

# HEALTH SCIENCES STUDENTS' INTEREST IN AND OPINIONS ABOUT GLOBAL HEALTH EXPERIENCES

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## ABSTRACT

*While there is a significant body of literature regarding the interest in global health experiences (GHEs) for medical students and resident physicians, there is very little published in the scholarly literature regarding whether college/university students who are not in medical school, but are interested in pursuing a medical, health science, or allied health career in their future are also interested in global health.*

*An anonymous electronic survey was sent to students enrolled in the College of Health Sciences and Technology at Rochester Institute of Technology to assess how important these students felt it was for them to learn about global health issues and then determine what types of GHEs they would like to have available to them. The participants were matriculated in the following majors: Biomedical Sciences (BS), Nutrition Management (BS), Diagnostic Medical Sonography (BS), and Physician Assistant (BS/MS).*

*Participants were asked five questions to assess how important they felt it was that GHEs were available to them. For each of the five importance questions, between 89.3% and 93.6% felt these GHEs are either somewhat or very important versus 0.5-1.1% of those who felt that they were either not important at all or minimally important.*

*The survey participants were asked thirteen questions regarding their opinions about what types of GHEs might be of interest to them. The three options that garnered the strongest interest were the ability to participate in a short-term international service project (91.4%), the ability to do international clinical rotations (89.3%), and the ability to participate in international research opportunities (82.5%).*

*Independent t-tests showed that participants that had international travel experience in developing countries, those who were women, or those that were multilingual showed heightened interest in GHEs of various types.*

*One-way ANOVAs showed that Biomedical Science & Physician Assistant students were significantly more interested in GHEs than Diagnostic Medical Sonography / Cardiac Echo students. Younger students were found to be more interested in international research opportunities than older students.*

## INTRODUCTION

There is a significant body of literature regarding the growing interest in global health amongst medical students. Many medical schools are beginning to offer global health experiences (GHEs), including clinical rotations in developing nations (also known as low- and middle-income countries) and data has been generated that shows a generally positive impact on these students (Bruno, Imperato, & Szarek, 2013). International GHEs have resulted in a higher percentage of medical school graduates who have decided to stay within a primary care specialty (Bruno et al., 2013). This is vitally important as much of the United States' current healthcare system is built on having an adequate number of primary care providers (Bruno, Imperato, & Szarek, 2013).

While it appears that the literature supports the growing interest in and impact of GHEs for medical students, there is much less literature available about the interest in or opinions about GHEs amongst college students who are not in medical school, but are interested in pursuing a medical, health science, or allied health career in their future. This study attempts to increase the understanding of what such students feel about the importance of having GHEs within their college's or university's curricular or extra-curricular offerings and determine what types of global health experiences they would like to have available to them. The data was analyzed further to look for differences trends based on age, gender, academic program, country of birth, fluency in more than one language, and international travel experience in developing nations.

## LITERATURE REVIEW

### Why is Global Health Important?

World events in recent years have shown how interconnected our world truly is now that international travel is common. The emergence of infectious diseases such as HIV/AIDS, Ebola, Avian Flu, Dengue Fever, severe acute respiratory syndrome (SARS) and others, which have all been transported across borders, have revealed humanities shared vulnerability and made it clear that what is occurring in one part of the world can easily have an impact in other distant locations (Ventres & Fort, 2014; Shah & Wu, 2008; Yarbrough, 2015). Given the potential movement of not only people, but also pathogens, it can easily be argued that virtually all health risks have both global causes and global consequences (Rowson et al., 2012).

### Student Interest in and Demand for Global Health Experiences

Because it is imperative that all future professionals who will work in disciplines that intersect with the various aspects of global health have a proper education to tackle the issues that they will face, institutions of higher education must increasingly modify their curricular and extra-curricular offerings to ensure global health concepts and experiences are woven throughout the programs they offer. On a very basic level, it is clear that whether healthcare workers venture to distant lands or not, they need to develop multi-cultural competencies and familiarity with global health issues because people from other parts of the world will be coming to them and bringing with them potential diseases, healthcare practices and beliefs that may be very different from what is traditionally seen in typical North American patients (Tuckett & Crompton, 2014). All of the multi-disciplinary global health programs should be training their students to work towards decreasing the global burden of disease and ensuring that all people have access to essential health services, regardless of their geographic location (Bjegovic-Mikanovic, Jovic-Vranes, Czabanowska, & Otok, 2014).

Fortunately, as the importance of training students in global health concepts has increased, the demand from students for such programs is also increasing exponentially (Broome et al., 2007; Logar, Le, Harrison, & Glass, 2015; Holmes, Zayas, & Koyfman, 2012; Kishore, Tavera, & Hotez, 2010; Bruno et al., 2013; Bernheim, Botchwey, & Dillingham, 2008; Imperato, 2004; Bjegovic-Mikanovic et al., 2014). Johnson et al. (2014) report that there has been a nearly tripling of global health programs in North America every five years since 2000 due to massive student demand.

There are many different ways that institutions of higher education have integrated global health into their students' academic programs as well as their extracurricular activities. In addition to global health course work, some institutions have implemented clinical rotations in other countries through partnerships and exchange programs, global health clubs, global health concentrations, minors, majors, graduate degrees and combined degrees such as MD/MPH, MD/PhD and others

(Drain et al., 2007; Fox, Thompson, Bourke, & Moloney, 2007; Rowson et al., 2012; Teichholtz, Kreniske, Morrison, Shack, & Dwolatzky, 2015) and collaborative classrooms between schools in different nations (Goodwin & Heymann, 2015). The increasing utilization of online learning formats will likely play a role in expanded opportunities for creative GHEs (Bjegovic-Mikanovic et al., 2014). One of the more innovative global health educational strategies can be found at the College of Health and Human Services at San Diego State University, where all students are required to have an international experience before graduation (Daly, Baker, & Williams, 2013).

