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Assessing Perspectives of a Global Health Area of Concentration Within the PharmD Curriculum

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Comments

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Assessing perspectives of a global health ARCO within the PharmD curriculum

Abstract

Introduction: While global health education in pharmacy expands, limited research has described the outcome of completing a global health area of concentration on career decisions, perceptions on cultural sensitivity, health disparity awareness, and global health competencies among pharmacists and students.

Methods: This mixed methods study enrolled 21 graduates and 17 student pharmacists who participated in a global health concentration at one school of pharmacy in the United States. Data sources included graduate interviews and surveys, student pharmacist focus groups, and global health competency self-assessments.

Results: Five themes emerged among graduates: (1) skills were applicable to diverse settings, (2) early exposure to underserved care prepared graduates for current practice, (3) participation impacted the lens through which graduates viewed careers, (4) participation influenced patient care in current practice, and (5) graduates gained insight on complex global health issues. Three themes were identified among student pharmacists: (1) the program provided opportunities to personalize education, (2) participants gained insight through hands-on experience, and (3) participants developed new perspectives on approaching underserved care. Many graduates (77.4%) currently practiced in an underserved setting. Graduates and fourth professional year students reported improvement in all seven global health competency domains.

Conclusions: A global health concentration in pharmacy curricula can facilitate skills and global health competencies that are applicable across a wide variety of patient care contexts. This concentrated experience provided opportunities to further develop career interests and personalize education, creating a cadre of pharmacists dedicated towards addressing health disparities and serving the underserved.

Keywords: Global health; Experiential education; Underserved; Cultural sensitivity; Health equity.

Conflict of interest: None.

Disclosure(s): None.

Introduction

Global health today highlights entrenched health disparities, worsened and complicated by an increasingly interdependent world. Global health is defined as an interdisciplinary approach to achieving health equity for underserved populations with a population-based and preventive focus at a global scale.¹ Global health not only encompasses healthcare in low- and middle-income countries (LMIC), but also healthcare provided to under-resourced and marginalized populations within high-income countries, including within the United States (US). More academic institutions are incorporating global health into the curriculum.² However, the content of global health education varies widely among pharmacy programs, spanning from topics on comparative health systems, international travel medicine, or health disparities, to international experiences through medical missions or clerkship experiences, to didactic courses linked to global experiences, as well as global topics seminars.³⁻⁸ This may be reflective of the variable roles pharmacists play in global health, which include formulary management and pharmacy operations in limited resource settings, developing partnerships, capacity building, working domestically with vulnerable populations, understanding and addressing disparities through research, quality improvement, patient care, and improving clinical outcomes in LMIC.⁹⁻¹³

Student interest in global health has been growing rapidly.¹⁴ According to a 2014 survey, 64% of US schools of pharmacy offered global experiential education rotations and 47% offered at least one globally focused didactic course.¹⁵ A survey on global health education in pharmacy programs found that 46% of respondents required some global health education.⁴ There is limited research on offering a concentration in global health that allows students to gain in-depth, longitudinal training within the context of pharmacy. With the expansion of global health education, further research on global health in pharmacy curricula is necessary to ensure that the training and education offered adequately prepares pharmacists for their increasingly globalized role. As of yet, no prior research has described the outcome of completing a concentration in global health on pharmacy career choices in addition to perceptions regarding complex global health issues.

The main objective of this study was to describe current and former students' perceptions on the outcome of completing an area of concentration in global health (ARCO-GH) on careers as well as skills in

cultural sensitivity and knowledge of health disparities. Additionally, this study aimed to describe the ARCO-GH through students' pre and post self-assessed achievement of global health competencies.

Methods

Study setting

This school of pharmacy offers several areas of concentration (ARCO) to provide students with the opportunity to personalize their education throughout the doctor of pharmacy (PharmD) curriculum.¹⁶ The ARCO-GH is intended to provide students with in-depth exposure to global health in pharmacy practice, with a focus in building leaders in health equity. Applications for the ARCO-GH are accepted starting from spring of the first professional year (P1) and are open to all interested students. The ARCO-GH requirements consist of six credits of approved elective classroom-based courses, two advanced pharmacy practice experiences (APPEs) related to global health, and a focused scholarly project that is suitable for presentation at a local, national, or global conference conducted under the guidance of an advisor. Global health-focused APPEs include international rotations in LMICs and US-based rotations working in limited resource settings, including Federally Qualified Health Centers, Disproportionate Share Hospitals, Indian Health Service (IHS) sites, Bureau of Prisons sites, outpatient Veterans Affairs sites, psychiatric hospital or behavioral health services sites, Ryan White-funded HIV care centers, 340B contracted pharmacies, and free clinics. Students may complete course and project requirements at any point throughout the PharmD curriculum, however most students complete elective requirements during the third professional year (P3). Additional ongoing requirements include attending monthly global health ARCO meetings and completing a global health competency self-assessment each semester.

