INTRODUCTION
Short-term medical service trips (MSTs) rely on a primarily volunteer workforce traveling from high-income countries (HICs) to low- and middle-income countries (LMICs) in an attempt to address healthcare shortages in the recipient communities. Teams originate from organizations ranging from large, non-governmental organizations with hundreds of small to large groups of healthcare providers. Without any formal structure outside the elements necessary to achieve federal tax-exemption status, there is a growing interest from critics and proponents alike in formalizing discussions around the impact of short-term medical service trips (MSTs) on the communities they serve.1 Healthcare organizations often evaluate expenditures in terms of their return on investment (ROI). An evaluation of ROI for MSTs would stand on its own merit, but the magnitude of this effort can no longer be ignored by aid and development researchers. It is time to dedicate resources to developing evaluative tools capable of assessing whether this is truly the best possible return on investment. MST sending organizations should meaningfully consider recruiting public health educators and workers to their volunteer teams. This is a workforce that routinely evaluates programs and health interventions and could represent an important step forward in improving the efforts of this largely informal sector of humanitarian effort. The independent nature of organizations performing these activities makes it difficult to suggest universal standards for their performance, but the magnitude of this effort can no longer be ignored by aid and development researchers. It is time to dedicate resources to developing evaluative tools capable of assessing whether this is truly the best possible return on investment. MST sending organizations should meaningfully consider recruiting public health educators and workers to their volunteer teams. This is a workforce that routinely evaluates programs and health interventions and could represent an important step forward in improving the efforts of this largely informal sector of humanitarian effort.

METHODS
Retroactive study of tax records (2014 or 2015) for organizations originating from the USA or Canada. We define MST-sending organizations as non-profit groups that sponsor or facilitate trips by medical professionals from HICs to LMICs for the purpose of providing direct healthcare services for periods ranging from 1 day to 8 weeks. Organizations identified using Internet search engines, established host websites with links to MST-sending organizations (i.e., www.globalfirstresponder.com, www.medicalservicetrip.com and www.medicalmissions.org), and lists of relevant MST-sending organizations generated by previous studies from collaborators (Kalib Lacki, Christopher Dainton, and Lawrence Latte).

Financial information was extracted from the Internal Revenue Service or the Canada Revenue Agency forms via official websites and web-based charitable organization databases (Foundation Center, GuideStar, ProPublica, and Charity Navigator).

Financial data collected - All data were collected or converted to US Dollars
- Income (contributions and other revenue)
- Expenses (program, management, and fundraising expenses plus salaries)
- Liabilities and Net Assets

We limited the sample to organizations with a web presence to capture organizational characteristics.

Organizational data captured from websites and tax forms
- Location of domestic offices
- Location of permanent offices abroad
- Location of MSTs performed
- Healthcare services performed

RESULTS

Figure 1. Organization Distribution by Income Category (USD)

Figure 2. Number of Organizations by Healthcare Services Provided

Figure 3. Number of Organizations by Region of Destinaton

DISCUSSION
The US government has spent roughly $10 billion on global health.2 Participants of this funding have strict requirements for reporting the use of these funds and the results of the programs they support. MST organizations included in our study report program expenditures equivalent to approximately 10% of this amount and in most cases are not subjected to the same critical oversight.

In 2008, Maki et al. conservatively estimated that MST organizations spent $250 million per year.3 Caldron et al. makes a significantly larger estimate of $1.7 billion borne by volunteers that includes opportunity and travel costs.4 The tax deductability of travel costs is specifically noted as it represents an informal federal subsidy for unregulated humanitarian aid.5

The independent nature of organizations performing these activities makes it difficult to suggest universal standards for their performance, but the magnitude of this effort can no longer be ignored by aid and development researchers. It is time to dedicate resources to developing evaluative tools capable of assessing whether this is truly the best possible return on investment. MST sending organizations should meaningfully consider recruiting public health educators and workers to their volunteer teams. This is a workforce that routinely evaluates programs and health interventions and could represent an important step forward in improving the efforts of this largely informal sector of humanitarian effort. Effective healthcare delivery models for this setting should be tested and the findings should be broadly distributed to the organizations working to address healthcare shortages in these countries. The financial scale of MST efforts justifies investments from funding agencies to promote formal evaluations of clinical and healthcare system outcomes associated with MSTs.

CONCLUSION
Organizational investments in MSTs exceed $1 billion annually and represents an area of opportunity for research into the positive or negative impact these efforts have on local communities and existing healthcare systems.

MST organizations are providing healthcare services in nearly all of the LMICs in the world. Much of the effort from the US and Canada is, as expected, in Central America and the Caribbean. Shorter travel times and the relative ease of communication are likely contributors to this unequal distribution. Organizations are providing services in a broad array of fields, but seem to concentrate on primary care, dentistry, and surgical care. Less than half (42%) of the identified organizations are Faith-Based organizations.

LIMITATIONS
- Data are not available for MST-sending organizations that are nested within larger non-profit organizations such as churches or universities.
- We are not measuring organizations that lead these efforts from countries outside of the US or Canada. Our data of familiarity with tax laws and reporting in other countries could further contribute to an underestimate of the true magnitude of this field.
- At the time of data collection 2015 tax forms were not available for all of the identified organizations. It is possible that differences between 2014 and 2015 could change the financial picture presented here.
- Some of the largest organizations support non-MST activities in association with the trips. Distinguishing program expenses at the program level is not possible with the available tax forms.

REFERENCES