The Global Health Action Committee of the American Medical Student Association has been very active in advocating for GHEs, stating that medical schools have an obligation to prepare students to serve in any context, including resource poor settings. In response to the increasingly clear need and growing demand for GHEs, some universities are dedicating elective courses, academic tracks, entire academic departments, and residency programs to the study of global health (Shah & Wu, 2008).

Holmes et al. (2012) report that medical students who have chosen to participate in international clinical rotations have identified the following five objectives that they hope to achieve through the experience: 1) To observe the daily practice and organization of healthcare in another country; 2) To improve medical (patient history and physical exam) and surgical skills; 3) To improve language skills; 4) To learn about another culture; 5) To deepen knowledge of infectious disease.

One published paper indicated that 30% of US medical school graduates had participated in a GHE as of 2012 (Bruno et al., 2013) compared to 6% in 1984 (Holmes et al., 2012) and in 2004 it was reported that 93% of US medical schools had allowed 3<sup>rd</sup> and 4<sup>th</sup> year medical students to study overseas for up to 2 months (Imperato, 2004). Some of these medical school students get global health experience as part of a Master of Public Health (MPH) program that is connected to their medical school training (Imperato, 2004). A survey of 96 US allopathic medical schools found that 95% had international opportunities for students to participate in and 87% specifically offered international clinical rotations (Holmes et al., 2012). There clearly has been a trend towards an increasing number of international clinical rotation opportunities in developing countries for medical students in recent years (Imperato, 2004).

There are some indications that the increasing interest in and demand for global health programs exists not just in medical schools or physician residency programs, but also at the undergraduate and master's degree level as well. Kishore et al. (2010) report that of the 37 institutions in the USA that had global health programs at the undergraduate or master's degree level in 2010, the number of students studying in those fields has doubled since 2006.

Responding to an ever-increasing interest in global health curricular offerings, the University of Virginia (UVA) has worked to capture the energy and imagination of undergraduate students by creating a Global Public Health minor (Bernheim et al., 2008). UVA faculty and administrators have noticed an increasing global orientation amongst their students and the university feels that their global health minor not only helps prepare the students to be better health professionals, but also to create better citizens of the world. Another benefit that has developed at UVA as a result of their Global Public Health minor is the creation of a multi-disciplinary learning community made up of faculty from schools of arts and sciences, medicine, engineering, nursing, architecture, and others (Bernheim et al., 2008).

## **Suggested Core Competencies for Global Health Educational Program**

As academic institutions grapple with the needs and demands around global health educational programs, several scholars have attempted to propose competencies that should be included in such programs. Houghton et al. (2007) feel that all of the important global health concepts that should be included in medical school curricula can be distilled down to three domains of competence including global burden of disease, traveler's medicine and immigrant health.

Bjegovic-Mikanovic et al. (2014, p. 4) reports that the Association of Schools of Public Health in the European Region (ASPHER) has defined the following six key competences that should be covered in global health curricula: 1) Methods in public health (epidemiology and biostatistics); 2) Population health and its social determinants; 3) Environmental health sciences; 4) Health policy, management of health services and health economics; 5) Health promotion (health education, health protection and disease prevention); 6) Ethics.

Wilson et al. (2014, p. 29) report that the Global Health Competency Subcommittee of the Consortium of Universities for Global Health has developed the following twelve competency domains for global health programs: 1) Global burden of disease; 2) Globalization of health and healthcare; 3) Social and environmental determinants of health; 4) Capacity strengthening; 5) Teamwork / collaboration and communication; 6) Ethical reasoning; 7) Professional practice; 8) Health equity and social justice; 9) Program management; 10) Social, cultural and political awareness; 11) Strategic analysis; 12) Communication.

Rowson et al. (2012, p. 2) surveyed medical schools in different parts of the world to determine what global health competencies were being taught and they were able to compile the following list that captures the nine most common categories: 1) Effects of poverty and inequality on health (with an international perspective); 2) Globalization and health; 3) International comparison of disease burden; 4) International comparison of health systems; 5) International elective and exchange opportunities; 6) International health and development; 7) International movement of people; 8) Travel medicine; 9) Tropical medicine.

The importance of teaching critical thinking and leadership abilities (Sandhu, Hosang, & Madsen, 2015) with a heavy focus on medical ethics have been put forth as other important priorities in global health programs (Shah & Wu, 2008; White & Evert, 2014). It is imperative that any students who do have the opportunity to participate in healthcare delivery in an international setting, do so using the same standards of care as would apply in the US. There have been unfortunate reports of medical students doing surgeries and other procedures they are not yet qualified to do while working without appropriate supervision in developing countries (Shah & Wu, 2008; Logar et al., 2015).

All of the proposed global health curricular competency lists lend themselves very nicely to a multidisciplinary model of instruction utilizing individual or group projects and collaborations between students and faculty from different academic programs to truly get a sampling of all of the many ways global health issues impact all of our lives.

For any academic institution considering the sponsorship of short-term medical missions that enable their students to travel and work internationally, this author has published recommended guidelines based on both qualitative and quantitative data gathered from healthcare providers and leaders in Haiti, the site of more medical missions than any other country (Bradford, 2016), and those from the USA who have participated as volunteer medical providers in Haiti (Oliphant, 2018).

## **Perceived Benefits of Global Health Experiences**

There have been many reported benefits for students who have had a GHE. A theme that shows up repeatedly throughout the literature is that of improving future healthcare providers' cultural competence. Unfortunately, many providers over-estimate their culture competency skills and actually function with people of other backgrounds in a less-than-ideal fashion (Cartwright, Daniels, & Zhang, 2008). Many authors extoll the benefits of stepping outside of one's cultural context and becoming familiar with different traditions in an attempt to increase understanding about how culture can impact the way patients think about their health and the ways in which they seek care (Peluso, Encandela, Hafler, & Margolis, 2012; Zanetti, Dinh, Hunter, Godkin, & Ferguson, 2014; Tuckett & Crompton, 2014). These skills can be very helpful, even for providers who never leave their countries of origin, given the presence of immigrants, refugees, and native people groups (e.g., Native Americans in the US, Aborigines in Australia) who may present at domestic healthcare facilities with very diverse traditions and beliefs about their health (Broome et al., 2007; Harms et al., 2011).