Data collection

A mixed methods design was used, which included surveys conducted with ARCO-GH graduates, global health competency self-assessments, eValue (MedHub) reports, semi-structured interviews with graduates, and focus groups with current students enrolled in the ARCO-GH. Graduates were eligible for inclusion if they successfully completed the ARCO-GH with corresponding notation on their official academic transcript. All second (P2) to fourth professional year (P4) student pharmacists who were currently enrolled in the ARCO-GH were eligible for inclusion in focus groups. The university's institutional review board determined this study to be exempt.

The quantitative data included ARCO-GH surveys, global health competency self-assessments, and reports from eValue. The eValue reports included a list of all the APPEs each student completed, which was corroborated by survey data. Demographic information was collected from graduates through surveys. For graduate surveys, three outreach attempts were made to recruit all ARCO-GH graduates telephonically and by email from December 2019 to March 2020. The surveys asked graduates to describe their current practice setting, whether or not they considered their practice setting as “underserved,” whether or not they worked with patients who had limited resources, estimated percent of time spent working with patients with limited resources, APPEs completed that met the ARCO-GH requirements, where they presented their ARCO-GH research poster, and whether or not they would recommend the ARCO-GH to future pharmacy students. Information regarding global health APPE settings was also obtained through eValue reports.

The global health competency self-assessments were adapted from the Global Health Competency Model created by the Association of Schools of Public Health (ASPH).¹⁷ This list of competency statements pre-dated the Consortium of Universities for Global Health (CUGH) competencies, but ultimately are extremely similar. ARCO-GH students rated themselves on a scale of non-readiness = 1 to competence = 5 for 36 competencies that spanned across seven competency domains (capacity strengthening, collaborating and partnering, ethical reasoning and professional practice, health equity and social justice, program management, socio-cultural and political awareness, and strategic analysis). Global health competency self-assessments completed by graduates and current student pharmacists for the P1 spring, P2 fall, P2 spring, P3 fall, P3 spring, P4 fall, as well as P4 spring semesters were analyzed retrospectively.

Qualitative data included interviews with graduates and focus groups with current students. All prior graduates of the ARCO were contacted via email; semi-structured phone interviews were scheduled as participants replied and interviews continued until thematic saturation was achieved (based on group consensus and discussion). An attempt was made to include at least one graduate from each academic year (2014 to 2019). Semi-structured phone interviews were conducted using an interview guide that addressed perceptions regarding the impact of the ARCO-GH on career choices, what graduates felt they learned or gained from the ARCO, perspectives on cultural sensitivity and health disparities, interest in underserved care or global health, and recommendations for improving the ARCO. The primary investigator conducted all interviews, and as a second-year postgraduate resident at the institution, did not have a

relationship with any of the graduates. were currently enrolled in the ARCO-GH at the time of the study. All current students were invited to participate with dates and times selected to accommodate the largest sample. Two focus groups with seven to ten participants per session were planned, with an attempt to include at least one student pharmacist from each academic year (P2 to P4) in each session. The focus group questions addressed reasons for applying for the ARCO-GH, what students learned, what they liked and disliked about the ARCO, the impact of the ARCO on their pharmacy education and future careers, and recommendations for improvement. The focus groups were audio-recorded and transcribed verbatim. The primary investigator conducted both focus groups. A notetaker was present during each to listen and provide a summary of the discussion at the end of the focus group.

Data analysis

Descriptive statistics were used to describe survey response data. Changes in global health competency self-assessments each semester from P1 spring to P4 spring were measured parametrically using unpaired *t* tests¹⁸ with SPSS, version 27 (IBM Corporation). Statistical significance was established if $P < .05$.

