. L. (2010). Medical education in the United States and Canada, 2010. *Academic Medicine*, 85(9 Suppl), S2–18. doi:10.1097/ACM.0b013e3181f16f52.
- Medical School Graduation Questionnaire. (2012). *All Schools Summary Report*. Washington, DC: Association of American Medical Colleges.
- Questionnaire, Medical Student Graduation. (1984). Washington, DC: Association of American Medical Colleges.
- Medical School Graduation Questionnaire 2011 All Schools Summary Report*. Washington, DC: Association of American Medical Colleges.
- Medical School Graduation Questionnaire. (2014). *All schools summary report*. Washington, DC: Association of American Medical Colleges.
- American Medical Student Association. International Health Opportunities. <http://www.amsa.org/AMSA/Homepage/EducationCareerDevelopment/IntlHealthOpps.aspx>. Accessed 20 Oct 2014.
- Association of American Medical Colleges. Global Health Learning Opportunities. <https://www.aamc.org/services/gho>. Accessed 29 Oct 2014.
- Mills, A. (2014). Health care systems in low- and middle-income countries. *The New England Journal of Medicine*, 370(6), 552–557. doi:10.1056/NEJMr1110897.
- Heck, J. E., & Wedemeyer, D. (1991). A survey of American medical schools to assess their preparation of students for overseas practice. *Academic Medicine*, 66(2), 78–81.
- Kennéy, L. B. (1972). *Mboka. A Congo Memoir*. New York: Crown Publisher.
- Kennéy, M. L. (1973). *Scope monograph on pathoparasitology. A color Atlas of parasites in tissue sections*. Kalamazoo: The Upjohn Company.
- Imperato, P. J. (1995). Michael Kennéy, M.D.: Colonial medical officer and tropical medicine specialist. *Journal of Community Health*, 20(3), 293–311.