Other authors have described that those who have had global health educational experiences have an enhanced appreciation for health disparities, an increased interest in volunteerism, and a heightened desire to work in primary care and with diverse or underserved populations (Bussell, Kihlberg, Foderingham, Dunlap, & Aliyu, 2015; DiPrete Brown, 2014; Tuckett & Crompton, 2014; Bruno et al., 2013).

Bjegovic-Mikanovic et al. (2014) point out that the Affordable Care Act in the US depends on an adequate supply of primary care physicians. Since evidence shows that medical students who participate in an international health elective rotation have a higher likelihood to select a primary care residency program than their classmates that don't have that experience, such international experiences may help generate a much needed supply of primary care providers.

## **Research Gaps**

Based on a review of the literature about GHEs, it is clear that the vast majority of the research is based on experiences within medical schools and physician residency training programs. While certainly it is important for those responsible for the education and training of future physicians to understand the role that global health experiences should play within medical schools and physician residency programs, it is also important to realize the students in other health science or allied health educational programs may also be interested in and benefit from integrating global health concepts and experiences into their training as well. It could be extrapolated that non-medical students who are contemplating a future career in medicine or one of the other allied health or health science fields (e.g., clinical professions such as Physician Assistant, Nurse Practitioner, Registered Nurse, Physical Therapy, or researchers in fields such as infectious disease, public health, epidemiology, etc.) would potentially have a growing interest in global health programs that mirrors their medical school counterparts, but a shortage of data gathered from that population makes any assumptions purely hypothetical. This pilot study analyzed a subset of that population and began to clarify whether an interest in or appreciation of the potential value of global health experiences exists within this cohort.

## **RESEARCH DESIGN AND METHODOLOGY**

The study participants were students enrolled in the College of Health Sciences and Technology (CHST) at Rochester Institute of Technology (RIT) in Rochester, New York, USA. The CHST is one of nine colleges that comprise RIT's domestic portfolio and includes both

undergraduate and graduate academic programs that primarily train students for future careers in medicine, the health sciences and allied health professions (“RIT CHST Overview,” n.d.).

The CHST does not include a medical school, but does have the following academic offerings that were the primary focus of this study: 1) Biomedical Sciences (Bachelor of Science degree); 2) Diagnostic Medical Sonography (Bachelor of Science degree); 3) Nutrition Management (Bachelor of Science degree); 4) Physician Assistant (combined Bachelor of Science/Master of Science degree) (“RIT CHST Overview,” n.d.). The aforementioned programs are designed to prepare students to work directly with patients upon graduation, with the exception of those within the Biomedical Sciences major. The Biomedical Sciences program serves as the primary option at RIT for those who plan to pursue medical or dental school or other medical / health related graduate school and research options (“RIT CHST Overview,” n.d.).

### **Research Instrument**

The research instrument was a questionnaire administered to willing RIT CHST students using an RIT-developed survey administration tool called Clipboard® (Rochester Institute of Technology [RIT], 2015). The survey was sent via email list-serve to all students currently matriculated into all of the academic programs housed within CHST. It consisted of 18 questions designed to explore students’ interest in and opinions about, the importance of integrating GHEs into the curricular and extracurricular offerings within their college. Among the survey questions were those that were designed to ascertain what types of experiences they would be interested in having access to or that they believe should exist within their college, including global health courses, a global health concentration, minor, major, graduate degrees as well international research and service opportunities, international clinical rotations, and opportunities to work with immigrant and refugee populations who have settled locally. The survey also included questions regarding basic demographic variables such as study participants’ gender, age, country of birth, fluency in more than one language, travel experience to developing nations and major course of study.

The instrument used in this study was constructed specifically for this research project and has not been used before (see appendix). It was field-tested prior to utilization in the actual study to check for validity in its ability to illicit the intended feedback. The final assessment of the reliability of the survey tool was done using IBM SPSS.® The survey instrument was found to be reliable with a Cronbach’s alpha of .921.

### **Procedures of Data Collection**

After IRB approval was received, an email was sent to all students currently enrolled within one of the academic programs housed within the CHST asking them to participate in this brief survey. After all explanations, definition of terms, disclosures and a statement of consent to participate had been provided; the email contained a link to the actual survey. Willing participants that clicked on the link were taken directly to the questionnaire that was administered through the Clipboard® application. Reminder emails were sent to potential study participants one, two, and three weeks after the initial solicitation email had been sent. The survey was considered closed after one month.

All data were initially stored on the RIT Clipboard® secured servers and then downloaded onto a password protected computer for further statistical analysis using IBM SPSS® software. Only the primary researcher and statistical analysis advisors had access to the anonymous data. The data has been stored in a secure manner for potential future research purposes. The identities of all participants who provided responses to the survey questions remain anonymous.

## Data Analysis

All data collected through the RIT Clipboard® application were downloaded into a Microsoft Excel® spreadsheet and then imported into IBM SPSS® for statistical analysis. Descriptive statistics were generated to create a general overview of the survey response data and then differences in the responses were analyzed based on demographic variables. Independent t-tests were used to look for significant differences based on gender (male or female), country of birth (USA or non-USA), language fluency (multilingual or only one language spoken), and whether the respondents had international travel experience in a developing nation (yes or no). One-way ANOVA with post hoc summary was used to look for differences in the responses based on academic major (Biomedical Sciences, Diagnostic Medical Sonography, Nutrition Management, or Physician Assistant) and the respondents' ages (<20, 20-21, or >21 years old).

## RESULTS

### Descriptive Statistics

Initially, 213 responses were received from the CHST students that had been asked to participate in the survey. That number was reduced to 188 valid participants once incomplete entries were removed. An analysis of the participants' gender shows that 73.9% were female and 26.1% were male. This ratio is fairly consistent with the gender breakdown in the overall student body matriculated within CHST, which is 75.6% female and 24.6% male (Personal communication with CHST Assistant Dean's Office, December 22, 2015).