Qualitative data analysis was conducted prospectively on interview and focus group transcripts using Microsoft Word, version 16.58 (Microsoft Corporation). All transcripts were de-identified prior to analysis. Two independent coders read and coded all interview and focus group transcripts using open and axial coding. Coders used a consistent codebook that was developed collaboratively. Regular research team meetings were conducted to discuss and resolve coding discrepancies by consensus and a third coder tiebreaker whenever necessary. Interview and focus group transcripts were separately analyzed for prevailing themes using conventional content analysis through iterative categorization.¹⁹

Results

At the time of the study, a total of 43 graduates had completed the ARCO-GH and 27 student pharmacists were actively enrolled. The total number of graduates who successfully completed the ARCO-GH by class year include: Class of 2014 (n = 2), Class of 2015 (n = 9), Class of 2016 (n = 5), Class of 2017 (n = 4), Class of 2018 (n = 12), and Class of 2019 (n = 11).

Graduate survey responses

Of the ARCO-GH graduates, 31 (74%) completed the survey. Information regarding current practice settings is included in Table 1. The three most reported practice settings were ambulatory care (n = 10), community pharmacy (n = 8), and hospital/health-system pharmacy (n = 6). Five graduates reported more than one practice setting (e.g., ambulatory care and academia). Global health APPE setting data was obtained through eValue reports and corroborated by survey data. Almost half (n = 18, 41.8%) of the graduates completed more than the minimally required number of two global health-focused rotations. Consequently, 43 individuals completed a total of 114 global health related APPEs. The most common global health APPEs were located in international settings (25.4%) including Honduras, the Philippines, Namibia, and Malawi, followed by the IHS, free clinics, and behavioral health services. Almost all (90%) survey respondents reported presenting a poster at a professional conference as a student pharmacist, with 8 graduates presenting research at more than one conference. All respondents would recommend the ARCO-GH to future pharmacy students.

Competency self-assessments

Global health competency self-assessment data for P1 spring through P4 spring is provided in Table 2. A mean change between 2 to 3 points on a 5-point scale from P1 spring to P4 spring was observed for all seven global health competency domains, which was statistically significant ($P < .001$). Participants rated themselves between “non-awareness” to “beginning competence” during P1 spring self-assessments, and this increased to between “intermediate competence” to “proficient” for P4 spring self-assessments. The change in overall median self-reported competency for each semester starting from P1 spring until P4 spring is shown in the Figure.

Qualitative interviews with graduates

A total of 21 interviews were conducted with graduates, including at least one graduate from each graduation year. The graduate interviews revealed five main themes; supporting quotes are provided in Table 3.

The first theme revealed that graduates gained skills that were applicable across many practice settings, including skills in cultural sensitivity and knowledge of health disparities. Graduates recognized that underserved communities exist in diverse settings and will be encountered in all fields of practice. Consequently, participants felt the skills gained from the ARCO-GH were widely applicable to different

careers in pharmacy. ARCO participation helped graduates learn how to navigate healthcare resources and communicate in diverse contexts. Furthermore, participants described how the skills gained extended beyond patient care settings. Because graduates gained research experience through completing a required research project, graduates felt better prepared for their post-graduate training.

The second theme displayed that early exposure to underserved care helped prepare graduates for their current careers and practice. Participants described the impact of structured experiences with diverse underserved populations through the ARCO-GH, reflecting that these experiences were not traditionally embedded into the pharmacy curriculum for all students. These experiences enabled them to gain empathy and speak with communities directly early on in their pharmacy training. Specifically, graduates described how they benefitted from more extensive practice with patient interviewing, motivational interviewing, and counseling. This early exposure helped set graduates apart and prepare them for their current careers.

The third theme showed that participation provided a lens through which participants viewed their careers. Participants described how the ARCO-GH helped to guide and solidify career interests. Many graduates felt that participation allowed them to identify specific career choices or provided insight on meaningful qualities they value in an employer. For some graduates, the experiences gained from the ARCO-GH were transformative and shaped their career pursuits.

The fourth theme revealed that participation in the ARCO-GH impacted patient care in current practice and helped them develop the skills to provide culturally sensitive care. Graduates discussed that experience working with diverse patient populations shifted their approach to patient care and how they care for patients in their current practice. Graduates reported realizing the importance of adapting patient care to each individual and collaborating with patients by considering social determinants of health (SDoH) and non-medication aspects to care. Moreover, participants learned to recognize their own biases regarding underserved populations. Recognizing and unlearning their biases helped graduates to see things from their patients' perspectives, which has been beneficial in their current practice.

