

Short-term medical service trips: what is the cost of patient care and student training?

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Background: Evaluations of the costs and effects of medical service trips (MSTs) are increasingly necessary. Estimates of costs can inform decision making to determine if participation is likely to be a wise use of resources.

Methods: This study estimates the costs and effects of a 1-week MST for 20 health professions students and seven providers to the Dominican Republic. Costs were defined as direct costs for students and providers and opportunity costs for providers. Effects were defined as the cost to treat one patient and the cost to train one student. Students were surveyed about their costs before and after the MST. Most provider costs were assumed to be the same as those of the students.

Results: The mean direct cost per student was US\$1764 and US\$2066 for providers. Total opportunity costs for seven providers was US\$19 869. The total cost for the trip was US\$69 612 to treat 464 patients. With and without provider opportunity costs, the cost to treat one patient was US\$150 and US\$107, and the cost to train one student was US\$3481 and US\$2487, respectively.

Conclusions: Short-term MSTs may be more expensive than previously thought. The cost to treat one patient was similar to a medical office visit in the USA.

Keywords: cost-effectiveness, global health, health occupations, medical missions, students, volunteerism.

Introduction

Volunteering for a medical service trip (MST) appears to be widespread among health providers and health profession students. One survey of 601 physicians reported that 32% had provided pro bono medical services in a developing country and 77% of those physicians had repeated the experience.¹ Similar to providers, trainees in medicine, pharmacy, dentistry and nursing are also keen to volunteer for MSTs, and universities are increasingly involved in planning and supervising MSTs for their students. Universities may subsidize the costs to their students and/or pay some or all of the costs for the supervising faculty. An estimated two-thirds of medical students expect to participate in an MST.^{2,3} As interest in MSTs has grown, so has the need to evaluate them.

One may reasonably ask, what are the costs and the effects of short-term MSTs?

Existing literature studying these issues is widely variable. Maki et al.⁴ estimated the cost to see a patient on a medical MST was US\$3, while the cost per patient was US\$700 for a surgical MST. Chapin and Doocy⁵ surveyed 40 MST groups and found the average number of patients seen was 1243, at an average cost per team of US\$22 650, suggesting the cost was US\$18 per patient. In a more rigorous cost analysis, Caldron et al.⁶ surveyed 601 physicians who had participated in one or more MSTs. They determined that the annual cost of US-based MSTs may be magnitudes higher than previous estimates. Direct and opportunity costs per physician responding to their survey were estimated

to total US\$14 275, which extrapolated to a total annual cost of more than US\$2 billion for physicians alone. When direct and opportunity costs for ancillary support team members (e.g. nurses, pharmacists, etc.) are included, costs were estimated at up to US\$3.7 billion annually. Costs borne by students or universities were not included in their analysis. Both volunteers and sponsors of MSTs must consider whether funds devoted to an MST are an effective use of resources.⁷⁻⁹

Objective

The objective of this study was to estimate the cost of patient care and health professions student training on a 1-week MST to the Dominican Republic, defined as the cost to treat one patient and the cost to train one student.

Materials and methods

Subject selection

Study subjects were health professions students and health professionals who accompanied the students on the MST for teaching and clinical supervision purposes. Student volunteers attended monthly pre-departure briefings to prepare for the MST. Most providers were full- or part-time faculty at their universities. All subjects provided informed consent prior to participation (Drake University Institutional Review Board submission number 2016-17027).

Description of the MST

The MST was a 1-week experience to provide medical care to low-income workers and their families on banana plantations in Monte Cristi, Dominican Republic. Patients presented with a variety of general medicine complaints (e.g. headache) as well as various chronic conditions (e.g. diabetes). Complex or seriously ill patients were referred to a local physician who worked alongside the volunteers. Clinic sites were donated in-kind by the communities and were usually schools or community centres.

Data collection

One month prior to and 1 month after completion of their MST, student volunteers were asked to complete online Qualtrics surveys inquiring about demographics, previous global health experiences and out-of-pocket costs. Survey questions are included in the Appendix.