Participants were asked to indicate their age by selecting one of five age groupings based around the typical ages of college students, but these were combined into three groupings for final statistical analysis purposes since some of the original five groupings did not have a large number of students within them. The final groupings were <20 (38.3%), 20-21 (40.4%), and >21 years of age (20.7%). One participant did not indicate his/her age.

The third demographic variable that the participants were asked to provide was their country of birth. It was found that 176 were born in the USA and 12 born elsewhere.

The fourth demographic variable that was collected was whether survey participants had any travel experience in developing nations. Approximately one-third did report having such experience (32.4%), while the remainder (67.6%) did not.

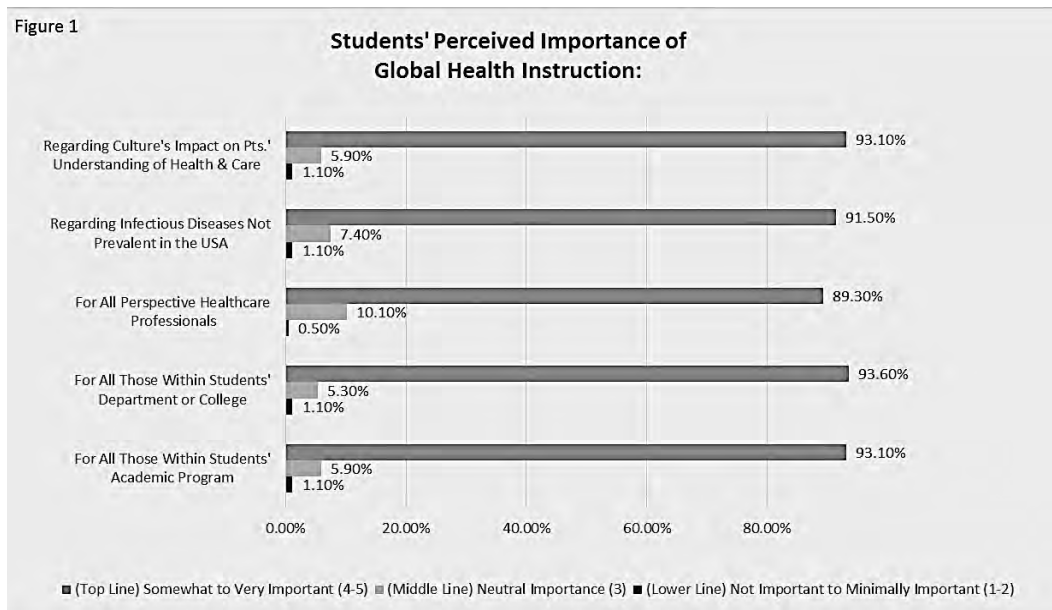
The fifth demographic variable obtained from the survey participants was whether they reported being multilingual or whether they only spoke one language fluently. The vast majority (81.9%) reported only speaking one language.

Finally, study participants were asked to indicate the academic program within which they were matriculated. The highest response rate was from the Nutrition Management program with 56% of their students completing the survey and the lowest response rate was from the Diagnostic Medical Sonography program at 22%. The highest number of participants came from the Physician Assistant program with 75, which represents 44% of the students within that academic major. An overall response rate of 31.6% was attained when all four academic programs were combined.

Participants were asked five survey questions that focused on how important the students felt it was for them to have exposure to global health experiences of various types. For each of these five questions, the students were given a five option Likert scale as follows: Not important at

all=1; Minimally important=2; Neutral=3; Somewhat important=4; Very important=5. For descriptive statistical analysis purposes, the two responses that would indicate the least importance were grouped together and the two that would indicate the most importance were grouped together. The middle-ground neutral category was left intact.

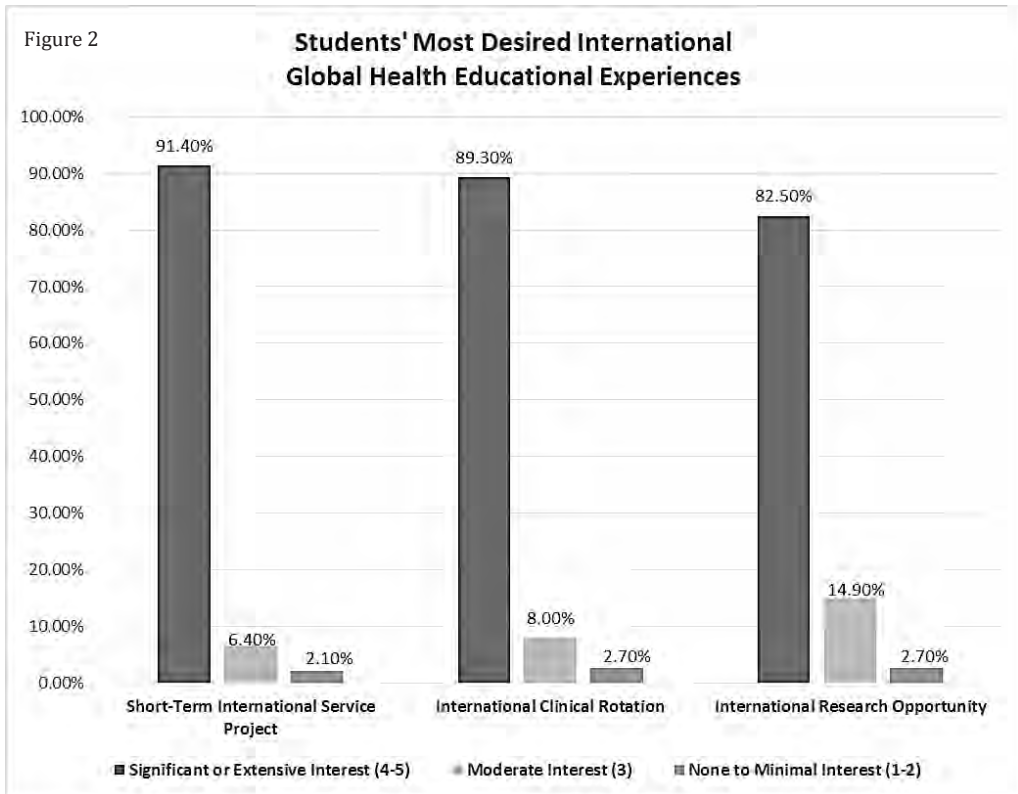
It is clear that the respondents feel strongly that global health concepts should be integrated into their coursework and college experience. For each of the five importance questions, between 89.3% and 93.6% felt these global health educational experiences are either somewhat or very important versus 0.5-1.1% of those who felt that they were either not important at all or minimally important. A relatively small percentage of respondents were even neutral in their feelings about the importance of global health educational experiences (between 5.3% and 10.1% for each of the five questions). See Figure 1.