The fifth theme illustrated that participation in the ARCO-GH impacted perceptions on complex global health issues. Participants expressed that the ARCO provided them with exposure to the realities and complexities of working with underserved populations and the health disparities that exist. Through their experiences, graduates gained a deeper understanding regarding health disparities and became more

aware of the pervasiveness of these disparities and inequities. Graduates also recognized the need to acknowledge the complexities, such as burnout, that may come with working with underserved populations. Graduates specifically described that faculty mentorship supported their ability to tackle these complexities and navigate health disparities. They also gained exposure to the structures of different healthcare systems which provided insight on ways in which the US healthcare system can be improved.

Focus groups with current students

Two focus groups were conducted with seven and ten participants per session, respectively. At least one student from each academic year was present at each focus group. The focus groups with current students revealed three additional themes; supporting quotes are provided in Table 4.

The sixth theme demonstrated that the ARCO-GH provided varied opportunities to personalize education. Participants felt that the ARCO provided opportunities to personalize their pharmacy education due to the flexibility to choose electives, projects, and clinical experiences in areas of interest. Participants describe the role of faculty mentors as encouraging this personalization, enabling students to pursue their career interests and passions. Participants believed that this mentorship and personalization helped prepare them for their career goals. Participants were excited to complete projects for the ARCO-GH and viewed their experiences positively. Additionally, the personalized experience enabled students to further explore different career interests, which prompted some students to change their career or postgraduate plans. The ability to explore interests in greater depth helped students find a way to connect specific passions to pharmacy and seek non-traditional pathways and careers in pharmacy.

The seventh theme presented the finding that students gained in-depth global health insight through hands-on experience. Current students felt that they were able to gain deeper insight from hands-on experiences and that these experiences allowed them to discover their patient care strengths. Participants believed that hands-on experiences through the ARCO-GH offered insight that they could not obtain within the classroom. Some believed that global health in general could not be learned solely in the classroom. Others described gaining a greater understanding of the true meaning of patient advocacy through community work. Participants described their ownership of and active engagement in patient care, which they had not previously experienced prior to the ARCO-GH. Overall, hands-on experiences enabled students to encounter more complex patient care issues including seeing the first-hand impact of health

disparities in their patients, practicing skills in cultural sensitivity, and gaining insight into resource distribution and health access.

The eighth theme displayed that students were able to develop new perspectives on approaching underserved care through their work in the ARCO. Many students reported the importance of applying skills in cultural sensitivity such as considering a person's background, context, and cultural beliefs. Students emphasized that healthcare providers should not make assumptions about their patients and should individualize care to each patient. They felt that flexibility is necessary when approaching people with barriers to health access. Students learned that they should not be afraid to ask questions regarding a patient's background. This perspective was seen as beneficial when working in a healthcare team. Students reported frequently recognizing the impact of SDoH and health disparities in patient cases and simulations. In groupwork settings, this insight introduced new perspectives to their peers.

Discussion

This study described the outcomes and experiences of participating in a global health area of concentration on careers, achieving curricular competencies, acquiring skills, and perceptions within the PharmD program. Although other studies have assessed achievement of global health competencies and skills after completing an international APPE, mission trip, course, or capstone in global health, there is limited research on the career impact of participating in a longitudinal global health curriculum in the field of pharmacy.²⁰⁻²⁸ Many ARCO-GH graduates in our study went on to work in underserved settings. The Health Resources and Services Administration defines "medically underserved" by four distinct parameters (areas with too few primary care providers, high infant mortality, high poverty, or a high elderly population), however, this definition has been debated as it inadequately identifies underserved populations particularly in metropolitan or urban areas.²⁹⁻³¹ Accordingly, the term "underserved" has been used for populations who are vulnerable due to risk factors tied to their position in social structures (e.g., persons in minoritized groups including persons belonging to lesbian, gay, bisexual, transgender, queer, questioning, intersex, asexual, agender and others communities, immigrants and non-English speaking persons, persons with disabilities, incarcerated persons, persons living with HIV, indigenous persons, persons living in racially segregated communities) in addition to health insurance status and/or income level.³² Most ARCO-GH graduates reflected this latter definition when defining their current practice as underserved. Because the ARCO-GH

program requires considerable commitment to global health-related coursework, project work, and experiential education throughout the PharmD curriculum, it is unsurprising that many graduates pursued careers related to global health broadly or underserved populations. ARCO-GH graduates described how participation impacted the lens through which they viewed their careers. The ability to personalize education through the ARCO-GH can enable students to explore and pursue their passions, which ultimately prepared them for their career goals. While participants may not have pursued careers working with international organizations, their work focuses on the goals of global health including addressing health equity in all places.