Cost determination

Each student provided an estimate of what he/she had spent to volunteer on the MST. Costs for all students were totalled and divided by the number of students to obtain the mean amount spent by a student on the MST.

Volunteer providers' direct (i.e. out-of-pocket) costs for travel were assumed to be the same as the mean direct cost paid by students except for fees paid to the third-party non-governmental organization (NGO) trip organizer, experiential learning fees charged by their university and airfare, which was verified by reviewing receipts. Providers' opportunity costs were estimated from May 2016 Bureau of Labor Statistics data. The

annual mean wage for each profession that participated was divided by 52 to reflect the cost of 1-week's wages.¹⁰

Effect determination

The effects of the trip were determined by the number of patients treated and the number of students trained.

Cost for each effect

The cost of the trip was divided by the number of patients treated and the number of student volunteers. The results represent the cost of treatment for one patient and the cost of training for one student.

Results

Twenty students participated in the MST and 20 (100%) completed both the pre-departure and post-return surveys. Seven providers participated in the MST (two family practice physicians, two physician assistants, one obstetrician/gynaecologist, one registered nurse and one registered pharmacist).

Student costs

The mean direct (i.e. out-of-pocket) costs were calculated as US\$1764. For all 20 students, the total cost was US\$35 284. An itemized cost breakdown is shown in [Table 1](#).

Provider costs

Providers' direct costs were assumed to be the same as for students except as noted above, and their opportunity (i.e. foregone wages) costs were determined as stated above. Providers' itemized direct costs are shown in [Table 1](#). The total provider direct costs were US\$14 459 (mean US\$2066) and the total provider opportunity costs were US\$19 869 (mean US\$2 838). Thus the total provider costs were US\$34 328 (mean US\$4904 each). Including the total cost for 20 students (US\$35 284), the total cost for providers plus students was US\$69 612.

Cost to treat one patient or train one student

The team treated 464 patients; thus the mean cost to treat one patient was US\$150. Excluding providers' opportunity costs, the total trip cost decreased to US\$49 743 and the cost per patient was US\$107. Including providers' opportunity costs and students' expenses, the cost to train one student was US\$3481. Excluding providers' opportunity costs, the cost to train one student was US\$2487.

Discussion

Since volunteering for an MST is a comparatively recent practice opportunity, the literature to evaluate MSTs is still under development. Caldron et al.⁶ suggest that the total value of MSTs is in the billions of dollars. At the other extreme, Maki et al.⁴ estimated the cost to treat a typical medical patient on an MST is as low as US\$3.

Table 1. Mean direct costs to participate in an MST

Cost item	Mean cost per student (US\$)	Mean cost per provider (US\$)
Visa/entry fee	9.75	9.75
Travel medicines	109.00	109.00
Meals in transit, souvenirs, other personal expenses	79.21	79.21
Airfare	713.39	796.36
Third-party fees	747.00	966.00
Experiential learning fees	0.59	0.00
Passport (new or renewal)	9.47	9.47
Vaccinations	95.79	95.79
Total mean direct cost	1764.20	2065.58

The present study seeks to provide a detailed estimate of a single MST, for a typical 1-week duration, with a typical mix of students and providers, and also defines how costs and effects were determined in some detail. Consequently the results of the present study are of interest to three stakeholders—student and provider volunteers, sponsoring NGOs and universities and stakeholders participating in the debate about whether MSTs are an appropriate form of aid.

Students and providers

Each student paid an average of US\$1764 for a 1-week experience. Although students grow personally and professionally from an MST, the US\$1764 must be put into the context that a typical 2018 medical or pharmacy school graduate has accrued US\$196 520 and \$166 528 of debt, respectively.^{8,11,12} Students must consider the trade-offs between their growth experience and their debt burden.

If providers' costs are borne out of pocket, the 1-week volunteer experience costs nearly US\$5000. Some of this may be mitigated by any tax legislation that allows providers to deduct the cost of their volunteering from their state and/or federal taxes as a charitable donation. This implies that there is a social cost of transferring part of their out-of-pocket costs to taxpayers. For providers in private practice, their practice partners may have to budget approximately US\$2800 for a locum tenens practitioner to cover for the week. Volunteers with a full understanding of the costs can decide if their out-of-pocket costs are an effective use of their own resources.