The survey participants' were asked thirteen questions regarding their opinions about what types of global health educational experiences might be of interest to students pursuing future careers in medicine, the health sciences, or allied health. Once again, the students were given a Likert scale with five options as follows: No interest at all=1; Minimal interest=2; Moderate interest=3; Significant interest=4; Extensive interest=5. For analysis purposes, the two lowest interest response categories were combined as were the two highest interest categories and those responses in the middle level were preserved.

The three options that garnered the strongest interest were the ability to participate in a short-term international service project (91.4%), the ability to do international clinical rotations (89.3%), and the ability to participate in international research opportunities (82.5%). See Figure 2.





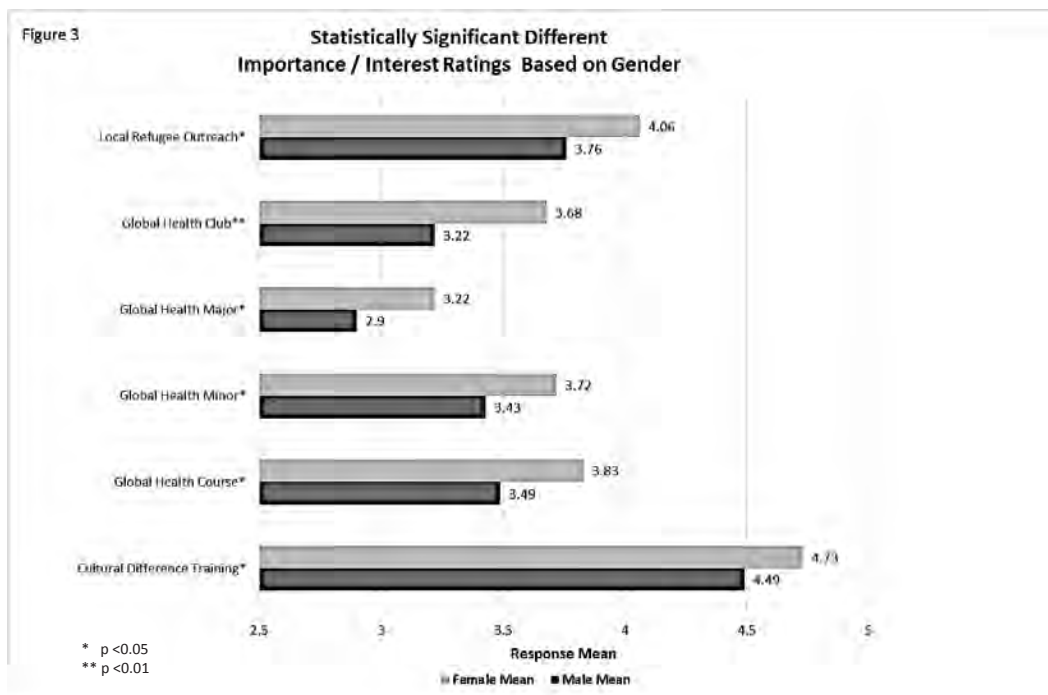
The three options that had the lowest percentage of people expressing significant or extensive interest were the availability of a global health focused PhD (24.6%), a global health major (29.2%), and a global health master's degree (30.5%). Interestingly, each of the aforementioned options had fairly large numbers of people expressing moderate interest, so if the moderate, significant, and extensive interest categories are combined, the interest in a global health PhD program jumps up to 64.7%, the interest in the global health major increases to 76.2% and the interest in a global health master's degree increases to 73.8%.

While the respondents rarely selected the middle category (neutral) of the five choices on the Likert scale in the five importance questions, the middle category (moderate interest) was utilized much more frequently in the 13 interest questions. Further scrutiny is warranted to determine if this indicates a real difference in participants' opinions in importance questions versus interest questions or whether the descriptors used for each option on the Likert scale warrant modification in future research.

### Independent Sample T-Tests

Four independent sample t-tests were performed. The focus of the first analysis was looking for differences in the respondents' answers based on gender. Six different questions showed a significant trend towards a higher rating of importance or interest by women versus men. Women felt stronger about the importance of learning how different cultures can impact people's access to healthcare or understanding of healthcare issues (Q5). Women also showed more interest in the following GHEs than their male counterparts: 1) An Introduction to Global Health course (Q6); 2) A