This study found that participants of the ARCO-GH improved in global health competencies upon completing requirements. Statistically significant growth was found for each of the seven global health competency domains assessed. Prior research by Steeb et al²⁸ assessed the impact of completing an international APPE on global health competencies. While all students had improvement in global health competencies, those who completed an international APPE demonstrated a greater growth than a control group who did not complete an international APPE rotation.²⁸ Steeb et al²⁸ utilized the competency framework developed by the Consortium of Universities for Global Health (CUGH), which differs from the ASPH model³³ used in this study in that the CUGH directly adapted seven domains from the ASPH competency model to create a framework that spans across disciplines and is more interprofessional in focus. The ARCO-GH competencies were created before the CUGH competence framework was published.

The skills gained from completing the ARCO-GH were applicable across diverse practice settings, whether or not the graduate was practicing in a defined underserved setting. The main skills reported in this study, which included research/evaluation skills, navigating patient resources, and communication with diverse populations, are supplemented by existing research. Gourley et al²³ reported that completing an international capstone and APPE had a positive effect on current practice and enabled pharmacists to gain skills they would not have gained otherwise. Survey data from Addo-Atuah et al²⁰ found that second professional year pharmacy students who completed an elective global health course felt more able to design drug-related research projects in resource-limited settings, manage pharmaceuticals in underserved populations, and search literature for relevant global information. Additionally, Steeb et al²⁸ found that

students who completed an international APPE showed improvements in problem-solving with limited resources and communication skills. Our study differs from this prior study because it describes the outcomes of longitudinal global health training and experiences that span across the pharmacy curriculum even before APPEs. Even so, it adds to existing research by demonstrating that these problem-solving and communication skills can be retained after graduation and utilized in expansive practice settings. ARCO-GH graduates reported that early exposure to underserved care helped facilitate skill acquisition and prepared graduates for their current practice and careers.

Both graduates and student pharmacists discussed the ways in which ARCO participation impacted patient care. Graduates reported becoming more adaptable by individualizing patient care and identifying the impact of SDoH. This is also reflected in literature; many student pharmacists who completed a global health elective or international APPE reported increased adaptability and awareness of SDoH and believe this to be a very important topic area in global health.^{20,22,28} On the other hand, student pharmacists in this study discussed gaining new perspectives on providing culturally sensitive care. Although several studies support this finding, a study assessing intercultural competence by Dang et al³⁴ showed no significant difference in cultural competency among student pharmacists who had prior cultural competency training, spoke other languages, or had previously traveled to multiple international countries. Existing literature also showed that limited exposure to cultural competency instruction was not associated with increased cultural competency, highlighting the need for sustained, more intensive cultural competency training in pharmacy curricula.^{24,35,36} As illustrated in this study, potential strategies to strengthen cultural competency training include offering an ARCO-GH or global health-focused APPEs.

ARCO participation impacted perceptions on global health among graduates and students in different ways. Graduates gained insight regarding complex global health issues, such as burnout from working in underserved settings as well as the causes and consequences of health disparities. Student pharmacists reported that hands-on experiences with underserved populations provided exposure to complex scenarios that could not be replicated in the classroom. These hands-on experiences may stimulate profound observations on global health issues. In a similar way, pharmacists who completed experiential education in global health contexts reported gaining a deeper sense of professional identity, a broader worldview of healthcare, and increased awareness of populations who are often hidden from view due to socioeconomic

segregation.^{20,23,37} Early, hands-on exposure to underserved care and global health may prompt deep critical reflection on the complexities of achieving health equity in the US and abroad.

A limitation of this study was that students self-selected to participate in the ARCO-GH. Consequently, this higher baseline interest in global health may have impacted the results of this study. Nonetheless, this study describes the ways in which an area of concentration may provide focused training and experiences for students who are interested in the field. Another limitation is that students can choose to withdraw from the ARCO-GH program at any point during the curriculum. Although this occurred infrequently, it may contribute to the finding that most ARCO graduates went on to work in underserved settings. However, literature in other health professions demonstrates that global health experiences during training can impact career choice.^{25,38} Additionally, the global health competencies were measured by self-assessment, which may introduce bias. Furthermore, there were no comparison groups for these self-assessments; consequently, the change in global health competency cannot be attributed to participation in the ARCO alone. However, a recent study by Steeb et al²⁸ showed that those who completed an international APPE experienced a greater change in global health competency than those who did not. Lastly, the ARCO-GH curriculum is highly individualized to each participant. This allows for personalization of the learning experience, which is considered a beneficial facet of the program, but also creates highly variable experiences and may subsequently impact outcomes.