Cost-effectiveness of MSTs

This study cannot answer the question of whether MSTs are cost-effective or not. However, using this methodology to evaluate alternative opportunities to care for patients or train students could allow that decision to be made by any person or organization that chooses to participate in an MST.

On a more abstract level, this study can help inform the wider discussion in the literature about the value of MSTs. The present results suggest that the cost to treat a patient is approximately the cost of a physician office visit in the USA. From that perspective, the US\$107–US\$150 cost to treat a patient on this MST is not unreasonable. However, it should also be noted that annual

per capita health spending in the Dominican Republic in 2014 was US\$580.¹³ Treating one patient on this MST was equivalent to 18–25% of the entire per capita annual health spending in the Dominican Republic. It is also worth noting that this expense does not include the resources that a third-party partner also contributes to the MST (e.g. local staff costs).

Limitations

Several limitations to this study should be noted. Overall, the sample size is small. That being said, a team size of 27 for a Dominican Republic MST would not be an unusual size for a typical trip. Student costs were estimated by self-reports. University policies to cover faculty supervision costs may differ, so the costs assigned to faculty in this study remain estimates. The specific breakdown of costs borne by universities or individual faculty members could not be calculated. MSTs to other locations may have different travel and lodging costs, and those without students would also be expected to have different results. Costs to the partnering NGO for ground staff, back-office operations, clinic space, etc. were not considered.

There may be several positive externalities as a result of service on an MST. Volunteers may find they have better career or residency opportunities. Experience in other countries may result in a better sense of global community among both volunteers and host communities. Although these are potential benefits of MSTs, they are difficult to measure and the lag time for them to occur is unclear.

Conclusions

Short-term MSTs may be more expensive than previously thought when accounting for the opportunity costs that providers incur and when student training costs are included. Opportunity and training costs are a large proportion of the cost of patient care. Whether short-term MSTs are cost effective for volunteers, students, universities or communities remains open for debate.

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Ethics approval: This study was approved by the Drake University Institutional Review Board (submission number 2016-17027). All participants provided informed consent prior to participating in the study.

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Appendix

Pre-departure survey

1. What is your age in years?
2. What is your sex?
 - a. Male
 - b. Female
 - c. Other/non-binary
3. What program of study are you enrolled in?
 - a. Osteopathic medicine
 - b. Podiatric medicine
 - c. Physician assistant studies
 - d. Biomedical sciences
 - e. Pharmacy
4. What year are you in your program?
 - a. First professional year
 - b. Second professional year
 - c. Third professional year
 - d. Fourth professional year

In order for you to participate on this trip, please estimate how much you had to spend (US dollars) on (do not count costs paid by your university to subsidise your trip):

5. Airfare
6. Fees paid to a third-party partner
7. Additional fees paid to your university for experiential learning
8. Obtaining or renewing a passport
9. Vaccinations for travel abroad (e.g. typhoid, hepatitis A)
10. How many times have you previously served as a volunteer on a medical service trip where the purpose of the trip was to provide clinical or public health services?
 - a. 0
 - b. 1
 - c. 2
 - d. 3
 - e. >3

11. Have you ever had a cultural immersion experience such as study abroad, home stays, research-related fieldwork, Peace Corps or a similar kind of experience in a culture different from your home culture?

12. If yes to Question 11, please explain further.

13. Have you ever taken formal coursework or training in cultural competency as part of your undergraduate education?

14. Have you ever taken formal coursework or training in cultural competency as part of your health professions education?

Post-return survey

Questions as above except for:

In order for you to participate on this trip, please estimate how much you had to spend (US dollars) on (do not count costs paid by your university to subsidise your trip):

1. Visa or entry fee to the Dominican Republic.
2. Travel medicines such as antimalarials, anti-diarrhoeals, sunscreen, insect repellent, etc.
3. Meals while in transit, entertainment, snacks, alcohol, souvenirs, tourism and other miscellaneous trip expenses.