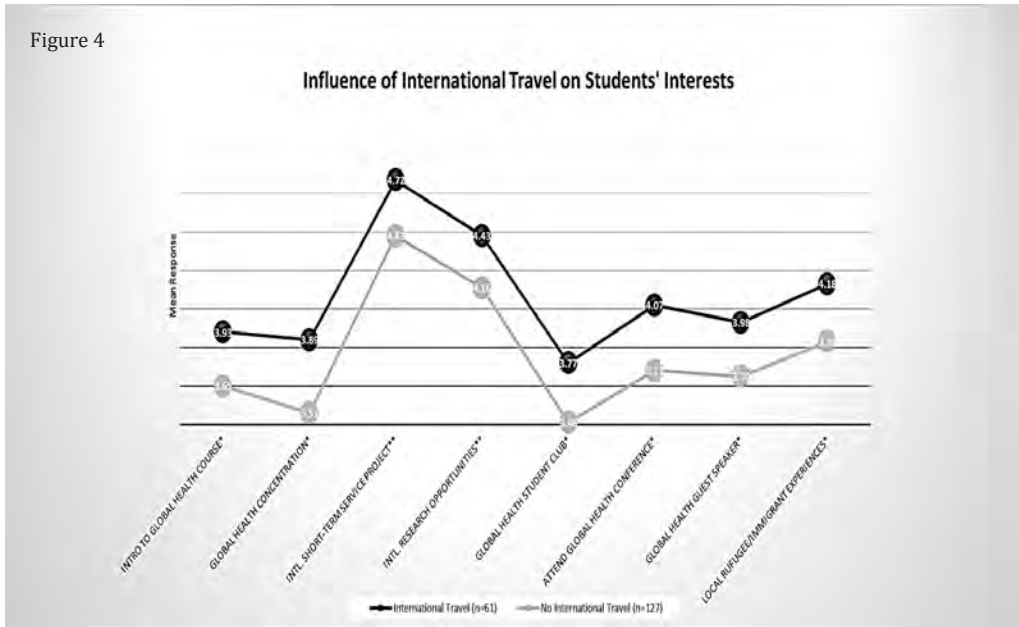
Global Health minor (Q8); 3) A Global Health major (Q9); 4) A Global Health student club (Q15); 5) The opportunity to work with refugees and other immigrants that live locally (Q18). See Figure 3.



The t-test performed that looked for significant differences between the participants' responses based on whether they were multilingual or only spoke one language revealed that the multilingual respondents were more interested in a global health student club (Q15).

The independent variable that produced the greatest number of significant differences in the participants' responses was whether or not the students had international travel experience to a developing nation. In one of the five importance questions and eight of the thirteen interest questions, those with international travel experience to a developing nation expressed a greater level of importance or interest in global health than those who had not had a similar travel experience. The questions that showed the higher importance or interest rating for those with travel experience versus non-travelers were as follows: 1) Graduates of a department or college that focuses on the health sciences should have the opportunity to participate in global health courses or other international learning experience (Q2); 2) Interest in an Introduction to Global Health class (Q6); 3) Interest in a Global Health concentration (Q7); 3) Interest in short-term service projects to developing nations (Q13); 4) Interest in international health science research opportunities (Q14); 5) Interest in a Global Health student club (Q15); 6) Interest in attending a global health conference (Q16); 7) Interest in inviting guest speakers to campus with expertise in global health issues (Q17); 8) Interest in working with refugees and other immigrants that live locally (Q18). See Figure 4.