Conclusions

Graduates and current student pharmacists demonstrated that a global health concentration in pharmacy curriculum can facilitate the acquisition of valuable skills and global health competencies that are applicable across a wide variety of patient care contexts. These concentrated experiences provided unique opportunities for pharmacists to further develop their career interests and personalize their education, creating a cadre of pharmacists dedicated towards addressing health disparities and serving the underserved.

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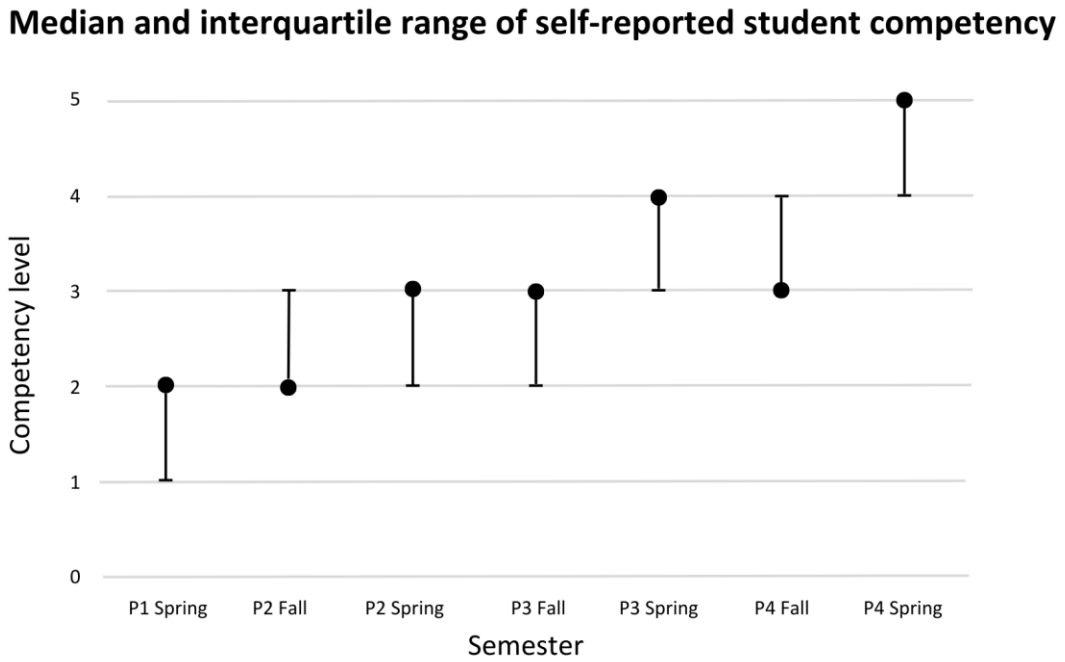
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Fig. Median and interquartile range of self-reported student competency.



P1 = professional year one; P2 = professional year two; P3 = professional year three; P4 = professional year four.

Table 1 Responses of PharmD graduates to items on a survey after completing an area of concentration in global health.

Survey Item	n (%) unless noted
Current practice setting (n = 31 graduates)	
Ambulatory care	10 (32.3)
Community pharmacy	8 (25.8)
Hospital/Health-System	6 (19.4)
Federal government (Corrections/prison, IHS, VA)	5 (16.1)
Academia	4 (12.9)
Non-pharmacy related	2 (6.5)
Nursing home/LTC	1 (3.2)
Pharmacy Resident	9 (29)
Working in underserved setting (n = 31 graduates)	24 (77.4)
Working with patients with limited resources (n = 31 graduates)	25 (80.6)
Percent time spent working with underserved, mean \pm SD	54.4 \pm 33.5
Global health APPEs (n = 114 rotations)	
International rotations	29 (25.4)
Honduras	16 (14)
Philippines	7 (6.1)
Namibia	4 (3.5)
Malawi	2 (1.8)
Indian Health Service	27 (23.7)
Free clinic	18 (15.8)
Behavioral health	10 (8.8)
Federally qualified health center	8 (7)
HIV clinic	7 (6.1)
Ambulatory care – other	7 (6.1)
Veterans Affairs – outpatient	3 (2.6)
Public health department	3 (2.6)
Federal correction center	2 (1.8)
Poster presentation - type of conference (n = 28 graduates)	
National	19 (48.7)
Local	10 (25.6)
Regional	6 (15.4)
Global	4 (10.2)

APPE = advanced pharmacy practice experience; IHS = Indian Health Service; LTC = long term care; PharmD = doctor of pharmacy; VA = Veteran's Administration.

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Table 2 Student self-competency^a by domain over time.

Domain	P1 spring n = 21 (mean ± SD)	P2 fall n = 25 (mean ± SD)	P2 spring n = 43 (mean ± SD)	P3 fall n = 35 (mean ± SD)	P3 spring n = 49 (mean ± SD)	P4 fall n = 27 (mean ± SD)	P4 spring n = 28 (mean ± SD)
Capacity Strengthening	1.8 ± 0.6	2.1 ± 0.8	2.5 ± 0.8	2.7 ± 0.8	3.5 ± 0.6	3.3 ± 0.8	4.4 ± 0.6
Collaborating and Partnering	2.4 ± 0.8	2.4 ± 0.8	2.8 ± 0.9	3.1 ± 1.0	3.7 ± 0.8	3.5 ± 0.9	4.4 ± 0.7
Ethical Reasoning and Professional Practice	1.9 ± 0.7	2.1 ± 0.7	2.5 ± 0.8	2.7 ± 0.8	3.4 ± 0.7	3.3 ± 0.9	4.3 ± 0.7
Health Equity and Social Justice	2.0 ± 0.6	2.2 ± 0.8	2.6 ± 0.9	2.9 ± 0.8	3.6 ± 0.7	3.5 ± 0.8	4.5 ± 0.6
Program Management	1.9 ± 0.6	2.1 ± 0.8	2.6 ± 0.9	2.8 ± 0.9	3.5 ± 0.8	3.4 ± 0.9	4.4 ± 0.7
Socio-cultural and Political Awareness	2.1 ± 0.7	2.0 ± 0.9	2.5 ± 0.8	2.9 ± 0.8	3.5 ± 0.7	3.4 ± 0.7	4.4 ± 0.7
Strategic Analysis	2.0 ± 0.6	2.0 ± 0.9	2.5 ± 0.8	2.9 ± 0.9	3.6 ± 0.7	3.5 ± 0.7	4.5 ± 0.6

P1 = professional year one; P2 = professional year two; P3 = professional year three; P4 = professional year four.

^a Competency was rated on a 5-point scale where 1 = non-awareness, 2 = awareness, 3 = beginning competence, 4 = intermediate competence, and 5 = proficient.

Table 3 Themes of graduate interviews.

Theme	Illustrative quotes
Gained skills that were applicable to wide practice settings	“The [global health area of concentration] ultimately is what I chose to pursue because I knew it would be integrated no matter what I chose. There are patients with limited resources in any place that you go. I think that is very important and something everyone will deal with at some point in their career [regardless] if it’s in community pharmacy or inpatient. I think the [global health area of concentration] has something to afford to any student and it provides a lot of important skills that can be incorporated into any area they choose. That is something I loved and valued.” Graduate 16
Early exposure to underserved care helped prepare graduates for current practice	“The [global health area of concentration] experiences I had really provided my first and really only structured experience as a student pharmacist with communities who were underserved. I also realized there were health disparities not only globally but within the city. The [global health area of concentration] really provided an opportunity to engage with underserved communities and to listen to what community members are saying rather than having this higher-level awareness. It actually provided direct opportunities to interact with communities that are marginalized. So I think it offered that firsthand experience and importantly, it was structured. It wasn’t just like I was seeking an independent volunteer opportunity but rather it was structured in a way that reflection was encouraged. There were opportunities to talk about what I had witnessed and how I was processing it.” Graduate 4 “I would say being able to make those personal connections with patients and identifying specific areas, whether it’s financial, housing, food, or social issues, that might be affecting their care. I find that I am more able to identify potential areas that the patient might be having difficulty in. Specifically, due to the experience that I saw as a student...being able to recognize the signs and symptoms that the patient might be having issues. I think it just made an empathetic provider as well.” Graduate 2
Provided a lens through which participants viewed their careers	“I came from a middle class family in a small town. It was really easy for me to never experience these things. I never experienced these hardships. Opening my eyes to that was really important in helping me understand why what we do for these underserved communities is so important, and I think that sort of created the foundation for me and seeking out these opportunities in underserved communities.” Graduate 11
Impacted patient care in current practice	“I remember we were having a conversation about how lack of education and how health literacy impacts health outcomes. I think the discussion was around how sometimes providing a way for individuals to have a formal education, even though that’s not directly providing medical care, the impacts of that on health outcomes. Just being able to have a change of perspective that...yes, I’m a pharmacist and I’m a pharmacy student, but it’s also important that I’m thinking about all of these different structural components that are at times more important than their specific medications. I think those similar concepts have weaved throughout my career.” Graduate 1
Impacted perceptions on complex global health issues	“It’s easy to say “I want to help underserved people”, but not experiencing how difficult it is doesn’t allow you to fully understand what taking care of an underserved population is [like]. Whether that’s burn out, it can be difficult on a person to work with underserved patients every day. You really need to understand that before jumping in, and the [global health area of concentration] definitely helped me do that. To talk to mentors who have worked in that setting for all those years and how they are not only able to take care of patients but themselves also. Learning the whole scope of it. If I had never worked with underserved populations, it would be really difficult for me to do what I’m doing now.” Graduate 19