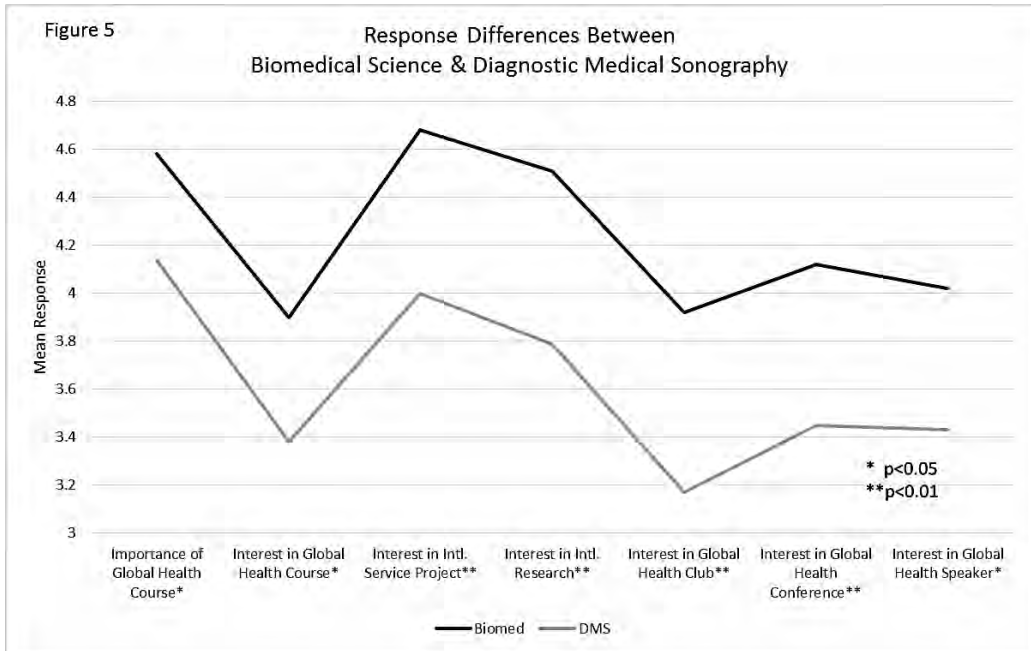
Figure 4



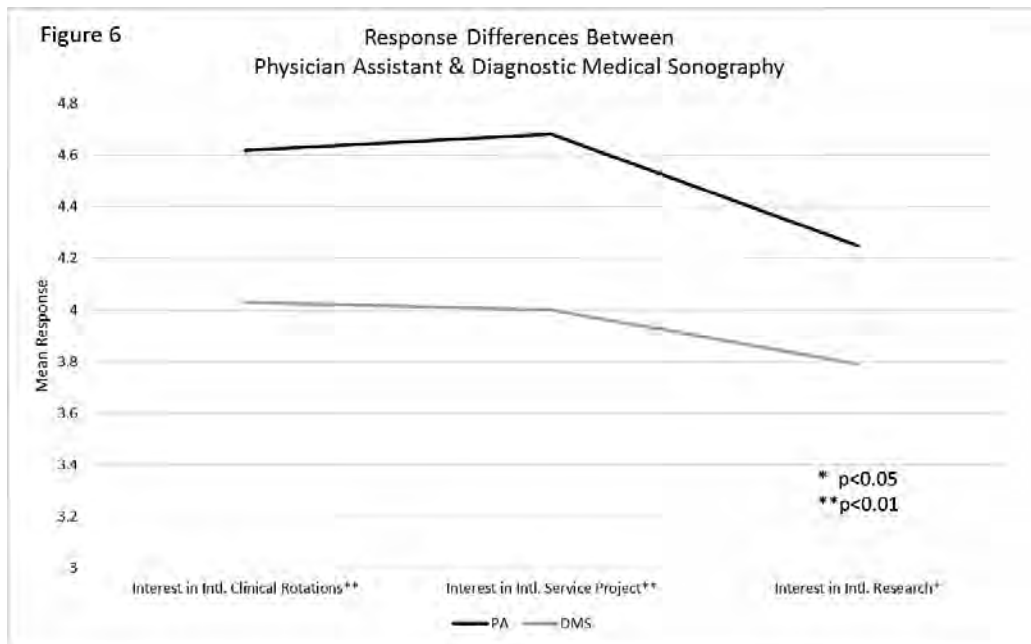
### One-Way ANOVA Tests

A one-way ANOVA and post hoc analysis was done to look for significant differences in the participants' responses based on academic program and age groupings. Eight different questions were answered in significantly different ways based on the academic program of the participants.

The most apparent trend was the significant difference between Biomedical Sciences students and Diagnostic Medical Sonography (DMS) students. When responding to seven different questions, Biomedical Sciences students' responses indicated a much larger interest in global health issues than their DMS counterparts. Specifically, the Biomedical Sciences students felt more strongly than DMS students regarding each of the following: 1) All graduates of a health sciences college should have the opportunity to participate in global health course work or international experiences (Q2); 2) Interest in an Introduction to Global Health course (Q6); 3) Interest in short term international service projects in developing nations (Q13); 4) Interest in international research opportunities (Q14); 5) Interest in a Global Health club (Q15); 6) Interest in attending a global health conference (Q16); 7) Interest in hosting a global health expert speaker (Q17). See Figure 5.



There were three questions where Physician Assistant (PA) students were significantly more interested in global health educational opportunities than their DMS counterparts. Specifically, PA students were much more interested than DMS students in the following: 1) International clinical rotations (Q12); 2) Short term service projects in developing nations (Q13); International research opportunities (Q14). See Figure 6.



Only one question showed a statistically significant difference based on age. A higher percentage of students <20 years of age were interested in international research opportunities versus those that were >21 years of age (Q14).

## DISCUSSION

Through a review of the literature, it is clear that the interest in and demand for GHEs is rising and that for medical students and physicians in residency training, such experiences significantly increase the likelihood of new physicians going into primary care and focusing a significant portion of their practice on working with diverse, underserved populations (Bruno et al., 2013; Bussell et al., 2015; DiPrete Brown, 2014; Holmes, 2013; Tuckett & Crompton, 2014).

Kishore (2010) reports that the demand for GHEs amongst students in bachelors and masters degree programs doubled between 2006 and 2010, while innovative programs, such as the Global Public Health minor at the University of Virginia, is creating great interest among students and generating innovative collaboration from faculty across multiple disciplines (Bernheim et al., 2008).

Data generated in this study, consistent with other relevant studies, show a significant student interest in having access to various types of GHEs. While data from most other studies have been collected using medical students and physicians in residency as the sampled population, this data was collected from students who were not currently in medical school, but who are preparing for future careers in medicine, the health sciences or allied health professions. Students within this study from across all demographic variables indicated a strong belief in the importance of having GHEs incorporated into their career preparation.

The independent variable that seemed to be the strongest indicator of interest in GHEs was shown to be prior travel to a developing nation. Future research might shed light on whether this increased interest in global health is a direct result of having a world-view expanding experience during such a trip. Perhaps those who have seen first-hand the healthcare challenges that exist in developing nations might be more interested in learning as much as possible about global health so they can work towards improving things for that segment of humanity.

This research revealed that female gender was the independent variable that had the second highest correlation with a strong interest in global health. Future research that investigates why females might have a higher interest than males in GHEs could be valuable. As understanding increases about why this relationship exists for women more than men, perhaps strategies can be developed to encourage women to further develop these interests and find new approaches that might heighten the interest in global health issues for men.

This research also showed that on multiple levels Biomedical Sciences and Physician Assistant students had a significantly higher interest in such things as international service projects, international research opportunities, and international clinical rotations than did their Diagnostic Medical Sonography counterparts. Nutrition Management students' interest and opinions tended to fall between those programs on either end of the spectrum. This knowledge might suggest that educational planners should place a priority on enhancing access to GHEs within programs whose students tend to have the highest interest and greatest need to understand complex global health issues, so that in the future they will be prepared to oversee the medical decision making process for diverse patients from around the world.

Other investigated variables such as being born outside of the USA, fluency in more than one language, and age variables did also impact the participants' interests in and beliefs about the importance of global health, but to a lesser degree. A much larger sample size may be needed to further explore the extent and importance of such relationships.

### **IMPLICATIONS FOR EDUCATIONAL PLANNERS**

College faculty and educational planners may find it helpful to know that a very high percentage of students from this sampled population are particularly interested in short-term service projects in developing nations, international clinical rotations, and international research opportunities. The three academic options that generated the most significant interest were an Introduction to Global Health course, a Global Health concentration and a Global Health minor. All of these options could be offered as enhancements to existing majors. A follow-up study with prospective students (as opposed to currently matriculated students, as was the case in this study) could be useful to determine what academic offerings they would prefer to have available to them in a college of health science. Perhaps a Global Health major might be more interesting to students who are not already locked into another currently available major.

If an educational institution's objective is to create globally aware healthcare providers that are prepared to care for patients in our increasingly connected world, based on this research, encouraging students to participate in cross-cultural healthcare learning experiences in developing nations may do more than anything else to produce providers that have a truly informed understanding of global health issues.

Given the positive outcomes shown for medical students and physicians in residency training who participate in GHEs and the demonstrated belief by most health science students in this study regarding the importance of global health concepts being integrated into their current bachelors and masters educational programs, perhaps this research can serve as a springboard to promote future research initiatives that can continue to inform higher education planners about what sorts of global health offerings to make available for their students.