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	<p>"I remember [a faculty mentor] sat me down and she was like, "I just want you to know that when you go to Malawi, you're going to see some things that are going to upset you, but just remember that you're not there to fix things, you're just there to observe and learn." And I didn't really understand what she meant, but then when I went to Malawi and we spent the first day at the clinic, we got to spend time with people who work there and speak to them about their experience and things. And I just remember I came home and I was so sad. But then I remembered what [the faculty mentor] said. I think that experience really helped me to see that it's not our job to fix people and make them "the American way," or think that our way is better than anyone else's." Graduate 12</p>
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Table 4 Themes of student focus groups.

Theme	Illustrative quotes
Provided varied opportunities to personalize education	<p>“The people that are the most rewarding to help and really need your help are the people who are of the underserved community. The [global health area of concentration] offers you so many opportunities, you have a whole list of projects you can pick from. And you’re basically your own boss when it comes to how the project is run and how you work with the clinic to help them give the results that they need. That was something really appealing.” Student 1</p> <p>“I feel like it’s opened so many doors because I now realize that there is a field that I could go into and work with the Spanish population, which I thought wasn’t really possible with pharmacy because I had the standard mainstream view of it where you’re either in a CVS or you’re in a hospital and that’s where I thought it ended. So that’s what the [global health area of concentration] offered me, it was just an opportunity to make pharmacy what I wanted it to be and work with [patients] I wanted to work with” Student 4</p>
Gained in-depth global health insight through hands-on experience	<p>“I came here with a different childhood background so working with these patient populations has challenged a lot of biases that I grew up with. Obviously, they had started to change earlier or else I wouldn’t be working in this patient population but we all have biases...we still all hold a lot of those biases. Directly working with patients, that’s another thing, we all are given the chance to actually take care of patients. I feel like that’s something a lot of other students can’t say, it’s that we actually get to manage patients and take care of them. I’ve had instances where I’ve said something to a patient and I’m like, ‘Oh, maybe I shouldn’t have said that.’ You learn from those things. I’ve learned that a lot of my biases aren’t true and it’s gotten me to both consciously and subconsciously work with those biases and see, ‘Hey, how can we look at this better? How can we treat other people better?’” Student 5</p> <p>“I didn’t have much experience with disparity, and just being from a suburban area, everyone was very one-note. There wasn’t much that I knew about how different policies within the government or just the nature of our field, the impact, so it is beyond just being eye opening. It has taught me a lot of skills on how to navigate the system to help people in situations that the system doesn’t really favor.” Student 3</p>
Developed new perspectives on approaching underserved care	<p>“My favorite part is just the change of mindset. So coming in, I always wanted to do medical service trips throughout my future career. I always saw that as going somewhere two weeks at a time. But really through the mentorship that I got through this and the education, understanding that that’s not a great model and that you’re really just serving yourself when you’re doing short-term trips because people in other countries, they have the capabilities to provide healthcare for themselves and it’s more so of being an ally and helping with resources and developing long term relationships. So, it’s helped change how I view my future career” Student 8</p> <p>“I think throughout P4 rotations, there have been a lot of times where I am able to bring a perspective to a team because I am thinking about all the different social determinants of health and all this other stuff that just gets forgotten a lot. I think what we learn in the [global health area of concentration] is so applicable no matter where we end up working, which is really awesome.” Student 9</p>

P4 = fourth professional year.