Prospective longitudinal studies that follow health science students that did and did not participate in GHEs could be important to determine the impact of these types of curricular and extra-curricular opportunities. Such studies would help to determine whether health science students who participate in GHEs would follow a similar career trajectory as their physician colleagues towards primary care and working with diverse and underserved populations (Bruno et al., 2013; Bussell et al., 2015; DiPrete Brown, 2014; Tuckett & Crompton, 2014). Such outcomes would be highly desirable.

### **CONCLUSION**

This study focused on the students in one college of health sciences at a university in the northeastern region of the USA. Replicating it at other colleges and universities in a broad range of geographic locations would increase the generalizability of the data as the sample size and diversity of the participants would be enlarged. It would also be useful to expand the research beyond the four health science-related academic majors included in this study. It is hoped that such an expansion in the scope of this research can be undertaken in the not-too-distant future.

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**APPENDIX**  
**QUESTIONNAIRE**

- 1) How important do you think it is for people within your academic program to learn about global health concepts?
  1. Not important at all
  2. Minimally important
  3. Neutral
  4. Somewhat Important
  5. Very Important
  
- 2) How important do you think it is that all graduates of a department or college that focuses on the health sciences have the opportunity to participate in global health courses or other international learning experiences?
  1. Not important at all
  2. Minimally important
  3. Neutral
  4. Somewhat Important
  5. Very Important
  
- 3) How important do you think it is that all those who plan to work in medical, health science, or allied health fields have exposure to global health concepts integrated into their education?
  1. Not important at all
  2. Minimally important
  3. Neutral
  4. Somewhat Important
  5. Very Important
  
- 4) How important do you think it is for people who plan to work in medical, health science or allied health careers in the USA to receive education and training regarding infectious diseases such as Ebola, malaria, cholera, typhoid, and others that are predominantly found in places such as Africa, Central America, South America, the Caribbean Islands, etc.?
  1. Not important at all
  2. Minimally important
  3. Neutral
  4. Somewhat Important
  5. Very Important

- 5) How important do you think it is for all those who plan to work in medical, health science, or allied health fields to receive training about how cultural differences between people may impact their access to healthcare or understanding of health issues?
  1. Not important at all
  2. Minimally important
  3. Neutral
  4. Somewhat Important
  5. Very Important
  
- 6) How much interest do you think there would be if your college offered an Introduction to Global Health course?
  1. No interest at all
  2. Minimal interest
  3. Moderate interest
  4. Significant interest
  5. Extensive interest
  
- 7) How much interest do you think there would be if your college offered a Global Health concentration?
  1. No interest at all
  2. Minimal interest
  3. Moderate interest
  4. Significant interest
  5. Extensive interest
  
- 8) How much interest do you think there would be if your college offered a Global Health minor?
  1. No interest at all
  2. Minimal interest
  3. Moderate interest
  4. Significant interest
  5. Extensive interest
  
- 9) How much interest do you think there would be if your college offered a Global Health major?
  1. No interest at all
  2. Minimal interest
  3. Moderate interest
  4. Significant interest
  5. Extensive interest

- 10) How much interest do you think there would be if your college offered a Global Health focused Master's degree?
1. No interest at all
  2. Minimal interest
  3. Moderate interest
  4. Significant interest
  5. Extensive interest
- 11) How much interest do you think there would be if your college offered a Global Health focused PhD?
1. No interest at all
  2. Minimal interest
  3. Moderate interest
  4. Significant interest
  5. Extensive interest
- 12) How much interest do you think there would be if your college offered clinical rotations in other countries?
1. No interest at all
  2. Minimal interest
  3. Moderate interest
  4. Significant interest
  5. Extensive interest
- 13) How much interest do you think there would be if your college offered short term service project trips to developing nations?
1. No interest at all
  2. Minimal interest
  3. Moderate interest
  4. Significant interest
  5. Extensive interest
- 14) How much interest do you think there would be if your college offered international health sciences research opportunities?
1. No interest at all
  2. Minimal interest
  3. Moderate interest
  4. Significant interest
  5. Extensive interest

- 15) How much interest do you think there would be if your college offered a Global Health student club?
1. No interest at all
  2. Minimal interest
  3. Moderate interest
  4. Significant interest
  5. Extensive interest
- 16) How much interest do you think there would be if your college offered students the opportunity to attend a Global Health conference?
1. No interest at all
  2. Minimal interest
  3. Moderate interest
  4. Significant interest
  5. Extensive interest
- 17) How much interest do you think there would be if your college invited guest speakers with expertise in global health issues to do presentations on campus?
1. No interest at all
  2. Minimal interest
  3. Moderate interest
  4. Significant interest
  5. Extensive interest
- 18) How much interest do you think there would be if your college created global health educational experiences where students could work with refugees or other immigrants that live locally, but come from other countries?
1. No interest at all
  2. Minimal interest
  3. Moderate interest
  4. Significant interest
  5. Extensive interest
- 19) At which college / university are you currently enrolled as a student?
- Rochester Institute of Technology
  - *(Several other area colleges and universities with health science and allied health programs were listed but not utilized for this pilot study)*

20) Within which academic program are you enrolled?

- Biomedical Sciences (BS)
- Diagnostic Medical Sonography (BS)
- Nutrition Management (BS)
- Physician Assistant (BS/MS)
- Undecided
- Other (Please list your academic program) \_\_\_\_\_
- *(Several other majors that are found at other area colleges and universities with health science and allied health programs were listed but not utilized for this pilot study)*

21) Please indicate your age.

1. Less than 18
2. 18-19
3. 20-21
4. 22-23
5. 24 or older

22) What is your gender?

1. Female
2. Male
3. Other (please specify \_\_\_\_\_)

23) Within which country were you born?

1. United States
2. Canada
3. Other (please specify \_\_\_\_\_)

24) Do you have international travel experience in a developing nation?

1. Yes
2. No

25) Do you speak more than one language fluently?

1. Yes
2. No